



**Barriers to public engagement with climate change
and the contribution of information sources: An
investigation from a climate-vulnerable area of
Vietnam**

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ABSTRACT

Context: Since anthropogenic climate change (CC) came into public discourse in 1980s, there has been a rich body of research into the impact of different sources of CC information and knowledge on public engagement. However, these studies have predominantly done in developed countries, where academic research into this topic have relatively saturated. In developing countries like Vietnam, where people are suffering from stronger daily impacts of CC, research on the relationship between CC communication and engagement, especially from the recipients' perspectives, is sorely needed.

Aims: This study has two primary aims. First, it investigates how Vietnamese people engage with CC socio-economically, politically and socially, in order to deeply understand both individual and structural barriers to such engagement. Second, it examines how Vietnamese receive and perceive the impacts of various sources of CC information – including government, the media, scientists, NGOs, business and lay people – on their engagement with CC issues.

Theoretical framework: To achieve its aims, the research first relies on the theory of public CC engagement to examine how people think, feel and act toward CC issues at social and individual levels, from political, socio-economic and moral perspectives. It revolves around the multi-faced engagement, namely low-carbon consumption, low-carbon working, low-carbon citizenship and low-carbon championship. Secondly, to examine sources of CC information and their impacts on public engagement, the research looks to the concept of media structure (institutions and outputs) affecting habitual media use patterns of audiences. In this research, the institution refers to various sources of CC information while output entails the characteristics of their produced content.

Methods: Qualitative in-depth interview method was employed. By using both generic purposive and snowball samplings, a total number of 47 participants in the Mekong Delta of Vietnam, one of the world's most CC-vulnerable regions,

were interviewed. These were selected across different genders, ages, locations, education levels, types of farming activities, to ensure sample heterogeneity and to reach data saturation for the research. Thematic analysis and interpretation using deductive and inductive approaches were implemented.

Findings: There is a substantial difference in socio-economic, political and moral engagement with CC between rural and urban participants. While both groups share some misunderstandings about CC causes, rural participants feel more severely affected and express greater concern about the future impacts of CC on their livelihoods. They also show more resilience and efforts in behavioural responses toward CC adaptation. Despite these efforts, various individual barriers (lack of resources, climate-unfriendly habits, indifference, responsibility denial) and structural barriers (limited policies, infrastructure, socio-economic fragility) impede an effective engagement. Among those, structural barriers are felt more by rural participants in their adaptation efforts.

With regards to the perceived impacts of CC information on their engagement, five official sources of CC information – namely mainstream media, government, NGOs, businesses, and scientists – are found to have different levels of influences. Overall, these official information sources fail to facilitate a meaningful CC engagement from the public due to several limitations, such as shallow and short-live content, irrelevant and exaggerated presentation, benefit-driven communication practices and information with limited efficiency in time, space and functioning cost. In acknowledging these official information sources, differences and similarities between urban and rural participants are also identified. While urban participants show less serious engagement with the information, rural participants deliberate more on the information and use it selectively for CC adaptation not just for themselves but for future generations.

Failing to obtain useful climate information and knowledge from formal sources, participants turn largely to informal sources of lay expertise (i.e. CC knowledge

and information gained from family, friends and neighbours, and/or from self-experiences in working and direct climate contact) to support their CC adaptation. The exchange of lay expertise is stronger among rural participants. However, by solely using this type of *information and knowledge in cultivation*, most rural participants remain unable to effectively adapt their farming works to CC, due to the information's low credibility and efficiency. Following this, the data shows that the integration of lay and scientific knowledge is found to be the most effective way to adapt to the changing climate.

Conclusion: From the results, the research suggests more appropriate communication approaches to enhance public engagement with special attention to various social and cultural context, especially for urban residents in Vietnam, such as taking advantage of the influential role of government and direct communication of other sources in transmitting CC information to the public. It also calls for more research on each source to substantially improve the quality of CC communication to better engage the public in Vietnam. More importantly, the research demonstrates how lay knowledge might be integrated with scientific expertise for effective CC engagement in the particular climate context of Vietnam and beyond, highlighting the need for more research into this integration to help those living in the most CC-vulnerable areas in their adaption endeavours.

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Chapter 1. Introduction

This chapter sets out the essential elements of the study by presenting its background, rationale, objectives, and theoretical underpinnings. It also offers an overview of the research methods, key findings, and main contributions, while outlining the overall structure of the study.

1.1. Public engagement in climate change

CC has evolved into one of the most consequential challenges facing humanity, cutting across geographic, socio-economic, and cultural boundaries. It encompasses a broad set of phenomena, including rising global temperatures, extreme weather events, melting ice caps, and shifts in ecosystems, that collectively pose significant threats to human livelihoods and natural environments (Ayanlade et al. 2023). These challenges necessitate urgent, decisive, and sustained interventions from governments, international bodies, civil society organizations, and individuals. Yet, while policymakers can issue climate frameworks and regulations, the success of any climate initiative ultimately hinges on the engagement, understanding, and commitment of the global public. Public engagement, therefore, forms the bedrock upon which long-term societal resilience to CC can be built (Lorenzoni et al. 2007; Whitmarsh et al. 2013).

Significant research has highlighted the rising level of public concern about CC worldwide. Studies have indicated that an increasing number of people accept the scientific consensus that CC is largely human induced (Van der Linden et al. 2015; Tyson and Kennedy 2020; Leiserowitz et al. 2021). Indeed, Pidgeon found mounting concerns and a growing demand for urgent measures to limit CC's consequences (Pidgeon 2012). This phenomenon is not restricted to highly industrialized nations; many developing countries in Latin America and Asia also report a surge in public concern. Brazil, Mexico, and Chile, for instance,

demonstrate high levels of worry over CC, with Brazilians ranking among the most vocal in demanding immediate action (Leiserowitz et al. 2020; Spektor et al. 2023). In Africa, communities are increasingly aware of changing environmental conditions that directly impact agriculture, food security, and local economies (Deane 2009; UNEP 2021; Ayanlade et al. 2023). Farmers in sub-Saharan Africa, for example, speak of shifting rainfall patterns and severe droughts that damage crops and exacerbate food insecurity. This increasing CC awareness on global scale is an important foundation for global climate cooperation, as climate-friendly policies attain higher chance to be accepted by the public.

However, public engagement with CC extends far beyond merely acknowledging scientific facts. Research on behavioural responses has uncovered diverse ways that individuals and communities can do in their daily routines and other socio-political activities (Steg and Vlek 2009; Whitmarsh et al. 2011). Such actions are like reducing reliance on single-use plastics, altering their food and energy consumption patterns, supporting renewable energy solutions, and collaborating in grassroots environmental organizations (Dietz et al. 2009; Ayanlade et al. 2023). Behavioural engagement is often deeply intertwined with broader societal structures, as illustrated by active participation in local decision-making processes, policy advocacy, and civic endeavours that push for more robust environmental regulations (Amel et al. 2017).

Despite this increasing momentum, it is also clear that formidable barriers remain to limit the capacity of many individuals to become effectively and consistently involved in CC mitigation or adaptation. These challenges include socio-economic inequalities restricting access to green technologies, knowledge deficits about local-level impacts or solutions, and deep-seated psychological hurdles such as cognitive dissonance and apathy. For instance, individuals may feel overwhelmed by the scale of the problem, leading to a sense of helplessness or disengagement (Kollmuss and Agyeman 2002; Hibberd and Nguyen 2013a;

Hibberd and Nguyen 2013b; Stoll-Kleemann and O’Riordan 2020). Further, the structural barriers also inhibit the engagement, which can range from inadequate policy frameworks and limited government accountability to weak enforcement mechanisms and insufficient economic incentives.

Addressing CC is undeniably a global endeavour. No single nation, no matter how technologically advanced or financially secured, can independently reverse the complex processes driving global warming. Effective climate action requires international collaboration, spurred and sustained by a well-informed, motivated and engaged global population. Yet, a critical gap persists in the scholarship surrounding CC engagement: while a substantial body of research has emerged from North America, Europe, and Australia, studies of populations in the Global South remain comparatively sparse. This imbalance is problematic because regions in the Global South – including large swaths of Africa, Asia, and Latin America – often bear the brunt of CC impacts. Sea-level rise in small island nations, extended droughts in sub-Saharan Africa, and intensifying cyclones in parts of Southeast Asia exemplify how the vulnerability of these regions can surpass that of wealthier nations.

Addressing this research gap is urgently needed because many recommendations derived from studies conducted in developed nations may not work in the contexts of developing countries. Approaches such as incentivizing electric vehicle adoption, for instance, might be of limited value in regions where infrastructure for charging stations is non-existent, or where the cost of clean energy technology is significantly high for most residents (Sovacool et al. 2019). Socio-economic and cultural contexts significantly shape how individuals perceive climate risks, respond to climate policies, or engage with local or international climate movements. For example, indigenous communities reliant on traditional agricultural practices in remote areas of Southeast Asia or sub-Saharan Africa may have different approaches to climate stewardship and conservation that do not

align with standardized Western approaches. The negligence of the distinct social, cultural, and political realities of these regions can lead to interventions that are ineffective, disregarded, or even disruptive to local ways of life. Another dimension often overlooked by conventional studies is barriers to CC engagement in Global South countries. These barriers are critical and restrict a meaningful public engagement, as their residents may lack the institutional support needed to adopt low-carbon lifestyles or undertake community-based measure. Their economic constraints often undermine their feasibility of adopting green technologies. However, these barriers receive limited attention from academic research for developing countries.

In light of these scholarly challenges, this research aims to offer a thorough and comprehensive analysis of CC engagement in the context of developing countries, using Vietnam as the research setting. In doing so, this research employs the theoretical framework of public engagement as a multifaceted concept involving cognitive, emotional, and behavioural components. By employing this theoretical approach, this research helps to obtain a clear-cut understanding of public engagement in three dimensions: socio-economical, political and moral. The socio-economic dimension probes how people develop their awareness and knowledge, such as the scientific underpinnings of CC, its causes, and its observable and projected consequences. It also refers to the integration of sustainability into daily decisions, from recycling, reducing energy consumption, or purchasing environmentally friendly products to participating in climate movements and organizations. On the political dimension, it investigates people's attitude and action for climate-oriented policies, including their willingness to support leaders who prioritize environmental issues, as well as their advocacy for systematic and structural regulatory on CC issues. Lastly, the moral dimension underscores the ethical elements – justice, responsibility, intergenerational equity – that drive individuals' concerns and actions around CC. Additionally, the investigation into multi-faceted public engagement offers a more comprehensive

understanding of challenges at both individual and structural levels to such engagement. Placing the research in Vietnamese context, it asks:

RQ1. How do Vietnamese engage with CC issues?

RQ1a. To what extent Vietnamese people engage with CC socio-economically, politically and morally?

RQ1b. What are the individual and structural barriers to CC engagement?

1.2. CC information sources and climate change engagement

Efforts to address CC and bolster public engagement are affected by an array of complex factors, ranging from individual attitudes and behaviors to institutional structures and cultural norms. Among those is the role of information sources. In fact, CC represents a highly complicated global issue, featuring causes and consequences that often extend far beyond most people's immediate lived experiences. Many individuals do not directly observe melting ice caps, intensifying heatwaves, or rising sea levels in their day-to-day life. Instead, they frequently rely on diverse channels of information, such as media outlets, government announcements, scientific reports, and community networks, to make sense of the evolving climate landscape. The cumulative effect of these information sources shapes public knowledge, perceptions, and ultimately, the willingness to act.

In this context, the channels through which CC information is disseminated becomes critically important. Research has consistently demonstrated that effective communication of CC information can significantly influence public engagement, promoting both awareness and action. The credible, accessible, and personally relevant information is more likely to internalize the urgency of CC and foster the adoption of mitigative and adaptive behaviors. Conversely, misinformation, information overload, and poorly contextualized messaging may lead to confusion, skepticism, and disengagement. Thus, the way climate

information is framed, communicated, and perceived plays a decisive role in determining the public's capacity and willingness to meaningfully engage with climate issues (Anderson 2017b).

Much research has been done in this area, but most is focused on mainstream media (i.e. television, radio, newspapers, and digital platforms), which have long been recognized as a key intermediary between climate experts, policymakers, and the public. Carvalho underscores the media's importance by describing it as an "important agent in the production, reproduction, and transformation of the meaning of climate change" (Carvalho 2008, p.172). Media outlets communicate scientific findings, policy decisions, and societal CC actions in ways that either promote or hinder public understanding and engagement. Empirical studies from developed nations repeatedly demonstrate that exposure to climate-related media coverage can strongly influence individuals' attitudes and behaviors towards CC (Arlt et al. 2011; McCright and Dunlap 2011b; Brüggemann and Engesser 2017; Schäfer and Painter 2021). Media exposure often serves as the primary conduit through which the public learns about climate science, policy developments, and environmental threats (Buys et al. 2014; Schäfer and Painter 2021). Furthermore, recent scholarship underscores that frequent, accurate, and contextually relevant climate coverage not only increases awareness but can also stimulate proactive measures such as participation in climate activism, adoption of sustainable lifestyle practices, and support for climate policy initiatives (Maibach et al. 2023).

Substantial evidence points to a strong link between media use and public engagement in CC. However, contemporary research shows a significant diversification of CC communication sources and channels. As Moser notes, numerous stakeholders – beyond the realm of conventional media – are increasingly attempting to reach a broader audience by harnessing multiple forums, communicative channels and approaches (Moser 2010). Governments, scientific institutions, non-governmental organizations (NGOs), business, and

community networks each bring distinctive messaging strategies into the public domain. Governments release official statements, policy briefs, or public service announcements, aiming to build citizen support for specific climate policies and initiatives (Boykoff and Yulsman 2013). Scientists and academic institutions deliver seminars, write scholarly articles, or collaborate with other partners to disseminate findings to wider audiences. NGOs often rely on advocacy movements and awareness campaigns, whereas private businesses might launch marketing efforts that spotlight their environmental credentials, sometimes to promote green products or services (Anderson 2017b).

In parallel, informal sources of information, including local opinion leaders, religious figures, community-based groups and other closed networks, serve as important conduits for localized knowledge, especially in rural or low-income areas. Such forms of knowledge are often experiential, grounded in direct interactions with the climate. For example, farmers who have personally observed shifts in planting and harvesting cycles can convey context-specific insights that supplement, or even challenge, scientific knowledge. These informal sources foster a sense of ownership and immediacy, which can be pivotal for facilitating adaptation strategies at the local level. The convergence of formal and informal sources thus generates a dynamic ecosystem of climate communication, offering a variety of voices that can empower those seeking to comprehend the complexity of CC (Marx et al. 2007; Weber and Stern 2011; Nakashima et al. 2012).

Despite this increasing plurality in CC information sources, there is insufficient research into the roles, functions and impacts of non-media sources on CC engagement. Further, this body of research suffers from a similar problem as research into public CC engagement: it is much centred on Global North contexts. Nations in North America, Western Europe, and Australia have received disproportionate scholarly attention, while countries in the Global South remain understudied. Furthermore, certain populations in marginalized groups,

indigenous communities, or remote rural areas, are frequently excluded or sidelined from mainstream research on CC information (Maldonado et al. 2015; Whyte 2017). As a result, the ways these populations access and process various CC information remain insufficiently understood. Even when studies do exist, they seldomly take into account indigenous knowledge systems or local community networks that can profoundly shape climate discourses, thus, critical gaps remain in the literature.

These gaps underscore the importance of expanding research on information sources in the Global South, asking for more geographical and demographic investigation into how CC information is conveyed and perceived. The interplay between formal channels, such as government-led or scientific institutions, and informal networks, such as community leaders and other closed networks, are particularly essential in shaping public climate perceptions and prompting collective actions. This study seeks to fill some of these gaps by examining how people receive, evaluate, and act upon CC information in their daily lives. Placing within Vietnamese context, it both aligns with past research on CC information in Northern countries and brings much-needed attention to underexplored contexts. The research asks:

RQ2. What are the perceived impacts of CC information sources on public CC engagement in Vietnam?

RQ2a. To what extent and in which ways do formal information sources affect CC engagement?

RQ2b. To what extent and in which ways do informal information sources affect CC engagement?

1.3. Vietnam as the research site

Vietnam's selection as the research site is informed by its uniquely socio-economic and climatic context. Vietnam's rapid economic growth has brought

significant improvements in living standards, but it has also exacerbated environmental degradation. The country's reliance on carbon-intensive industries, such as coal-fired power plants and large-scale agriculture, contributes significantly to its greenhouse gas emissions (MONRE 2020). At the same time, according to the World Bank, it ranked among the top five most CC-vulnerable nations globally. Vietnam's geographical features amplify its susceptibility to climate impacts. With a coastline stretching over 3,000 kilometres and low-lying deltas that support the livelihoods of millions of people, the country is particularly vulnerable to sea-level rise, storm surges, frequent flooding and saltwater intrusion. These phenomena directly threaten the livelihoods, food security, freshwater availability, and economic stability of millions, particularly in rural areas dependent on agriculture and aquaculture.

Therefore, it is critical to investigate the Vietnamese public's CC engagement to understand whether people have been applying measures to reduce GHGs emission, adapt to the change in climate, and especially the challenges in implementing those measures. Yet scholars stationed in Vietnam have paid very little attention to this topic. Specifically, Vietnamese researchers criticize the shortage of CC understanding in the public, but did not identify the information sources that the public can use to tackle this lack of understanding (Pham and Nash 2017; Tung et al. 2024). Indeed, during my detailed literature review, I found no comprehensive research into the relationship between the Vietnamese public's CC engagement with their perception of CC information from different sources. The limited body of research has only provided superficial information about their communication activities, without further analysis on what impacts they have on public engagement (IMHEN 2013).

Another critical point is that the limited body of research on CC engagement and information in Vietnam often focus on government and other institutional perspectives, overlooking the voices of the general public and the impacts of lay

expertise on CC engagement. By choosing the Mekong Delta – the “rice bowl” of Vietnam, this research aims to shed light on how Vietnamese residents utilize lay expertise to cope with the grave climate challenges that have disrupted agricultural productivity, affecting the livelihoods of millions.

Further, in doing the above, this research represents a significant effort to address the aforementioned gaps in the global research literature on the relationship between CC information sources and public engagement. It contributes a more nuanced understanding of CC engagement and communication within the socio-political and cultural specificities of a developing country.

1.4. Summary of methods, findings and contributions

To answer the above questions, this research employs qualitative in-depth interview with two sampling methods: purposive and snowball sampling to ensure the diverse and comprehensive selection of participants. In total, 47 in-depth interviews were conducted, including 33 rural participants, 10 urban participants and 4 climate specialists. These participants were selected with relevant to the research questions and with diversity in age, geographic location, education, type of cultivation and roughly gender balance. This diversity enhances the depth and richness of the data collected, and ultimately contributes to more valuable and comprehensive findings. The data collected is then analysed with deductive and inductive thematic analysis, which both facilitating the (re)examination of existing literature, both empirical and non-empirical; as well as allowing new insights and themes to naturally emerge from the data. It helps me to understand various aspects of public CC engagement and information in Vietnamese context.

By using in-depth interview method and thematic analysis, the research is able to produce valuable results. There is a substantial gap in socio-economic, political and moral engagement with CC between rural and urban participants. While both groups share some misunderstandings about CC causes, rural participants feel more severely affected and express greater concern about the future impacts of

CC on their livelihoods. They also show more resilience and efforts in behavioural responses toward CC adaptation. Despite these efforts, various individual barriers (lack of resources, climate-unfriendly habits, indifference, responsibility denial) and structural barriers (limited policies, infrastructure, socio-economic fragility) impede an effective engagement. Among those, structural barriers are felt more by rural participants in their adaptation efforts.

With regards to the perceived impacts of CC information on their engagement, five formal sources of CC information – namely government, mainstream media, NGOs, businesses, and scientists – are found to have different levels of influences. Overall, these official information sources fail to facilitate a meaningful CC engagement from the public due to several limitations, such as shallow and short-live content, irrelevant and exaggerated presentation, benefit-driven communication practices and information with limited efficiency in time, space and functioning cost. In acknowledging these official information sources, differences and similarities between urban and rural participants are also identified. While urban participants show less serious engagement with the information, rural participants deliberate their perception more on the information and use it selectively for CC adaptation not just for themselves but for future generations.

Failing to obtain useful climate information and knowledge from formal sources, participants turn largely to informal sources of lay expertise (i.e. CC knowledge and information gained from family, friends and neighbours, and/or from self-experiences in working and direct climate contact) to support their CC adaptation. The exchange of lay expertise is stronger among rural participants. However, by solely using this type of information and knowledge in cultivation, most rural participants remain unable to effectively adapt their farming works to CC, due to the information's low credibility and efficiency. The data, however, show many

instances where the integration of lay and scientific knowledge proved to be very effective for people to adapt to the changing climate.

By answering the two research questions, this study highlights the unique challenges and opportunities associated with CC engagement and communication in highly climate vulnerable developing parts of the world. The findings are expected to inform scholars, scientists, media practitioners, policymakers, and community organizations in designing more effective communication strategies that foster meaningful engagement of the Vietnamese public and enhance its adaptive capacity. The research also suggests more appropriate communication approaches to enhance public engagement with special attention to various social and cultural context, especially for urban residents in Vietnam, such as taking advantage of the influential role of government and direct communication of other sources in transmitting CC information to the public. It calls for more research on each source to substantially improve the quality of CC communication to better engage the public in Vietnam and beyond. Not less importantly, the research demonstrates how lay knowledge might be integrated with scientific expertise for effective CC engagement in the particular climate context of Vietnam and beyond, highlighting the need for more research into this integration to help those living in the most CC-vulnerable areas in their adaption endeavours.

1.5. Chapter outline

Chapter 1 sets agenda for this research by providing information about its background, motivation, goals, and theoretical framework. It further summarizes the methodology, findings, and contributions.

Chapter 2 reviews the existing literature on public CC engagement and information sources. The review of other research works help to establish a comprehensive theoretical framework on the research's topic. It also allows the identification of the research gap in developing countries that this research can fill

in. More importantly, the clear understanding of existing literature guides the process of data collection, analysis and discussion.

Chapter 3 elaborates intensively the research's method selection which is qualitative in-depth interview. It examines the underlying rationale for choosing this method, recruiting participants and research sites to ensure a sufficient collection of data. Crucially, the chapter discusses step-by-step thematic analysis to extract valuable findings from the data. Finally, the chapter states the challenges, limitations and ethical considerations of the chosen method and ways to overcome these barriers to ensure the research validity, credibility and reliability.

Chapter 4 is the first finding chapter, answering the research question 1. It shows the analysed results about public CC engagement socio-economically, politically and morally. From there, it discusses the understanding about perceived individual and structural barriers to the engagement.

Chapter 5 is the second finding chapter, revolving around CC information sources and their impacts. It examines how people receive and appreciate the information from different sources. Following that, the chapter analyses how this reception and appreciation affect people's subsequent CC engagement.

Chapter 6 is the continued chapter on CC information sources. It devotes the entire content to lay CC expertise and its impact on engagement. Further, the chapter explores the combination of lay expertise and scientific knowledge to foster CC adaptation. The findings presented in this chapter and chapter 5 aim at answering the research question 2.

Chapter 7 is the discussion chapter, which aims at discussing the most noteworthy and intriguing findings and reflecting them with the research's goals and other relevant literature. This chapter also provides further discussion and implication for the particular context in Vietnam.

Chapter 8 is the conclusion of this research. It summarizes the key points in methodology, findings and discussion. From there, it points out the limitation of the research empirically and academically. In doing so, it lays out suggestions for future research. It also provides some recommendations for various social stakeholders in further fostering public CC engagement and effectively communicating their climate messages to the public.

Chapter 2. Literature Review

This chapter reviews the existing literature on public CC engagement and its relationship to information sources. It is categorized into various themes according to the theoretical and conceptual frameworks of public CC engagement and CC information sources. The chapter identifies the knowledge gap that this research attempts to bridge. More importantly, this literature review provides a framework to guide the data collection, analysis and discussion of this work.

2.1. Understanding public engagement with climate change

In the past two decades, engagement in CC has become a central concept in academic, industry and policy discussions about CC responses. We commonly encounter words such as "public engagement", "engaging the public", "engaging with the public" in newspapers and CC-related documents. But beyond the buzz, what does it really mean? How can we arrive at a clear-cut definition of CC engagement? In this research, the theory on public CC engagement is utilized to analyse three levels – namely perceptions, attitudes and behaviours. Lorenzoni noted that CC engagement epitomizes "a personal state of connection with the issue of CC, in contrast to engagement solely as a process of public participation in policy making" (Lorenzoni et al. 2007, p.446). That is to say, people think, feel and act toward CC problems not only from political views but also from socio-economic, moral, and personal perspectives. This implies that having knowledge is not enough and people must also attain feelings and concerns about CC as well as capability of acting on it.

How people act toward CC is attributed to their social, political and economic activities. People join in informal community networks such as volunteering in local non-governmental organizations to fulfil their citizen responsibilities because they often feel disappointed and hopeless about government officials and policy makers at provincial and central levels. Traditional definition of individual

engagement in CC refers essentially to as 'consumers' making the act of purchasing for multiple purposes (for home, entertainment, travel and so on). These actions have changed from mainly voluntary (carbon lifestyle choices) to increasingly compulsory (government policy imposed). In fact, every individual can facilitate a low-carbon society by playing different societal roles in the combat against CC, such as low-carbon consumers (using and purchasing energy-saving products or changing to alternative 'green' energy), low-carbon worker (efficient energy use at work such as turning off idle lights and computers), low-carbon citizens (advocating for CC campaigns or policies or joining climate movements), low-carbon champions (spreading climate messages and actions to close relationship such as friends, families or colleagues) (Whitmarsh et al. 2013). For that reason, this research attempts to find out what ordinary population can do to engage in CC issue and to contribute to a low-carbon society.

With one-third of the world's GHGs emissions being attributed to traveling and domestic energy uses (Olivier et al. 2017), it is imperative to attain the concerted effort from the society because every single member has its respective societal responsibility in discernible human influence on GW. In an effort to clearly explain the meaning of public engagement in CC, this section will analyse it according to three separate dimensions, namely socio-economic, political and moral engagements.

2.1.1. Socio-economic engagement

Socio-economic engagement in CC issues refers to the understanding of CC causes, impacts and behavioural responses for mitigation and adaptation individually and collectively. It also entails the decision to participate in social movements or organizations to fight against CC; and economically, relating to the purchases of green products and services. Generally, the global public has acknowledged that CC is caused by human activities from traffic/transportation, industrial development, deforestation, household energy use, urbanization or

agriculture practices, emitting a huge amount of GHGs such as including CO₂, methane, NO₂, CFCs to the atmosphere (Capstick et al. 2015; Marlon et al. 2019; Marlon et al. 2022). It has impact on their personal life and society at national and international scales. They perceive ecological and natural consequences of CC such as temperature/weather change, flooding, drought, sea level rising, icebergs/glaciers melting, fickle precipitation, wildlife, and species extinction. They also understand CC consequences on human beings such as health problems, the lack of water or agriculture/crops eradication. The level of awareness about CC is not only high in developed nations, but high in developing Asian and South American countries such as Brazil, Mexico and Chile, with Brazilians being the most concerned and worried about CC (Eduardo and Franchini 2017). In Africa, thanks to the increasing amount of information about CC causes and impacts, people have acknowledged the change in environment and climate which severely affect their crops and livelihood (Selormey et al. 2019, p.60).

Regardless of the established and undisputable consensus on the existence of human-induced CC and its impacts from the scientific community and the public, there remain confused, perplexed, and doubtful thoughts about CC causes and consequences among certain segments of the public in both developed and developing countries. A study by Yale and George Mason Universities in 2020 shows that only 31% of Americans believe in global warming. In addition, only 26% are confident that human activities are the main roots warming up the earth's climate (Leiserowitz et al. 2021). This lack of understanding and misconception "inhibit the public's ability to participate meaningfully in democratic discussions of the issue, to understand how their own actions affect the climate and to fully and accurately appreciate how CC will affect our future" (Seacrest et al. 2000, p.253). The inadequate understanding is shown in the perception of the causes of anthropogenic global warming. For example, Yale's Climate Change in American Mind report shows that while fossil fuel use roughly contributed 50% of CC gases, just half of the respondents consider this factor "important". They also think that

agricultural practices have minor effects on the earth's climate when indeed, it presents as a significant cause of greenhouse gas emissions. From a different perspective, deforestation made up just 15% of the worldwide greenhouse gases emission but was regarded "very important" by most respondents (Leiserowitz et al. 2020).

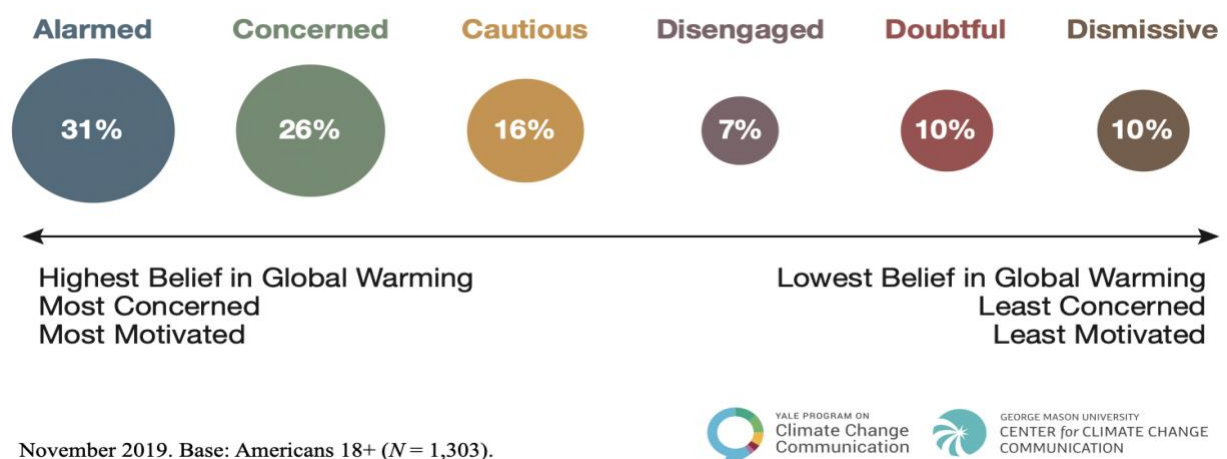


Figure 2.1: Levels of Belief in Global Warming

The same awareness trend occurs in developing countries. An identical study carried out in India demonstrated that only 43% of the population who are informed and experienced CC, understanding what is happening with the earth's CC, believing in human – induced CC and supporting government's CC policies and actions (Leiserowitz and Thaker 2013). There are also other CC misconceptions such as the depletion of ozone layer, aerosol or the debris of space programs are the main causes of CC. In Ghana, part of the population (mostly pre-service teachers) think that ozone depletion sets path for solar radiation to increase the Earth's temperature. They also perceive CC as normal phenomena as regular change in weather and season annually and there is nothing to worry about (Nyarko and Petcovic 2021). To the same extent, many people in Singapore misconstrue about CC, especially young people. They attribute the Sun and ozone layer depletion to the cause of CC, emphasizing that the ozone layer losses its capacity to prevent the Sun heat warming up the Earth (Hung 2022).

Social engagement in CC issues connects tightly with the participation in social grassroots movements. Social action in CC is ranging from attending educational and informational programs to social movements to raise CC awareness. As Cao Benito noted in his book, *Environment and Citizenship*, educational and informational programs play a decisive role in promoting ‘environmental citizenship’, which aim to improve social support and participation among the population (Cao 2015). In addition to attending CC educational programs, self-education of each individual constitutes an indispensable factor in enhancing CC knowledge, and this holds true not only for scientific experts but also the public as a whole. Self-education is the process where individuals personalizing unfamiliar topics for individual comprehension and knowledge, especially in issues like CC and global warming (Cao 2015). Apart from attending educational and informational CC programs, members of the public can also undertake other participatory approaches through civic CC movements aiming at reducing daily carbon emission, changing their lifestyle in food and energy consumption, travel and holidays (Wang et al. 2018). Some instances can be mentioned to such as the Global Action Plan which guides the public to manage their energy consumption and financing situation to reduce the purchase of carbon-emitted products. Movements like ‘Transition town’, ‘plastic bags ban’ are also listed as crucial bottom-up initiatives to promote social CC engagement.

Other constructive channels contributing to greater social engagement in CC are civic CC groups. These groups are often deemed as ‘green niches’ where individuals can reconsider their behaviours toward the environment through public discussion with others. By 2013 there were around 4,000 CC civic groups that aim to improve the public engagement in CC and exchange knowledge about CC causes, consequences, and actions in the UK (Whitmarsh et al. 2013). People participate in local community groups have chances to identify their connection to high-carbon and consumption-oriented lifestyle. Joining these groups also help them to promote confidence and resilience to lower their energy demand and

consumption. Furthermore, their societal engagement is also expressed through their role as facilitators to invite friends, acquaintances and co-workers to participate in their groups. As a result, the attitude about CC of these groups' member is also improved. Active participation creates a sense of responsibility and belongings for themselves as an accountable member in their society (Whitmarsh et al. 2015).

Concerning economic engagement, as emission of greenhouse gases is strongly embedded in private household consumption and purchasing patterns, encouraging the public toward more pro-environment consumption behaviours is an essential public policy in the fight against CC. 20% of the global economy will be deflated by 2035 if the world does not spend 1% of its GDP (recently increased to 2% due to inaction from nations) to deal with CC problems (Stern 2007, 2016). Therefore, it is important to note that the desired target of a low-carbon economy is a vital strategic plan for all social actors, not just the government, business, industry, but the general public to pursue.

The conventional role assigned to individuals, as promoted by governments and businesses, has been primarily to act as “low-carbon consumers”, who incorporate low-carbon products and services into various daily activities, such as household management, transportation, and recreation (Spaargaren and Mol 2008). Economic engagement at the individual level reflects how people worldwide integrate climate-conscious decisions into their financial behaviours and consumption patterns. By adopting sustainable practices, purchasing eco-friendly products, and supporting climate-friendly initiatives, individuals contribute to the course of CC mitigation and adaptation. Green consumerism is a critical facet of individual economic engagement, involving the selection of products and services that minimize environmental harm (Young et al. 2010). Studies have shown a global increase in consumer preference for green products, indicating heightened awareness of CC challenges (Zhuang et al. 2021; Leonidou et al. 2022; Panda et

al. 2024). In developed nations like Germany and the United States, consumers are increasingly purchasing organic foods, energy-efficient appliances, and electric vehicles. Another crucial aspect of green consumerism is how individuals modify their travel choices to reduce environmental impact. The rise of ecotourism and “staycations” highlights a growing preference for sustainable and cost-effective travel options (Hares et al. 2010). In regions such as Scandinavia, people are turning to train travel over flights, fuelled by the “flight shame” movement, popularized by Swedish environmentalist Greta Thunberg, which encourages consumers to choose low-carbon transportation (Gössling 2019). Such changes demonstrate the power of individual choices in reducing emissions through economic engagement.

In addition to green consumerism, energy consumption is another area where people can economically engage with CC mitigation. Across the globe, studies have shown that individuals are transitioning to renewable energy sources for household use. In the European Union, initiatives like the "Prosumer Movement" encourage residents to install solar panels, enabling them to produce and sell renewable energy back to the grid (Campos and Marín-González 2020; Niamir et al. 2020). Similarly, Australia has seen a surge in rooftop solar panel installations, supported by government incentives (IEA 2021). In low-income regions, energy transitions are also implemented with solar energy panels providing affordable electricity to rural households in Sub-Saharan Africa, reducing reliance on fossil fuels (Bishoge et al. 2020). The clean energy transition is also illustrated through the rise of cycling and public transportation reflects a shift away from car dependency. For example, cities like Copenhagen and Amsterdam lead in bicycle usage, with individuals choosing this low-carbon alternative for daily commutes.

Economic engagement with CC is also expressed through individuals' lifestyle changes. Waste reduction practices, including recycling and composting, form an integral part of individual economic engagement. The global recycling rates have

increased by 10% in the past decade, driven by heightened awareness and infrastructure development (Kaza et al. 2018). This has also been identified and accepted by people in London, United Kingdom through the way they pictured about CC and how to respond to it (Smith and Joffe 2013). They committed to carry out carbon-reducing actions such as using long-life light bulbs, boiling water when needed, and turning off the lights to save money. To the same extent, some segments of the US public recognized that the best solutions to combat CC economically are to reduce industrial greenhouse gases, plant more trees, using energy-saving technologies, recycling more or driving less (Chryst et al. 2018).

2.1.2. Political engagement

The failure of current CC policies has led many to raise their voices, emphasizing the need to improve citizen political engagement. Pope Francis has called for more democratic participation in CC policies, suggesting that “unless citizens control political power [...] it will not be possible to control damage to the environment” (Francis 2015, p.13). Also, there is an increasing number of voices from international grassroots movements, experts and citizens demanding a democratic enhancement (de Coninck 2022). Public engagement in climate politics, therefore, has been considered a fixed element in CC decision-making process. Within international community, hopelessness arises from the inability of politicians and policymakers at national and global scales to issue effective policies to deal with CC problems (Arnold 2018).

Effective political policies require a proactive engagement by the general public. This is true for all new technology and infrastructure development policies as government constantly seeks for public support before official policy issuances. Historically, the practices of political participation in CC appeared quite early in various countries from the grassroots activism in the early 1970s (Rogers and Marres 2000). The rationale for these movements is to increase public understanding of CC and to transform this public debate into expert debate. On

the national scale, some political actions that individuals can do to engage in CC issues include voting, proposals to legislators or law-making process participation.

Following the above discussion, three kinds of political engagement with CC can be elaborated here – namely public endorsement of, contestation against, and demand for climate policies. First, political engagement with CC refers to people's support of government role and policies on CC and how they enact those policies into their daily life (Carvalho et al. 2017). That is to say, people proactively advocate the execution of governmental CC adaptation and mitigation plans (van Riper et al. 2013). Globally, the public stresses the responsibility to address CC belonging to governments, social institutions, and every individual and support the concerted cooperation of these stakeholders, as neither the government nor individuals can do it alone. Any lack of political action and cooperation from the government and the society could lead to public disengagement toward CC (Vraga 2017).

The government is the key player in the combat against CC by providing informative programs, economic-benefited incentives, issuing laws and policies, individual strategies, and implementation targets so that community-based actions could be instigated and multiplied. Some governmental legal efforts to deal with CC that are supported by the public include auto and industry emission reduction policies, the enhancement of alternative energy research and development, and pollution minimization/recycling maximization, among other things (Reynolds et al. 2010). Thus, the public underpins ideas and policies of organizing more CC programs for people and provide them with more information about this vexing phenomenon. They expect better policies to address the issues of environmental degradation and CC since many have severely suffered from crop loss, increased temperatures, drought, pollution and flooding, especially in some developing countries (Carvalho et al. 2017).

In addition to public endorsement as the backbone for governmental climate policy implementation, political engagement also involves contestation and opposition towards climate-unfriendly policies. Political engagement, in this case, notably refers to the societal confrontation toward political goals, policymaking or development processes that contribute to deteriorating CC. Instead of contemplating engagement as parts of 'top-down' models, in which citizens are influenced and directed by political juxtaposition, public engagement with contested perspectives pertains to the public's call for 'bottom-up' direction to challenge political CC regulation (e.g. the 2015 People's Climate Summit in Paris, the development of civic-led campaigns and initiatives against government and businesses). In fact, several empirical pieces of evidence have indicated the strong growing presence of civic participation in CC issues from 'bottom-up' context. For instance, the public's explicit support for intensive democratic CC politics, emphasizing that the more political control people possess, the better possibility environmental and climate consequences can be managed, or the demand for a 'democratic regeneration' to deal with the ecological crisis (Carvalho et al. 2017).

The third kind of political engagement is also a 'bottom-up' direction, which is the public demand for further CC regulation (Pina et al. 2017). This 'bottom-up' voluntary action refers to public pressures on the government to have immediate actions toward CC, such as the issuance of stricter regulation to control high carbon emission. However, due to the difficulty in balancing interests for different social stakeholders, the structurally legislative impediments, as well as the inherent limitations to politicians' perception of CC issues, the influence of such societal demand for tougher CC policies is a rather limited. This limitation can be partly solved by practices of communication through various channels attempt to encourage public demand for CC regulation on the one hand and to swiftly report this demand back to the government on the other. This constructive communication may provide lawmakers with a sense that the issuance of future CC policies will receive compliments and awards from the public, rather than the

public backlash against such policies (Carvalho et al. 2017). In addition to mediated communication channels, government can and should organize direct public meeting sessions at grassroots and local levels so that the public will enjoy opportunities to express their concerns and opinions. This strengthens the public's political engagement, giving them a chance to express opinions on CC bills and policies. In fact, as being consulted for legal advice and recommendations, people feel more responsible and concerned about CC and have a sense that their actions bring about change to the course of CC mitigation and adaptation, rather than only making actions privately at household and local levels. Furthermore, people will have more confidence in collective efficacy as heterogeneous ideas are gathered.

2.1.3. Moral engagement

Moral engagement is believed to be critical in the field of CC. It provides views, positions, discourses to answer fundamental questions related to social inequity and justice of CC. There are several moral views on CC containing disparate ideologies on perceptions, evaluation, and actions toward the environment and CC. The moral and ethical issues in CC have caught attention from religious communities around the world. In 2006, for example, 86 US evangelical leaders from Christian communities, under the sponsorship of the Evangelical Climate Initiative (ECI), challenged Bush administration over the issue of CC. They conveyed different views and statements to express their opinions about social inequity and justice of CC. Three dominant moral and ethical ideas about CC in the US religious communities emerged from this event, namely conservation stewardship, development stewardship and development preservation (Wardekker et al. 2009a). These moral and ethical aspects of CC are believed to be somewhat universal since other religions also hold equivalent ideas to Christians. For example, Buddhists are proved to possess stronger engagement to CC issues and policies (Morrison et al. 2015). This section will analyse the major moral positions on the environment and climate.

Firstly, pro-environmental ideology refers to the idea of “the garden of God”: human beings as a part of the “God's creation” have the responsibility to preserve the environment as it was gifted and created. It is critical to note that, in some countries, where the majority of people believe in “environment stewardship” and the existence of God as the creator of the universe, religion is a decisive cultural factor in understanding the issue of CC. This understanding embraces the belief of “the sacred [human] obligation to preserve and protect the earth in all of its majesty, this garden with which we have been entrusted, for those who will follow” (MacCracken et al. 2008, p.262). The idea is that this God's gifted nature or ‘God’s Garden’ must be preserved and passed on to the next generation as intact as possible (i.e. intergeneration equity) (Wardekker et al. 2009b). Conservational/environmental stewardship takes the view on CC as destruction to the ecological balance, wildlife habitats and other species and that human beings must do everything they can to protect the environment and to refrain from letting CC happen.

People following this ideology support the idea of more preservation and less development. Due to its attachment to the responsibility of human beings to the earth's preservation and protection, it supports government regulation to use renewable energies and technologies that emit little CO₂. Total banning on the extraction of cheap and dirty fossil fuels energies such as coal, oil, and gases should be executed immediately (Morrison et al. 2015). Besides, national and regional religious networks organize public campaigns to advocate CC remediation and environmental protection. They also deliver CC information to the local churches to educate its members and urge religious leaders to be good examples in CC combat. Other operations may include organizing CC workshops and events, sending letters and recommendations to the authorities, lawmakers and the media to amplify their own voices (Asim and Todd 2010).

The second ideology – pro-development – takes an opposite point of views. It sees that human beings are superior to nature and humanity's mission is to “subdue the earth” and “turn the wilderness into a garden” (Spencer et al. 2005, p.14) and that “human beings come first in the God's created order”(Spencer et al. 2005, p.13). This system of beliefs is in line with traditional doctrines that highlight the human supremacy over nature and views nature as something to be conquered, dominated and controlled (White Jr 1967). Genesis – the first book of Bible – said: “Let us make mankind in our image, in our likeness, so that they may rule over the fish in the sea and the birds in the sky, over the livestock and all the wild animals, and over all the creatures that move along the ground” (Driver 1916, p.Chapter 1).

These views are often embedded in climate denialism, and sceptics contended that the deterioration of CC is attributed to natural factors, not by human activities. They oppose the restriction of fossil fuels exploitation as well as limitation of greenhouse gases emission by playing the card of social justice and interregional equity. They emphasized that these activities will be harmful to the economy of the poor (i.e. poor people and countries), deliberating that the less extraction of cheap energy will decelerate the poor's economic progress as it increases the price of necessities such as food, clothing, water, energy and only the rich can afford it (Morrison et al. 2015). The best and only way to prevent CC from further deteriorating is to promote economy and technological advancement, hence the need to use for fossil fuels. Rich countries will then be able to help poorer countries (i.e., mostly developing countries in Asia, Africa, and South America) by sending newer and greener technologies.

The final consideration on moral and ethical engagement in CC issues is a balanced view between development and environment. This view more or less takes the position in between the previous two ideologies, endeavouring to integrate economic development with environmental protection. It supports the view that environment as a “God's gift” should be protected and preserved, but

still maintains the confidence in human technological and entrepreneurial capacity through development courses to stop and minimize the conflict between economic evolution and environmental preservation.

Although a growing number of people accept and understand that CC is primarily a human-caused problem in both developed and developing countries, there remains an awareness difference in the moral responsibility of who cause CC the most and who bear the brunt. The majority of the global public believes that every nation should have their respective responsibility to CC remediation because of their contribution to the global warming (Wardekker et al. 2009b). Nevertheless, the public places more responsibility for developed countries (Morrison et al. 2015), with the linkage to greenhouse gas emissions from pollution, deforestation and fossil fuel use in the period of industrial revolution. Developed nations should bear more substantial responsibility to assist developing nations in dealing with CC consequences created by the rich during their industrial revolutions and in integrating CC remediation with economic advancement. The assistance includes advanced green technologies provision, money granting for developing countries to deal with CC consequences in their own countries (Carvalho et al. 2017) – CC political. Developing countries with less economic prosperity, located in low-lying areas mainly in Asia, Africa, and South America, are the hardest hits of CC impacts such as rising sea levels, widespread and constant floodings. These countries have less economic capacity to cope with CC consequences, hence raising the need for more material supports from developed nations (Asim and Todd 2010).

2.1.4. Barriers to public engagement with climate change

Despite a growing recognition of CC, both individual and structural challenges continue to hinder public engagement with this complex issue. These challenges include lack of knowledge, feelings of disempowerment, competing life priorities, and social perceptions of the problem (Lorenzoni et al. 2007). In particular, CC

often ranks lower in perceived importance compared with political, economic, or educational concerns, partly because its effects are not always immediately visible. Given people's familiarity with seasonal weather variations, modest shifts in temperatures or long-term climatic changes are easily overlooked. Many view CC as a future-oriented phenomenon, with delayed impacts, and thus do not have a strong sense of its immediacy and urgency (Doyle 2016). Moreover, CC is frequently viewed as a distant problem that is the responsibility of government and industry, rather than individuals (Whitmarsh et al. 2011; Spence et al. 2012). Studies show a "spatial optimism" where people believe climate threats are more severe for distant communities than for themselves (O'Neill and Nicholson-Cole 2009; Gifford and Chen 2017).

On an individual level, Bostrom and others identified a "free rider effect", whereby people avoid taking responsibility for CC, hoping others – especially politicians – will act on their behalf (Bostrom et al. 1994). This mentality contributes to overall public inaction. People also face barriers to low-carbon decision-making due to insufficient knowledge, psychological biases, and limited material and financial resources. For instance, the public often fails to acknowledge which activities (such as food choices or travel) contribute most to CC (Attari et al. 2010; Whitmarsh et al. 2011). Similarly, green consumerism is impeded by high prices, limited availability, and scepticism about corporate "greenwashing". While for residents in developing nations, financial constraints often overshadow sustainability concerns (Young et al. 2010).

A deeper examination of these individual barriers highlights the complexities of human psychology in addressing CC. The concept of cognitive dissonance is particularly relevant (Norgaard 2009; Gifford et al. 2018). People may understand the importance of climate-friendly behaviours but find them at odds with their daily routines or desires. For instance, while an individual might recognize the benefits of reducing air travel, they may still prioritize convenience or leisure

activities. This conflict between values and actions fosters a sense of internal discomfort, which individuals often resolve by downplaying the importance of their personal contributions or shifting responsibility to external actors, such as corporations or governments (Edenbrandt et al. 2021).

Furthermore, CC engagement often fails to align with immediate personal achievement. Thaler and Sunstein argued that human decision-making is often short-term oriented, focusing on tangible and immediate benefits rather than abstract or distant outcomes (Thaler and Sunstein 2009). For example, individuals may prioritize saving money on a fuel-inefficient vehicle over investing in an electric alternative, even if the latter offers long-term environmental and financial advantages. This tendency for temporally valuing present benefits over future gains – further exacerbates inaction on CC. Social and cultural norms also play a significant role in shaping individual responses to CC (Weber 2010; Adger et al. 2013; Van der Linden 2015). For many, entrenched social norms prioritizing fossil energy consumption such as the frequent car uses are not only practical but also socially reinforced. Efforts to deviate from these norms can lead to social alienation or humiliation, creating additional psychological barriers. For instance, adopting plant-based diets as a climate-friendly choice may be perceived as socially unconventional in certain communities, discouraging individuals from making such transitions despite their environmental benefits.

At the structural level, many governments acknowledge the importance of consumer actions but hesitate to impose regulations on consumption due to fears of political backlash and administrative burdens (Ockwell et al. 2009). Consequently, policies often focus on voluntary behavioural changes, public information campaigns, and economic incentives to encourage more sustainable choices. However, these strategies frequently fail to attain favourable results due to additional hurdles, including perceived social inaction, inadequate alternatives

to energy-intensive activities (Lorenzoni et al. 2007), and the inherent consumer lifestyles (Spaargaren and Mol 2008).

A critical challenge at the structural level is the lack of robust policy frameworks to enforce meaningful action. Bernauer and Gampfer mentioned that while international agreements such as the Paris Accord provides overarching goals, implementation efforts depend predominantly on national governments, which often face competing political and economic priorities (Bernauer and Gampfer 2015). For example, reluctance to impose carbon taxes or cap emissions frequently arises from concerns about economic competitiveness and potential public opposition (Giddens 2009). The absence of decisive governmental leadership in turn perpetuates a cycle of inaction, wherein individuals perceive themselves as disempowered to effect substantive change (Ockwell et al. 2009). Furthermore, infrastructural limitations also present tangible barriers to the adoption of sustainable practices. For example, planning strategies prioritize automobile use, leaving few accessible alternatives such as robust public transportation or safe cycling networks (Spaargaren and Mol 2008). The availability and affordability of renewable energy similarly vary across regions, often disproportionately affecting lower income communities.

2.1.5. Section summary

The current literature shows that public engagement with CC emerges as a dynamic, multi-dimensional process that encompasses people's perceptions, attitudes, and behaviours toward this global issue, transcending mere acquisition of climate knowledge or irregular policy participation. On the social level, engagement involves everyday decisions and collective actions that promote low-carbon lifestyles such as switching to eco-friendly household products and volunteering in local environmental activities. Such social participation goes hand in hand with broader social movements and grassroots initiatives, illustrated by examples like community-led "green niches" (Vickers and Lyon 2014), where

residents come together to exchange knowledge, reduce waste, or adopt renewable energy. From the economic standpoint, individuals also demonstrate CC engagement through green consumerism – opting for energy-efficient appliances or sustainable travel choices – as well as through direct financial contributions and investments in environmentally responsible funds or bonds.

Meanwhile, political engagement with CC underscores the importance of both endorsing and contesting government policies, as well as actively demanding stricter regulations on emissions and fossil fuel use. Yet political engagement also operates from the bottom-up collective movements, in which civic groups and organizations voice their concerns and shape public debate, effectively keeping CC on the political agenda and pushing for stronger institutional responses to CC. Equally pivotal is the moral dimension of engagement, which delves into questions of intergenerational justice, social equity, and humanity's intrinsic relationship with nature. While in some cases, it is the competition between the advocacy for the conservation of ecosystems and immediate cessation of fossil fuel extraction, with the prioritization of development, harnessing affordable energy, even if it is carbon intensive. Many people's moral perspectives, however, fall somewhere between these two poles, supporting both economic advancement and responsible environmental stewardship.

Despite this growing recognition of CC and its varied engagement pathways, major barriers persist in translating awareness into meaningful action. Structural barriers such as insufficient governmental leadership and weak policy frameworks often stall large-scale transformations. In many places, poor access to enabling facilities (e.g. reliable public transportation, renewable energy sources, and logistic infrastructure for rural communities) constrains individuals' capacity to transition away from carbon-intensive habits. As a result, even where strong environmental values exist, the lack of enabling conditions – be they political, financial, or infrastructural – can restrain ambition and momentum needed for

sweeping societal shifts in CC engagement. At the individual level, misunderstandings about the root causes of CC, cognitive dissonance, the “free rider” effect, and competing life priorities often inhibit informed choices and lead individuals to defer responsibility for climate solutions to governments or other people, diminishing personal engagement. Additionally, entrenched social norms, like the inherently cultural preference for driving private cars, can deter those willing to adopt more climate-friendly habits.

While the literature reviewed above offers a rich and multi-dimensional understanding of public engagement with CC, it is important to acknowledge its inherent limitations when formulating the conceptual framework of this research. The major limitation is that much of the reviewed perspectives on public CC engagement are from western countries such as North America, Western Europe, and Australia. Survey instruments, experimental designs, and theoretical constructs like spatial optimism, free-rider effect, cognitive dissonance (Leiserowitz et al. 2021; Whitmarsh et al. 2022), are developed and validated primarily within these socio-political and media environments. Consequently, they may insufficiently capture contexts where CC is experienced less as an abstract, future-oriented risk and more as an immediate livelihood concern, or where trust in government, media systems, and civil society operates differently. Applied to the case of Vietnam, the Western-dominated literature remains relevant but requires careful contextualisation. Vietnam is among the countries most vulnerable to sea-level rise, extreme weather events, and agricultural disruption, particularly in regions such as the Mekong Delta. Public engagement cannot be reduced primarily to consumer choices or formal political participation. Instead, it is embedded in community-based adaptation practices, informal knowledge exchange, family networks, and connections at local governance structures. Moreover, state-led policy frameworks for development and collective cultural orientation may reconfigure the meanings of socio-economic, political, and moral engagement in ways that have not been accounted for.

With that in mind, the application of Western literature in this research requires careful consideration. It acts as a guidance in informing the research questions and data collection. For example, the core dimensions of engagement – perception, attitude, and behaviours, as well as barriers to engagement, such as knowledge gaps, psychological distancing, mistrust, disempowerment, and the constraints imposed by everyday routines, are valuable for designing interview questions and coding themes in this study. They help frame inquiry into whether Vietnamese citizens understand CC as a scientific, social, moral, or livelihood issue; whether they see it as immediate or distant; whether they feel personally capable of responding; and what kinds of actions they regard as meaningful. In this sense, Western perspectives serve as an important analytical starting point. However, this research does not assume that concepts developed in Western contexts can be transferred to Vietnam.

One issue is the tendency in Western literature to equate engagement with highly individualized forms of action, such as changing consumption habits, purchasing green products, reducing flights, or joining organised activism. While such forms of engagement may also appear in Vietnam, they do not necessarily capture the full range of how people respond to climate-related risks in their everyday lives. In a context where many people, especially in rural and climate-vulnerable areas, experience CC through disruptions to farming, fisheries, water supply, health, and seasonal changes, engagement may take more practical and relational forms. It may be expressed through adjustments in agricultural practices, livelihood diversification, informal sharing of weather and environmental knowledge, or mutual support within family and neighbourhood networks. These practices are not always labelled by people themselves as “climate adaptive action”, yet they can still represent meaningful forms of engagement with CC. A framework that focuses too narrowly on individual green consumption would risk overlooking these situated and context-specific responses.

A second limitation concerns political engagement. In much Western scholarship, political engagement is often associated with overt public deliberation, protest, voting behaviour, or pressure on policymakers through civil society channels (Carvalho et al. 2017; de Coninck 2022). These remain important theoretical dimensions, but their relevance must be reconsidered in Vietnam's one-party political and institutional setting. Public engagement here may be mediated more strongly through local authorities, community meetings, and state communication campaigns than through highly visible climate movements such as protests. Citizens may participate in CC-related responses not by directly contesting policy, but through compliance, negotiation, adaptation, or collaboration within local governance structures. Therefore, this research approaches political engagement more broadly, asking how people understand the role of the state, what forms of climate discussion or influence they believe are possible, and how they navigate responsibility between government, community, and individual actors.

Similarly, moral engagement with CC in Vietnam may not structure neatly onto the religious and ethical categories that dominate some Western discussions (Wardekker et al. 2009a; Morrison et al. 2015). Although ideas such as stewardship, intergenerational responsibility, and justice remain relevant, their meanings may be articulated through different cultural languages and social values. In Vietnam, moral engagement may be tied less to explicitly theological debates and more to notions of collective responsibility, care for family, obligations to future generations, social harmony, and protection of local livelihoods. It may also be linked to practical ethics grounded in everyday vulnerability. This suggests that moral engagement should not be limited only through Western normative categories, but through how people themselves justify concern, obligation, and action in relation to CC.

For these arguments, this research places a strong emphasis on the Vietnamese public's own accounts of CC, especially how they perceive risks, where they

obtain information, whom they trust, and how they respond in daily life. It recognises that engagement may be mediated by social positions, livelihood pressures, access to resources, communication networks, and culturally embedded understandings of responsibility. This is especially significant in the Vietnamese context, where climate experiences are often unevenly distributed across regions and socio-economic groups, and where adaptation practices may be collective, informal, and embedded in ordinary life. It seeks to address these limitations by examining public engagement with CC in Vietnam through a multidimensional framework by asking:

RQ1: How do Vietnamese engage socio-economically, politically and morally with CC issues, and what individual and structural barriers shape this engagement?

In doing so, the research investigates the extent to which Vietnamese citizens participate in climate-related activities across these three dimensions and explores the factors that facilitate or constrain their engagement. In doing so, the study will also move beyond a purely deficit-based model of public engagement (Suldovsky 2017), which assumes that more knowledge automatically produces stronger action.

2.2. Relationship between information sources and CC engagement

A critical determinant of enhanced CC engagement lies in how effectively CC information is communicated and disseminated across different sources. The interplay between individuals' existing worldviews and the sources through which they receive updates, such as news outlets, academia, or personal networks, greatly influences how they perceive risks, interpret scientific findings, and choose the forms of action. This section will explore in detail the existing literature related to the sources of CC information and the manner in which the information is delivered that can either galvanize or inhibit public engagement, depending on the clarity, relevance, and credibility of the content.

CC communication has been diversified in recent times, moving towards less dependence on the mainstream news media and more on non-mainstream channels and platforms (Moser 2010). To fully understand this diversification, this study starts with the concept of media structure, which posits that an individual's pattern of media use is affected by available media choices and possibilities (McQuail 2010). Media structure is characterized by media production, distribution, and content. Weibull notes that, in order to adequately grasp the meaning and impacts of media structure, it is important to make distinction of the two elements, namely institutions and output (Weibull 1985, p.129). As posited by Weibull, these elements are differentiated from both qualitative and quantitative perspectives. Quantitatively, institutions refer to the number of media outlets (or providers) while output refers to the volume of produced media content. Qualitatively, institutions entail the kinds of media organizations, such as TV, radio channels, printed and online newspapers, social media, while output entails the characteristics of produced media content.

Of interest here is how various components of the CC media structure function to shape CC engagement. In other words, how do different CC information sources (i.e. mainstream media, government, scientists, NGOs, business, and lay networks) impact on public CC engagement?

To start with, information systems, as the core of the media structure, are a fundamental driver of public engagement, significantly shaping how individuals understand, interpret, and respond to complex issues. In contemporary societies, information about CC transcends mere awareness raising; it actively constructs the context within which public perceptions and actions take shape. Firstly, at its most basic, climate information transmits scientific findings, projected impacts, and policy options to lay audiences. This function addresses widespread knowledge gaps about the greenhouse effect, carbon budgets, and long-term consequences of the fickle changing climate. When people understand why CO₂

concentrations are rising, how sea levels will change, and what adaptation measures exist, they are more likely to accept the reality of CC and see themselves as part of the problem-solving process (Corner et al. 2015; Roser-Renouf et al. 2015).

CC information functions to enhance public understanding of climate-related risks. Scholars like Slovic and Sander argued that effective climate communication can bridge the cognitive gap between abstract scientific data and the public's lived experiences (Slovic 2016; Van der Linden et al. 2017). This bridging is crucial because CC presents unique challenges for public comprehension. It is a phenomenon characterized by long-term impacts, complex causality, and inherent uncertainties. The translation of scientific findings and explanations about climate risk into accessible and relatable narratives helps individuals visualize and internalize the potential consequences of climate inaction or inadequate adaptation measures. As a result, well-presented and well-delivered information not only raises awareness but also motivates behavioural change by clearly linking individual and collective actions to tangible outcomes (Schäfer and Painter 2021).

Furthermore, CC information plays a crucial mediating role between scientifically climate expertise and public understanding. This perspective emphasizes the socio-cultural processes involved in the public interpretation of scientific information. Rather than viewing CC information as merely factual dissemination from experts to the public, scholars have highlight that the meaning and credibility of received climate information are socially constructed (Wynne 1992; Jasanoff 2021). The public's reception of scientific climate knowledge often hinges on trust and perceived legitimacy of sources, making information channels, messengers, and communication styles equally significant as the content itself (Sanz-Menéndez and Cruz-Castro 2019; Goldberg et al. 2020; Fage-Butler et al. 2022). Hence, fostering public engagement requires attention to the socio-cultural

dimensions of communication, where information is tailored not only in terms of clarity and accuracy but also with cultural sensitivity, social credibility and responsiveness to public concerns (Jasanoff 2021).

Another important function of CC information is that it serves as a pivotal element in enabling informed public participation in climate governance and policymaking. Research has stressed that democratic participation in social issues depends on informed public discourse (Honneth and Joas 1991; Chambers 2003; Dryzek et al. 2013). In this view, climate information must be designed to facilitate open, inclusive, and rational dialogues on climate policies and action plans among diverse stakeholders, including citizens, policymakers, scientists, businesses, and NGOs. Quality climate information fosters deliberation by providing a shared climate knowledge base from which informed and reasoned discussions can emerge (Sanz-Menéndez and Cruz-Castro 2019). Without reliable and accessible climate information, public discourse on climate risks becoming fragmented, polarized, and ineffective, weakening democratic decision-making processes on climate policies and ultimately hindering collective climate action (Bogert et al. 2024).

Additionally, CC information functions as a critical factor in shaping public perceptions and emotional responses to CC. It refers to the way information is presented to emphasize certain interpretations or responses over others. It shapes whether CC is perceived as an urgent crisis, a manageable challenge, or a distant and abstract threat. Emotional and psychological engagement with climate issues is thus significantly influenced by how the information is presented that can either empower or paralyze public responses (Nabi et al. 2018; Myers et al. 2023). For instance, catastrophe-focused presentation might induce fear and a sense of urgency but can also lead to feelings of helplessness and disengagement. Conversely, solutions-oriented presentation can foster optimism and proactive attitudes, driving positive behavioural and policy actions.

CC information also acts as a catalyst for collectively social mobilization to deal with climate crisis. Shared information and narratives about CC can unite disparate individuals into cohesive groups, creating collective identities around social movements, including among others, environmental and climate advocacy (Benford and Snow 2000; De Meyer et al. 2021). CC information is leveraged strategically by social stakeholders such as government, NGOs, activists, and community network to galvanize public climate action, employing narratives that underscore collective responsibility, social justice, and intergenerational equity on climate issues. CC information thus acts not only as a vehicle for awareness rising, but as a facilitator for collective climate action, ranging from grassroots activism to structured advocacy campaigns.

In short, the functions of information in public engagement with CC are multifaceted, operating across cognitive, socio-cultural, democratic, emotional, and collective dimensions. These functions are not exclusive but interlinked, contributing jointly to shape public attitudes, behaviours, and participation towards solving climate crisis. Recognizing and optimizing these informational functions is crucial for enhancing the effectiveness of climate communication and achieving meaningful and sustained public engagement with climate issues. However, less attention has been given to the broader ecosystem of information sources, including government communication, scientific institutions, NGOs and businesses. As a result, the ways in which these different sources of climate information interact and influence engagement have received minimal scholarly attention and remain insufficiently understood in such contexts. In the following sections, I will analyse the CC communication ecosystem by examining different CC information sources and their influences on public engagement with CC issues, to understand how existing sources of CC information contribute, positively or negatively, to facilitate public engagement with CC issues. These sources – including mainstream media, governments, scientists, NGOs, business and lay people – deploy numerous methods such as professional news reporting,

strategic communication, public relations or advocacy in efforts to get their own agenda into CC debate (Anderson 2009).

2.2.1. Mainstream media

Mainstream media play a major role in public discourse about CC science and technology and more importantly act as a potential motivation source for people and societies to overcome psychological, institutional and individual barriers to effective CC engagement. Public CC understanding, attitudes and behaviours are substantially affected by media messages (Bell 1994). It presents as the most common information source of CC and global warming for the UK and European citizens (Ruiu et al. 2023).

A study of the German public by Arlt and colleagues found a correlation between frequent media use and levels of CC engagement (Arlt et al. 2011). In a similar vein, Cabecinhas and others observed that in Portugal, media consumption was a robust predictor of various mitigation-oriented behaviours, intentions, and concerns (Cabecinhas et al. 2009). These findings echo in other developed countries as well; for instance, Australian respondents reported that mass media served as their primary conduit for learning about CC, with television emerged as the most frequently used medium, trailed by newspapers, film, and documentaries for CC information (Buys et al. 2014). In the United States, mainstream media, similarly, stand out as the primary channel for climate-related information. However, differences in political ideologies often shape the choice of preferred media outlets. Democrats are more likely to consult news sources such as The New York Times or CNN for coverage on climate issues, whereas Republicans incline toward Fox News or The Wall Street Journal (McCright and Dunlap 2011b).

Numerous studies have found public views on CC issues are shaped differently by the media across different countries. In the US and the UK, the discrepancy between an increasing public concerns about CC and a limited understanding of

the course of actions and the solutions to remediate this problem has been attributed in part to the media (Stamm et al. 2000, pp.219-238; Lorenzoni et al. 2006, p.265). In Australia, the mainstream media are the predominant CC information source for the public, but have also been seen by as a key source of confusion and uncertainty about the phenomena of CC. This is due false balances in news representation of scientific information, leading scholars to highlight the needs for more “data” and “evidence” instead of sole “assertion” from the scientists (Schäfer and Painter 2021). In developing countries, mainstream media are good for people to understand the impacts of CC, but not much about its causes, processes and solutions (Barreda 2018; Ahmed et al. 2022a; Ahmed et al. 2022b).

The impact of the media on CC awareness and engagement varies not only between countries but also between media channels and platforms. Bolsen found that the epistemological and attitudinal impacts do not exist equally in three forms of communication, and those watching CC news on public TV obtain more awareness than those watching commercial channels (Bolsen and Shapiro 2018). Printed media is found to have a negative impact on CC awareness and cause people less likely to change their daily lifestyles, as it emphasizes on distant and abstract impacts (Bogert et al. 2024), it causes psychological distance and denial (Alawade et al. 2024) and it fails to lead to behavioural change due to the approach of only feeding information (Suldovsky 2017). Exposing to different media platforms with different ideologies also resulted in diverse CC discourses. In the US, the public is divided into four categories that are based on their media sources: those denying anthropogenic CC and its significance, those doubting the human impact but believe its importance, those uninterested in CC and its significance; and those engaged in CC issues (Ballew et al. 2019).

Mainstream news sites also play a major role in public CC engagement. In fact, they have long replaced other mainstream media platforms to become a major

source of scientific CC information in the US (Brossard 2013b). Empirical studies in Europe and the United States have found a positive relationship between online media use, including online news, with the increase of public knowledge, positive attitudes and active behaviours toward CC (Anderson 2017b; Carmichael and Brulle 2018). Although online news shares key characteristics with other mainstream media types (i.e. being owned by a media firm and having an editorial board), it differs in its discursive interactive characteristics. Specifically, online newspapers possess the ability to facilitate two-way discussion among audiences, by allowing them to exchange ideas and information via its interactive means such as news comments (Koteyko et al. 2013).

There are certain limitations of mainstream media which inhibited its meaningful influence on public's actions toward CC. Mainstream journalism practices often deal with events as they rise (Lugo-Ocando and Nguyen 2017). On a given day, media agencies receive more news they can take from their reporters who themselves have to compete with each other to gain attention with more urgent news feeds. In this situation, editors must select the information that is deemed the most newsworthy. In many ways, CC news is disadvantaged from this selection. Specifically, CC impacts are intangible and time-lagging, even the most dramatic effects occurring at a far distance from audience (Anderson 2017a). Moreover, CC news often oozes rather than breaks as it takes longer time for CC impacts to physically appear in front of audiences. On the other hand, mainstream media agencies have pressures from competition from other news outlets, reduction of newsroom staff and shrinking advertising revenue (Boykoff and Yulsman 2013). These factors have affected how CC information is communicated on mainstream media.

Conflict-driven CC news coverage

One of the ways to attract audiences is to talk about conflicting factors in CC news. Historically, journalists covering CC issues are attached to balanced

reporting, giving equal weight to those who advocate for the scientific consensus anthropogenic CC and demand an immediate plan to tackle the issue, and those who negate it and argue that CC is a natural variation and action should be voluntarily (Boykoff and Boykoff 2004; Beltrame et al. 2017). However, this false balance has dramatically decreased, with research having noted less presentation of so-called "balance of bias" in US media (Bolsen and Shapiro 2018), less CC contrarians and more scientific consensus in all kind of French media platforms (Beckemeyer 2017 CC), and less climate certainty claims by CC contrarians and sceptics on German media (Verheggen et al. 2014).

In recent times, news communication of CC conflicts has been transformed dramatically from questioning the existence of CC to national and international negotiations over the responsibility and contribution to remediate its impacts. This change in CC reporting is primarily due to the urgency arising from the frequent occurrences of devastating natural events starting with the Hurricane Katrina that destroyed New Orleans in 2005 (Schlosberg and Collins 2014). The media present the conflict between countries in terms of the unbalance between GHGs emission into the atmosphere and contributions to CC mitigation and adaptation efforts. Further, CC news communication of conflict continues to be embedded in the reporting of "the global blame game" (Bache et al. 2015), in which poorer developing nations blame developed countries for causing the climate problem and demand their actions (such as financial assistance for the drastic reduction of GHGs emission) while developed nations argue that their reductions will be meaningless if poorer nations don't act.

Audiences express their disbelief and criticism toward conflicting climate news, which has been proved to result in misconception and confusion about CC causes, consequences and action for audiences. It also contributes to the growing suspicion and cynicism from audiences about journalists' CC claims (Buys et al. 2014, p.14). They don't trust what they receive from the news and would doubt

that news does not represent the vested interests of political groups (Whitmarsh 2015 CC). It is clear that conflicting messages limit the public's capacity to engage in meaningful democratic dialogue, to recognize the impact of their personal choices on the climate, and to fully comprehend how CC will shape the future (Seacrest et al. 2000). By presenting conflicting opinions, journalists indirectly generate a mixed emotion toward CC. In fact, this kind of CC reports are often lack of consolidating element, refraining from giving audience conclusive and take-away messages.

The focus on the extreme

Another way that journalists use to attract audience is to focus on the catastrophic impacts of CC. According to Boykoff, dramatization is one of the frequent elements in journalistic norms that aims for attractiveness and effectiveness (Boykoff 2007). As noted, CC issues are time-lagging and lack immediacy, making it hard to make CC stories appealing to audience. Thus, journalists are inclined to dramatize CC stories in order to make them more compelling to audiences. Scaremongering stories account for a great amount of space on the news media, for example dystopian scenarios, natural disaster pictures of crumbling North Pole icebergs, dying polar, rising sea level or even apocalyptic advertisement (Hibberd and Nguyen 2013a). In efforts to attract audience attention, the media endeavour to use such words as catastrophe, death, disaster, doom and gloom, immense, beyond human control and in the language of acceleration and irreversibility. Strong words and pictures using to depict the climate disaster such as communities being “erased”, “swallow up”, “swept away”, “washed away”, “vanishing”, “disappearing” with little hope designated to possible action against CC have appeared more frequently on the mainstream media than stories covering the issues of adaptation, mitigation, and empowerment (Arnold 2018).

While vivid images of CC disasters provide a long-lasting memory and improve the understanding about CC in audience's mind, they can disengage people from it by instilling a sense of distance from events (Segnit and Ereaut 2007). The element of catastrophic narrative such as alarmism (We are all going to die) is more likely to arouse confusion, contradiction and chaos, which subsequently tend to cause people disengaged, disempowered and uncompelled to act. Mike Hulme - the director of the UK Tyndal Center, was concerned that catastrophic discourse risks pushing society towards pessimism, despair, and reactive rather than constructive responses. (Hulme 2014). This kind of communication not only fails to get appreciation from the audiences but also drives them away from CC action (Hibberd and Nguyen 2013a). People tend to find the motivation and courage for change when they encounter the problem they can deal with. If the problem is too immense and beyond their capacity, they are inclined to avoid and reject adaptive measures (Rogers 1983). Therefore, the portrayal of CC as an uncontrollable and extreme issue could implant an idea that it is something "just too big to cope with" in audience's mind and subsequently restrain their actions (Poberezhskaya and Danilova 2022).

Further, the reporting of distant catastrophic and devastating events brings about a sense of CC being irrelevant to audience's daily life. As Boykoff emphasizes on the quality of a piece of CC news: "The key is relevancy...we cover the issues that most immediately effect our readers, and most in our readership are working class. They are not as interested in theoretical science papers at an academic conference" (Boykoff 2008a, p.559). In other words, CC news should be able to connect the climate problem to audiences' daily life. CC news of direct relevance will be more likely to generate interest from the public, as people seem to be worrying about problems they can witness and experience first-hand. However sometimes, the image of shrinking polar bears or iceberg melting fail to provide this relevancy. It does not intrigue audiences who has no first-hand experience of these CC impacts, especially those living inland.

Recent shift to CC mitigation and adaptation.

Recent news coverage of CC has seen a gradual shift from the catastrophic and negative side of CC to success stories in CC mitigation and adaptation (Schäfer and Painter 2021). Such optimistic, hopeful and enthusiastic narratives generate belief in change. It exhibits the possible plans for CC solutions as well as the green opportunities that CC brings about, instead of demonstrating terrifying climate data and images, causing denial and despair from audiences (Arnold 2018). This is a way to instigate audiences' interest in CC issues and encourage their actions. Frequent positive coverage of ecologically behaviours plans and policies increase the amount of individually pro-ecological choices (Huang 2016). As Arnold elaborated that to empower the public's CC actions, there should be more "win-win" stories which being told in a way relevant to diverse groups of audiences. The advantage of the communication of this constructively problem solving is that it shows that CC solutions "are working in one place, it takes away excuses for failure elsewhere" (Arnold 2018, p.15); hence, making people believe in the success of CC adaptation and mitigation.

The communication of adaptation and mitigation not only depicts the small triumph of individuals with adaptive ideas and projects, but also illustrate the fruitful negotiations and cooperations between responsible social stakeholders nationally and internationally to reach an agreement in CC policies and action plans (Lück et al. 2018). For example, in global events like COP, CC mitigation is frequently considered as transnational concerns. The responsibility to mitigate CC is not only accounted for residents in developed countries, but also to those in developing nations. Therefore, the communication of successful political cooperation between parties and countries, such as issuance of governmental and inter-governmental climate policies like regulated standards, carbon taxes, cap and trade, subsidies for alternative energy, reductions targets and financial assistance, could motivate concerted actions of the world's public to reduce the

GHGs emission through the limitation of fossil fuel use (Ayanlade et al. 2023). Likewise, the productive cooperation of business, government and grassroots communities for the implementation of CC initiatives and projects to improve the environment and ecosystems is also a kind of hopeful and positive story needed to be communicated. It has the power to encourage people to gradually change to cleaner and greener lifestyle.

2.2.2. Government channels

CC communication by governments aims ultimately to raise public awareness and understanding of CC regulations and policies, to earn their support and to facilitate societal demand for better policies. Most governmental CC communication practices depend on the collaboration and cooperation with other organizations such as the media, government-sponsored institutions, scientific communities, NGOs and citizen campaigns (Pearce et al. 2015). Maibach highlighted the role of these organizations in policy communication (Maibach et al. 2008, p.14):

“NGOs and citizens-sponsored campaigns can be used [by governments] to advocate changes in government policies. ... These include policy advocacy, media advocacy, and dissemination of evidence-based practices”.

In fact, governments have continued to use grassroots-level campaigns to disseminate information on CC policies helping the public to further understand the policies. For instance, in the UK, the government has worked with the Carbon Trust, the Centre for Sustainable Energy and the Energy Saving Trust to disseminate information on CC policies. These organizations also support in investigating public opinion about the policies, providing insights and opinions on communication strategies. Some other examples of government's CC campaigns like the “Save money, save energy and ACT ON CO₂”, “Let's go Zero” or “Zero Hour” suggest residents to calculate their daily CO₂ emissions and then try to reduce it (Nerlich et al. 2010). In the US, government's climate programs like “Climate Change Action Program” or “U.S. Global Change Research

Program” have attempted to provide CC information by engaging people in research. The goal is to help the US government to directly communicate with the people and to help them to gain a more understanding of CC policies (Ros et al. 2020; Schwarber 2021).

In addition to various campaigns and programs, the prevalent use of the mainstream media has further enhanced CC communication between governments and the public (Pillay and Maharaj 2010). Research in both developed and developing countries has found that governments have used the media to facilitate participation in CC campaigns, as well as to manage society in disaster situations (Revi 2012). Direct communication via online media has also helped governments to introduce CC policies. Studies have shown that ‘the Internet is increasingly being used as a tool of governance’ (Howes 2002, p.328) and a method to improve the efficiency of political policies and actions. For example, since 2008, McNutt has analyzed 80,000 websites and found the predominance of government frames and statements in virtual policy networks on several issues including CC. In the case of CC, these account for 86% of the climate information links (McNutt 2008). Presently, CC articles about adaptation strategy processes on governmental domains such as their informational portals are prevalent (Clar 2019). On another example, a study in four western countries found that millions of young people have intensively used online media platforms such as YouTube and Instagram to contribute their discussions and expression about the climate policies (Boulianne and Ohme 2022). In other countries, the Japanese government has successfully adopted Kyoto Protocol Target by launching national campaigns and advertise about it intensively via mass media (Liang et al. 2024). In Italy, the media, including social media platforms, are considered as interconnected spheres for the government to deliver updated CC information to people and receive their feedback about the issue (Albanese and Graziano 2024).

Governments in some developing countries have also paid attention to CC communication. In Nepal, with the support from the United Nations' REDD+ program aiming at cutting down GHGs emissions, the Nepal government is able to organize open climate talks and dialogues at various local areas to understand what public think about and how they adapt to CC. In these dialogues, the government convey the messages on CC as both a global issue and a national concern, stressing that global CC mitigation is beneficial to national economic development in Nepal (Bastakoti and Davidsen 2017). In other developing countries like India and Brazil, the governments have communicated their national plans to cope with CC impacts such as flooding management, clean energy transition, improvement of road heigh and structures or renovation of a whole community following disciplined environmental standards (Fischer 2017). They have also deployed another way of communicating climate policies which is the incorporation of local knowledge in mitigation and adaptation process (Chu et al. 2016; Chilvers 2024). Perceiving likeminded knowledge and information night help the public better engage, accept and adopt government's climate policies as they can see the government's non-bias over lay public's opinions (Haque and Jahid 2021). This is in line with other researchers such as Nalan, in his research, suggested that any research on, organizations of and executions of governmental CC policies should encompass a thoughtful examination and inclusion of the local views (Nalau et al. 2015).

Effectiveness of government communication of CC

Despite rigorous efforts from governments, there remain drawbacks preventing the effectiveness of their CC communication. Firstly, and again, the time-lagging and distant nature of CC causes the government to not prioritise the substantive issues and focus on immediate and urgent issues such as politics, health, economy (Doyle 2016). Second, societies are divided over climate policies for pragmatic and ideological reasons. One area of concerns is over economic losses, with many

believing that if pro-environmental plans, such as the shutdown of gas and coal companies to reduce CO₂ emission, are executed, the economy will be the hardest hit and energy competitiveness will be minimized on a global scale (Nisbet 2009). Further, support for climate policies is often lessened due to the concern over the possibilities that government will take advantage of new climate policies to charge more taxes and fees such as transportation or domestic waste disposal (Carvalho et al. 2017). Not less importantly, the level of trust that the public bestows on government's CC communication is not often high. Research has shown that the public expresses low level of trust and credibility toward CC information of the government. Many people feel that governments fail to care about or provide the information they really need to understand how CC relates to their life (Carvalho et al. 2017; St-Laurent et al. 2019; Cologna and Siegrist 2020). Politicians and governments are highlighted as untrustworthy communicators of CC information who are perceived to manoeuvre CC communication for their own interests and purposes (Hibberd and Nguyen 2013a).

This is partly due to the way governments contemplate differently about CC, with different political agendas, thus sending conflicting and confusing messages to the public. Some governments show more disapproval and hostility toward CC policies and actions than others (Chater 2018). They portray CC as an uncertain science that leads to unnecessary and excessive climate actions; green policies as a cause of energy competitiveness failure on global scale and the deficits of economic benefits; and CC advocacy as ominous agenda to achieve vested economic and political purposes. For example, President Donald Trump is the latest example of climate deviant who conveys CC as an “expensive hoax” (Cillizza 2017), having twice withdrawn the US from the Paris agreement on his familiar “America first” premise that the agreement is less about tackling CC and more an opportunity for other countries to gain financial advantages over the US. On the contrary, other governments advocate pro-climate policies and plans, highlighting achievable economic benefits from them. For example, in addition

to the emphasis on individual and collective economic costs of climate consequences, economic benefits are communicated through renewable energy development and natural resource preservation, which create more safer and greener jobs, and in return, beneficial to the national economy (Government of 2009). Such divergent approaches to CC among different governments and parties cause many people to be reluctant to believe in what the governments said about CC, their policies and action plans.

2.2.3. Scientists as CC communicators

Scientists are highly trusted sources for the general public. People are prone to believe CC messages originated from more “authoritative and trusted groups” (Lowe et al. 2006). Dilling and Moser suggest the idea of “trusted messengers” to improve the credibility of CC message to lay public and substantially to change their behaviors (Dilling and Moser 2004). Since CC emerged as a major issue on the public agenda in the 1980s, scientists have been considered an agent of definition, the most credible and dominant source of CC information on the media (Trumbo 1996). Scientists are regarded as “problem solvers, authorities, and the ultimate source of truth” (Nelkin 1991, p.xiii). In fact, politicians, governments and the media stand as untrustworthy sources in the eyes of the public while scientists are considered as the most trusted sources for CC information (Shuckburgh et al. 2012). CC scientists, with their expertise, have earned high credibility from many segments of the public, including demanding and challenging audiences. However, trust building requires effective communication strategies that help scientists to link the lay public’s concerns to their professional knowledge and perspectives and to make climate information more compelling and attractive.

Scientists have cultivated traditional methods like public lectures, community workshops, and educational programs to directly engage with audiences, foster trust and understanding, and provide an opportunity for immediate feedback and

interaction (Bevan and Smith 2020). These formats encourage active dialogue, allowing scientists to clarify misconceptions and tailor their communication to the audience's knowledge level. Public forums and town halls are places where scientists discuss CC issues with community members to foster a collaborative environment. Such events provide a platform for local residents to voice concerns and ask questions about specific regional impacts of CC, bridging the gap between scientific knowledge and local experiences. Moreover, face-to-face interactions enhance scientists' ability to convey climate urgency through authentic knowledge and information that is often lost in digital communication (Weber and Stern 2011). Scientists also participate in outreach activities like environmental fairs, exhibitions and school visits, bringing CC science closer to lay audiences in an interactive and engaging manner (Gabrys and Yusoff 2012; Nunn and McNamara 2019). For example, the "Earth Story" initiative in the UK featured scientists sharing personal stories about their research on CC at public libraries and community centres. This approach aimed to make complex scientific concepts relatable and engaging for non-expert audiences (Corner et al. 2018). These activities often employ visual aids, hands-on experiments and storytelling to demystify complex scientific concepts, making them more relatable and memorable to the public.

In addition to face-to-face meetings, individual scientists also use social media as a channel for CC debate and communication. When blogs emerged as a new and promising medium in the early 2000s, numerous scientists took the opportunity and employed blogging “as a way to share journal articles, advertise their thoughts and scientific opinions, post updates from conferences and meetings, and circulate information about professional opportunities and upcoming events” (Bik and Goldstein 2013, p.1). Scientists also use other social media platforms like Twitter and Facebook to promote scientific climate discussions like climate ideas, concepts, findings sharing and feedback gaining (Metag et al. 2017; Saunders et al. 2017). These activities have enhanced the information exchange among

scientists themselves as well as between them and the public. Given the prevalent situation of public ignorance and misconception towards CC, these online platforms have, to some extent, helped scientists cope with false science claims and prevent further spreading of unpublished scientific information to the public. Alison Ashlin also emphasizes the role of these social media as forums for scientists to debate CC issues with other stakeholders including political leaders, environmental activists and journalists (Ashlin and Ladle 2006).

Limitations of scientists' CC communication.

Despite the above efforts, scientists' climate communication suffers from a lack of public appeal. This is attributed to their deficit top-down approach to science communication (Bucchi 2008; Suldovsky 2017). Scientists still think that they are the elite who have the right, professional knowledge and authority to influence the lay public's knowledge, attitudes and behaviours towards CC. As such, scientists primarily aim to transmit knowledge rather than engage people in meaningful dialogue. The deficit model assumes a one-way flow of information, disregarding more interactive and participatory exchanges. Therefore, they often fail to produce simple and plain messages for audiences when discussing about CC issues.

The most oft-mentioned problem is their tendency to use scientific jargons in communication with laypeople (Arnold 2018). For example, they often use "anthropogenic" instead of "human-induced" or reluctant to replace "space" and "time" for "spatial" and "temporal" (Somerville and Hassol 2011). Additionally, scientists use certain words that can cause further confusion; for instance, the combination of "aerosol" and "climate" confuses people about the causes of CC. For general public, aerosol refers to "spray can" which they correlate with CC and ozone depletion, but what scientists mean by that is simply tiny particles in the atmosphere which cause no harm to the climate. Or the constant use of 'likelihood' terms (e.g. likely, very likely) also triggers impressions and ideas in people's mind

that scientists are uncertain about CC and its consequences (Budescu et al. 2009). Words often used by scientists but completely differ in meaning to the public are listed in the table below.

Terms that have different meanings for scientists and the public		
Scientific term	Public meaning	Better choice
enhance	improve	intensify, increase
aerosol	spray can	tiny atmospheric particle
positive trend	good trend	upward trend
positive feedback	good response, praise	vicious cycle, self-reinforcing cycle
theory	hunch, speculation	scientific understanding
uncertainty	ignorance	range
error	mistake, wrong, incorrect	difference from exact true number
bias	distortion, political motive	offset from an observation
sign	indication, astrological sign	plus or minus sign
values	ethics, monetary value	numbers, quantity
manipulation	illicit tampering	scientific data processing
scheme	devious plot	systematic plan
anomaly	abnormal occurrence	change from long-term average

Table 2.1: Words frequently used by scientists (Budescu et al. 2009)

All this creates challenges for scientists to help people make sense of scientific information and to fully engage the public with the information (Metag et al. 2017). Scientists are often recognized as alien “others” and their information generates low levels of engagement as their research findings are seen as too distant from daily life, too hard to understand and too vague to apply into practical actions (Shuckburgh et al. 2012). Over time, this contributes to situations where people are not able personally connect to CC issues and thus become gradually less enthusiastic about the legitimacy of climate science. It also more likely to

make people engage in psychological distancing, i.e., they consider CC as a future issue and as a problem designated for those living far away (Spence et al. 2012; McDonald et al. 2015). As a result, some might stray away from accepting CC existence and the implementation of pro-environmental actions based on scientific knowledge.

Additionally, there have been calls for scientists to reverse their academic style if they want to be effective public communicators of science (Hak-Soo 2011). Traditionally, when speaking with their peers, scientists often start with background information, moving to supporting ideas and lastly stating conclusions and findings. Now as they talk to the public, it is necessary to change the direction. By performing the bottom-up approach, scientists start the conversations with conclusion and findings (i.e. what people have to do to fight against CC), then moving to the supporting details (i.e. why they should care about that) and finally providing more abstract information related to CC science. This simple and efficient communication help to reach people's mind and thoughts. Furthermore, people expect CC issues should less be covered from scientific perspectives and more from daily-life aspects such as the use of food and water, or health protection, which help people to connect with their life. They admitted the needs for more daily life implication, instead of solely assertion of scientific data and statistics (Buys et al. 2014).

2.2.4. CC communication efforts of NGOs

Numerous CC movements have been orchestrated by NGOs around the globe. These organizations are not decision-making authorities; therefore, they incline to use campaign activities to influence the climate-related decision-making process, both politically and societally. As Hansen highlighted, NGOs communicate about environmental and CC issues for two purposes: to gain public publicity and legitimacy (to recruit members and raise fund for campaigning activities) and to achieve public and political attention and action regarding the campaigned issues

(Hansen 2018, p.52). NGOs have been successful in changing the politicians and public's awareness over certain issues other than CC such as forest, whale or deforestation (Lähtinen et al. 2017).

In order to gain the acceptance and support from politicians and the public, climate NGOs communicate in a way that can persuade others to listen to what they propose. The purpose of NGOs' communication is mainly to change the public's CC attitudes and actions. Climate NGOs perform persuasive campaigns to initiate pro-environmental consciousness from the public and encourage them to accomplish a certain number of green practices (Comfort and Hester 2019). By cultivating this direct communicative method, NGOs are able to assist members of the public in becoming active participatory stakeholders to address the pressing energy concerns and contribute their efforts to minimize the impact of CC at their local areas. Surveys are then carried out to learn more about public opinions and recommendations over the issuance of climate-related policies. They encourage people to express their support for CC mitigation and adaptation policies such as signing petition in climate policy-making process or participating in discussions over international CC meetings such as COPs at UNFCCC.

Further, NGOs' climate campaigns help to strengthen the social network with lay community, granting them more opportunities to communicate with people on the ground. Comfort and Hester have highlighted that through these campaigns, climate NGOs keep people up to date with their planned activities and encourage them to participate in the organizations' programs and events (Comfort and Hester 2019). More significantly, it allows climate NGOs to form a strong foundation with key people in the public such as opinion leaders, so that they can reach to a larger population and generate a stronger impact from their activities.

In support of these on-the-field campaigns, climate NGOs take full advantage of online media such as websites, blogs, social media like Twitters or Facebook to promote their activities to the governments and the public. Because of the lack of

resources, networks and influences (as compared to other key players in CC communication such as mainstream media and government), NGOs cultivate online media more intensively to approach a larger pool of audiences with a lower budget expenditure (Vu et al. 2020; Osman et al. 2025). Furthermore, online media provide a fairer playground with other stakeholders in CC communication field for NGOs, specially as journalists tend to operate for the interests of established parties or groups. This is particularly true for countries with tightly regulated journalistic practices like Vietnam or China.

Research on the climate NGOs' activities on web-space and found that they utilize websites to communicate and connect themselves to the public climate activities. They post information about their climate works and achievement on social media platforms (Takahashi et al. 2019; Vu et al. 2021; Moreno-Cabanillas et al. 2024). The reason is because NGOs want to assure the audiences to receive their original information without any interference from the media and to remain direct interaction with the public (Pickerill 2013). They invite members of the public, especially opinion leaders, to join and provide ideas in climate discussions on the web. For instance, Greenpeace has invited web users to become "cyber activists" on the issue of renewable energy, so that the Internet users can participate in the operation of the organization by posting comments or queries (Hindmarsh and Calibeo 2016; Vu et al. 2021).

Limitation of CC communication by NGOs.

Despite their strengths, NGOs' CC communication also presents notable limitations. One major challenge lies in their perceived legitimacy and trustworthiness. NGOs often face scepticism and doubts regarding their motives, as critics argue that they may exaggerate environmental risks to mobilize support or secure funding, thereby potentially overstating threats and creating alarmist narratives (Rödder 2020). Such perceptions potentially undermine the credibility of their information and messages, diminishing their influence over broader

audiences and policymakers. Research indicates that exaggerated claims or sensationalist communication can inadvertently foster scepticism and compassion fatigue on climate issues among the public, rather than promoting sustained engagement and action (Boykoff and Yulsman 2013).

Another significant limitation of NGOs' CC communication relates to their resource constraints. Limited financial resources and manpower often restrict the scale and scope of their climate campaigns, preventing sustained long-term engagement in communicating climate issues to the public. Many NGOs rely heavily on project-specific grants or donations, which typically have short-term horizons and specific conditions attached, thereby hindering strategic planning and continuity (Bryson et al. 2014; Lewis 2014). The fluctuating nature of such funding sources often compels NGOs to shift priorities frequently, which can dilute the clarity and consistency of their climate information and messages. Additionally, dependency on external funding can lead to agenda-setting influence from donors, raising concerns about the independence and credibility of NGOs' communications (Banks et al. 2015; Romero et al. 2023). Smaller NGOs, in particular, encounter significant operational challenges due to resource instability which restricts their ability to recruit skilled personnel, invest in comprehensive communication strategies, and consistently engage their target audiences over time (Lewis 2014).

Apart from the dependence on official donors, some NGOs express the confrontational stances towards governments and industries' climate policies and development plans. This communication approach can inadvertently influence lay audiences' perceptions negatively. While confrontational communication is designed to highlight urgency and demand immediate action on CC, it can also create perceptions among the general public of excessive negativity or aggression, potentially leading to disengagement rather than motivation (Skurka et al. 2022). Studies indicate that overly aggressive communication may cause audiences to

feel overwhelmed, leading to feelings of helplessness or apathy (Feinberg and Willer 2011; Skurka et al. 2022). Furthermore, confrontational communication often resonates predominantly with individuals who already hold strong pro-environmental views, thereby limiting NGOs' effectiveness in appealing to a broader and more diverse audience. This communication approach might create echo chambers rather than fostering inclusive public dialogue.

2.2.5. Businesses as CC communicators

Businesses hold a unique position in CC communication, as they are both main contributors to CC and key players in providing solutions. Through communication strategies, businesses shape public understanding, drive behaviour change, influence policymaking, and execute product marketing agenda. As Stechemesser argue, the business sector has the capacity to affect CC awareness by leveraging its resources, networks, and influence, reflecting the role of corporate actors in addressing one of the most pressing global challenges (Stechemesser et al. 2024). The prominence of CC come to business' attention following the Paris Climate Agreement (Averchenkova et al. 2016; Bui and De Villiers 2017). Since then, they have been actively communicating their commitment to climate actions by cultivating several methods.

Corporate Social Responsibility reports are one of the most common methods of CC communication from businesses. The aims of these reports are to inform the business' stakeholders and consumers not only of its underlying climate values and attitudes but also its climate actions, such as detailed accounts of environmental performance in greenhouse gas emissions, energy use, and climate adaptation measures and the like (Carroll and Shabana 2010). Through these reports, the climate perceptions of stakeholders and customers can be transformed towards more socially responsible (Kim and Ferguson 2018). Another method that businesses have implemented to amplify their climate communication is collaboration with governments, NGOs, and international organizations. Public-

private partnerships have effectively enabled coordinated climate campaigns that combine business' resources with the credibility of non-business actors. Advocacy efforts, such as supporting carbon pricing or renewable energy policies, demonstrate how businesses can influence systemic change while communicating their commitment to sustainability (Pinkse and Kolk 2012; Andonova 2017; Chan and Amling 2019).

CC communication by businesses has emerged as a critical area of study. Many studies have found that business often involves strategic CC communication – e.g. illustrating CC from specific perspectives related to the business' operation to influence customers' perception and political responses (McCright and Dunlap 2000; Ihlen and Nitz 2008; Marchildon 2016; D'Amato et al. 2023). Other research has identified the transition in how businesses communicate CC to the public overtime. Schlichting distinguished three key stages in how industry actors in the US have framed this issue (Schlichting 2013). During the first phase, from the early to mid-1990s, business organizations frequently cast doubt on the mere existence of CC. Invoking the words of sceptical researchers to claim that GHG emissions had no scientifically substantiated impact on the global climate and thus political intervention was unjustified. The second phase presented CC predominantly as a socio-economic concern, claiming that measures following the Kyoto agreement could stunt social and economic growth and is not a proper solution to CC. In the third phase, the communication has devoted to the responsibility and opportunities for business in addressing climate challenges.

Similarly, Bowers discovered a change in sustainability reporting of various global businesses (Bowers 2010). It has showed that the reports sway away from the communication of economic advantages with current energy utilization, to openly emphasized the economic gains that sustainability could bring. Nike's annual report is a good example illustrating this transformation. Its 2001 report notes how the company is "just beginning to understand what a sustainable

business means”, while the 2006 report underscores how sustainability offers substantial economic prospective (Bowers 2010, p.256). Domenec revealed that companies moved from communicating environmental concerns as threats to their operations to highlighting proactive and responsible corporate behaviours towards CC (Domenec 2012).

Most businesses have acknowledged that man-made CC presents a major danger to society and sees itself as an accountable actor for climate protection. Many companies now deliver their messages about accountability, emphasizing their role in reducing emissions and mitigating climate risks (Hahn & Kühnen, 2013). For instance, oil and gas companies have adopted narratives of “energy transition”, highlighting investments in renewables and carbon capture technologies. Businesses focus on positioning themselves as providers of technological solutions to climate challenges. This communication highlights the development of sustainable technologies, eco-friendly products, and resource-efficient practices as they function as crucial catalysts for establishing a climate-friendly, low-carbon society. For instance, automotive companies advocate for carbon-free electric vehicles and position themselves as “Green Energy Generator of the Year” (Schlichting 2013). Tesla’s focus on electric vehicles and energy storage solutions exemplifies how innovation is central to business climate communication (Hardman et al. 2017).

Apart from emphasizing the responsibility to cope with CC impacts, business-led communication also informs and inspires their stakeholders, including consumers, employees, and investors to make sustainable choices. They incorporate green messaging into their marketing strategies. Green advertising emphasizes the environmental benefits of products or services, promoting energy efficiency, sustainable sourcing, or carbon neutrality. By encouraging individuals, businesses foster a sense of collective climate responsibility and catalyse a broader societal engagement. Campaigns like Starbucks’ push for reusable cups, H&M’s recycling

programs or Unilever's "Sustainable Living Plan" illustrate how companies engage stakeholders in their climate initiatives (Sheehan and Atkinson 2012; White et al. 2019).

Concerns over business' CC communication

While business' CC communication has grown in prominence, the effectiveness of such communication depends on the authenticity and clarity of the message. The motivations behind business' climate communication vary widely. Many have voiced worries that businesses have steered public debate on climate issues in order to safeguard their interests against policy constraints (Delmas and Burbano 2011; Lyon and Montgomery 2015; Marchildon 2016). Some businesses adopt communication strategies to align with regulatory requirements, while others may prioritize research and promote results that serve the business's strategic goals, such as enhancing brand reputation, attracting eco-conscious consumers, or gaining a competitive edge (McCright and Dunlap 2000; Delmas and Burbano 2011). Nyilasy and others highlight that consumers are sceptical of vague or exaggerated green claims, underscoring the importance of transparency and accountability in climate communication (Nyilasy et al. 2014).

Additionally, concerns about greenwashing arise when businesses overstate their environmental achievements without substantial action to back their claims, which further fuel the lack of authenticity and alignment with genuine actions within their climate communication (Lyon and Montgomery 2015). Research reveals that businesses sometimes focus their marketing efforts on minimal or symbolic eco-friendly initiatives, overlooking more significant environmental issues (Delmas and Burbano 2011; de Freitas Netto et al. 2020). A classic example is labelling products as "natural" or "eco-friendly" without adhering to rigorous sustainability standards. This tactic, known as "greenwashing" (Lyon and Montgomery 2015), striving to profit from growing consumer interest in eco-friendly options, yet lacking actionable commitments. Similarly, selective

disclosure is another prevalent form of greenwashing (Cherry and Sneirson 2012; Marquis et al. 2016). Organizations may emphasize their minor green achievements while withholding information about serious environmental failings, leading to a false presentation of actual climate actions. For instance, a firm might publicize its use of renewable energy but fail to mention a heavy reliance on fossil fuels in other operational areas (Parguel et al. 2011).

Studies have indicated that greenwashing, or the dissemination of misleading information about pro-climate practices, undermines the credibility of businesses and public trust in its commitments to CC, leading to widespread scepticism. Stakeholders and consumers become wary of legitimate sustainability initiatives, viewing them through the lens of potential deceit (Cherry and Sneirson 2012; Lyon and Montgomery 2015; de Freitas Netto et al. 2020). De Freitas Netto and others showed that consumers and stakeholders have increasingly disbelieved the business' CC communication because superficial or unsubstantiated claims (de Freitas Netto et al. 2020). Secondly, greenwashing also hinders genuine climate initiatives. When businesses allocate their resources to projecting a misleading image rather than implementing substantial environmental reforms, it delays progress toward global sustainable objectives. This is particularly detrimental in sectors with a significant carbon footprint, such as energy, manufacturing, and agriculture (Delmas and Burbano 2011).

2.2.6. Lay people

Unlike the recognition given to CC scientists, journalists, policymakers and activists, lay people are often treated as individuals who have little knowledge in the field of CC communication. However, it is crucial to understand that lay people are becoming an important information source for CC mitigation and adaptation (Nakashima et al. 2012). Mutz indicated that when given a choice of information from lay sources or scientific sources, general public prefers to judge intrusive problems like CC based on their own or others' experiences. People with

strong personal experiences with the weather and climate tend to rely on the experiential knowledge to judge climate situation, and thus less using information from other sources (Mutz 1992; Marx et al. 2007; Weber and Stern 2011).

In fact, not everybody has the capacity to process scientific CC information, charts, diagrams or patterns. Learning these abstracted scientific facts requires analytical and cognitive abilities which are scarce commodities among population. The word “climate” in itself is an abstract term that is not easy for people to perceive directly and to fully grasp its consequences. Therefore, lay information and knowledge, which contains the affective, associative, intuitive, automatic and effortless elements, are more likely used to make sense of CC and its consequences such as flooding, drought, storms, typhoon, etc. (Spence et al. 2011; Myers et al. 2013; Myers et al. 2023) .

Public perception of, attitudes and responses to, CC are not only shaped by the communication from political elites, CC experts and the media, but also direct communication with networks of friends, families, neighbours and other lay members (Manandhar et al. 2011). Existing research has highlighted the significant link between CC perceptions and behaviour with the communication of lay knowledge. Research carried out in Alaska and Florida in the US found that discussing with people who have frequently physical exposure to extreme weather events help to improve awareness about climate variations and willingness to adapt mitigative actions (Leiserowitz and Broad 2008; Spence et al. 2011; Borick and Rabe 2014). Ojala and Bengtsson highlight that direct CC communication with close sources exerts a strong influence on young generations, who mostly learn about CC through conversation with their parents, friends, relatives, and colleagues (Ojala and Bengtsson 2018). The research has shown that the more positive communication the youth enjoy with families and friends, the more inclined they are to seek solutions to deal with CC problems emotionally and practically – and vice versa. Speaking with fathers proved to have the most

positive influence on young people with regards to pro-environmental and anti-CC behaviours (Ojala and Bengtsson 2018).

The direct communication of lay information and knowledge plays a more crucial role for rural people in developing and low-lying countries in their CC adaptation. They participate in on-site trainings and discussions to learn the latest adaptive plans and cultivating experiences from other fellow farmers. For example, experiential risk perception establishes how farmers in some African countries respond to CC. They often apply traditional signals learnt from indigenous knowledge to make sense of the change in weather and climate. This knowledge is the long-term accumulation of perceived self-experience and understanding of surrounding environment and species such as birds, plants, etc., or constant communication with other people in the same local areas (Jiri et al. 2016; Mugi-Ngenga et al. 2021). Some methods that farmers often adopt from their peers in order to adapt to CC include adjustment of farming calendar, crop and plating rotation in heavy rainy and drought seasons, improvement of water and irrigation system, and varied planting of rice seeds (Mekonnen et al. 2021).

With regards to online discussion, although it only accounts for a small segment of population and does not represent for all CC conversations within the public, it is still worth noting that online CC debates exert a strong impact on public CC opinion and further scientific conversations (Walter et al. 2018). Research has noticed the potential of online debates on facilitating discursive space for conversation, deliberation and organization about CC issues (Graham and Wright 2015). People's posts, comments and opinions are the founding elements that made CC discourse distinct from that of offline context. Through commenting, sharing, posting, evaluating CC news content, lay people are able to express their thoughts and opinions as well as transform or alter other engagements in the current diverse, complex and contested climate problems (Hjorth and Hinton 2019). Thanks to these activities, interpersonal CC communication is now

increasingly promoted alongside that of face-to-face context. Research has found people's understanding and discussion over social, health and natural impacts of CC have been improved thanks to interpersonal online communication channels (Connor et al. 2016).

On online media, some individuals can serve as opinion leaders to disseminate information for others within the network (Choi 2015). Research found that friends and families have been proved to be the trusted sources for online CC information (Jaspal et al. 2014). Secondly, communication and discussion about an issue with people who are like-minded within a group have been proved to enhance the acknowledgement and understanding of that issue (Cohen 2003; Kuhn et al. 2019; Strandberg et al. 2019). A study on CC discussion on Twitter reports that the majority of people express their preferences over talking with those who have the shared climate values and opinions, rather than those with diverse views (Pearce et al. 2014; Kirilenko et al. 2015).

Limitation of lay CC information and knowledge

However, learning CC from lay knowledge is often perceived as a somewhat faulty process as this largely hinges on observation, association, feeling and memory (Weber 2010; Van der Linden et al. 2017). The information's quality and credibility from these sources pose an immense challenge for certification. Further, lay knowledge and public opinions around CC are filled with disagreements and polarizations over the issue and CC knowledge is often polluted by CC scepticism and denial in public discussions (Collins and Nerlich 2015; Walter et al. 2018). As noted, public opinion about CC is deeply divided between "sceptics, deniers or contrarians" and "alarmists, warmists, believers or catastrophists" (Howarth and Sharman 2015, p.244). McCright & Dunlap explain this conflicting situation through the concept of identity-protective cognition, in which people tend to maintain opinions that conforming to their group's identity and oppose to the one threatening to that identity (McCright and Dunlap 2011a).

Kahan found that people with different world views are inclined to hold separate opinions about CC, in which hierarchical and individualistic people tend to have less serious attitude toward the issue, and often express antagonistic arguments refuting mainstream CC science than egalitarian and communitarian ones (Kahan et al. 2012).

This difference in CC perception is shown more clearly in online discussions. Through a variety of online participative activities such as CC news sharing, comments, and its rating, sceptics and denialists have been producing and promoting false facts against CC and CC responses, causing misunderstanding and misconception for other users. Taddicken and Reif studied two conflicting groups of online users, “participating experts” and “less active knowing”, which precisely reflecting the heterogeneous characteristics of public CC discussion on social media and online newspapers. Both groups are actively participating in CC discussion, but have different opinions about the existence of CC. The “participating expert” group shows enthusiasm in dealing with CC consequences and willingness to take responsibility. On the contrary, the “less active knowing” group casts doubt on CC existence and exhibits disapproval for the complexity and dynamic of the issue. They have a propensity to spread negative comments, such as the disapproval of climate scientists' information and knowledge using some negative words like negation, falsification (Taddicken and Reif 2016). In the process, much misinformation and disinformation is spread and interfere with lay knowledge about CC.

2.2.7. Summary

Existing literature on the diversity of information sources shows that communicating CC plays a pivotal role in shaping how the public perceives, internalizes, and responds to the issue. Mainstream media remain a central avenue for delivering CC news, yet their tendency to be catastrophe-driven can instigate initial alarm and undermine long-term engagement by making the issue seem too

distant or overwhelming. Similarly, conflict-oriented coverage mostly generates polarized views, causing audiences to question the credibility of different voices or feel paralyzed by mixed messages. On the other hand, media stories focusing on mitigation success, adaptation strategies and hopeful narratives have the potential to empower citizens, showing that feasible solutions exist and that collective action can mitigate the worst impacts of CC.

Governments, meanwhile, mainly work with other organizations to communicate climate policies and regulations, such as traditional press releases, online announcements, and grassroots awareness campaigns, to rally public support and enhance policy legitimacy. Nevertheless, government-led communication faces significant obstacles, including accusations of political bias, low trust in political motives, and competing economic priorities that sometimes overshadow climate agendas. These challenges mean that even well-intended governmental campaigns may struggle to mobilize communities if the CC policy messages appear uncertain, contradictory, or disconnected from people's day-to-day experiences.

Scientists have long been perceived as the most trusted for CC information, thanks to their professional expertise and evidence-based approach. Nevertheless, scientists' reliance on technical jargon, abstract concepts, and risk-based language sometimes alienates non-expert audiences from their information particularly and CC generally. Particularly, the so-called "deficit model", in which scientists primarily transmit their information without considering the general public's awareness, can perpetuate disengagement and skepticism.

NGOs often communicate CC through activism, educational outreach, and bottom-up workshops and campaigns. Because NGOs lack formal authority, they typically rely on persuasive, people-centred communication to raise people's awareness, encouraging them to adopt more eco-friendly practices and advocate for policy change. However, their impact can vary widely depending on resources, public trust in specific NGO brands, and the extent to which they collaborate with

or confront government and industry partners. In the similar extent, for businesses, even though exerting efforts to highlight their green credential through sustainability reports, renewable energy investment, and green advertisement, their CC communication's credibility is questioned by the public due to the widespread instances of "greenwashing", which erode public trust, impede genuinely impactful policies, and create confusion about the viability of corporate-driven climate solutions.

Lastly, lay people themselves are increasingly recognized as a source of CC knowledge, particularly when sharing firsthand experiences of floods, heatwaves, or shifting farming conditions. Conversations within families, neighbours, and social networks can powerfully enhance local adaptive measures and reinforce communal responsibility. However, at the same time, this experiential exchange can also transmit inaccurate information.

Overall, what is still largely missing from the above literature about public CC engagement and CC information sources is theoretical and empirical insights from developing countries with very different media and communication eco-systems and peculiar socio-cultural norms and practices that would influence how people receive and respond to different CC information sources. This highlights the pressing need for similar research to be conducted in developing countries like Vietnam, where formal science media and communication systems are not well developed (Nguyen and Tran 2019; Tran and Nguyen 2023) and where collective community-oriented cultures, especially in rural areas, are often the breeding ground for informal information and knowledge. Understanding how Vietnamese people perceive CC information is essential for evaluating its role in fostering public engagement and, ultimately, for identifying ways to enhance CC communication. Recognising this gap, the study further asks:

RQ2: What are the perceived impacts of formal and informal information sources on public engagement with climate change in Vietnam?

This question examines how both formal sources (such as government, mainstream media, NGOs, businesses, and scientists) and informal sources (including family networks, community members, and personal experiences) influence the ways individuals interpret and respond to climate change. Further, it provided an opportunity for the researcher to select the suitable methodology to collect the most valuable data from a largely uncharted area. This will be discussed in detail in the next chapter, showing the rationale and procedures of data collection and analysis.

Chapter 3. Methodology

This chapter discusses this study's methodological approach. It establishes the rationale for choosing in-depth interviews, describes the data collection and analysis procedures as well as reflects on the whole process. In doing so, the chapter discusses the challenges, limitations and ethical considerations of the chosen method and how these were addressed to ensure the research validity, credibility and reliability.

3.1. The in-depth interview method

In-depth interviews are a frequently used qualitative method to explore human behaviour and experiences. These interviews allow researchers to follow the natural flow of conversation, uncovering unexpected details and insights. A key aspect of this approach is engaging with participants' language, beliefs, and emotions to gain a deeper understanding of their perspectives. Seidman characterized these interviews as a method to delve into the complexities of personal experience (Seidman 2013). This process facilitates a deeper connection with lived realities of participants, framing the interview as a conversational exchange centred on the interviewee's narrative. Zhang and Wildemuth highlighted the importance of in-depth interviews in capturing authentic experiences without constraining them through predefined theoretical categories, thus broadening the scope of inquiry (Zhang and Wildemuth 2009).

This method is especially valuable when exploring a new research area, as they provide a comprehensive understanding of the cultural or social context being examined. In fact, qualitative in-depth interview has been widely employed to conduct research about public CC engagement and their perception of CC information from different sources, especially in developed countries (Lorenzoni et al. 2007; Whitmarsh et al. 2011; Wolf and Moser 2011). Such research is significantly insufficient in Vietnamese context. In this PhD, I expect to achieve two sets of findings: (1) the current engagement level with CC in socio-economic,

political and moral terms as well as the barriers to effective CC engagement; and (2) the perceived impacts of formal and informal sources of CC information on public CC engagement.

The in-depth interview method was chosen to achieve these aims. The open-ended nature of in-depth interviews allows me to uncover unforeseen themes, unexpected topics, and deeper perspectives as they naturally emerge during the interview. This approach enables participants to express their climate experiences in their own words, providing rich and nuanced insights into how they navigate climate issues in their daily lives. By offering a contextual understanding of participants' climate behaviours and attitudes, and perceptions of CC information, these interviews help uncover the underlying 'why' behind their responses, including emotional and psychological aspects. This yields more meaningful data, far surpassing the insights gained through surveys or questionnaires. This was particularly useful in the context that I started this study with very little insight, due to the rarity of research into these topics in climate-vulnerable regions like the Mekong Delta.

3.2. Data collection process

3.2.1. Participant recruitment

This research employs two sampling methods: purposive and snowball sampling. Initially, I engaged with a diverse group of individuals relevant to the research questions to ensure the collection of a broad spectrum of perspectives. The snowball sampling was then used to recruit more participants to expand the research and to ensure the achievement of greater credibility on data collection and analysis, as well as results.

Purposive sampling involves strategically selecting participants or cases to ensure they are directly relevant to the research questions being investigated. The research questions typically outline the categories of individuals or other units of

analysis that need to be prioritized and targeted for sampling. Therefore, in selecting the first group of participants, I strived to achieve a significant diversity within the sample, ensuring that participants vary in key characteristics that might be relevant to the research issues – namely differences in CC engagement levels, differences in the challenges and barriers to an effective CC engagement, differences in the sources of CC information that participants receive from and its diverse impacts on their subsequent engagement. Key factors such as age, gender, education and types of cultivation were used as criteria. The inclusion of participants from a range of socio-economic backgrounds was to enhance the depth and richness of the data (Moser and Korstjens 2018). This diversity contributes to more valuable and comprehensive findings.

Further, I prioritised the need for my sampling to encompass the various contexts in which my observations would occur (Robinson 2014; Ames et al. 2019). As people's perceptions, attitudes and behaviours towards CC and its information sources are shaped by contextual factors, I intentionally chose different locations (urban and rural areas in different provinces) to observe variations in the data. I also chose three Can Tho, Soc Trang and Ca Mau, three of the most CC-sensitive provinces in Vietnam, as fieldwork sites. These have had experienced severe CC consequences for a long time, such as rising sea levels, coastal erosion, land loss, severe weather events and so on (MONRE 2020).

For this research, the sampling process is also sequential, meaning it evolves over time. To support this process, snowball sampling was employed to extend the scope of the research. Snowball sampling is a method where the researcher begins by selecting a small group of individuals relevant to the research questions. These initial participants then recommend others who share the relevant experiences or characteristics. The process continues as each new participant suggests additional individuals, creating a chain of referrals. I constantly monitored and revisited the data as they emerged to determine whether the recruitment of more interviewees

for further data was essential. Through this sampling procedure, I was able to gradually increase the authenticity and comprehensiveness of the data.

In terms of the sample size, the general guideline was that the broader the focus of a qualitative study to compare between groups and themes, the more interviews are typically required (Morse et al. 2002; Warren 2002). Warren notes that a minimum of 20 to 30 interviews is usually required for a publishable qualitative study (Warren 2002, p.99). Adler and Adler suggested the number of 30, an average of 12 to 60 interviews (Baker et al. 2012). These differences highlight the challenge of achieving a universally acceptable minimum sample size. In my sampling process, however, I observe the demand for theoretical saturation – i.e. I recruited new participants until I found that there was not much more to achieve from doing more interviews. As Onwuegbuzie and Collins pointed out: “In general, sample sizes in qualitative research should not be so small as to make it difficult to achieve data saturation, theoretical saturation, or information redundancy. At the same time, the sample should not be so large that it is difficult to undertake a deep, case-oriented analysis” (Onwuegbuzie and Collins 2007, p.289)

Taking all information of sampling approaches and sample size into consideration, I recruited 43 participants, namely 33 rural and 10 urban residents. These are from three provincial cities: Can Tho (17 participants), Soc Trang (12), and Ca Mau (11). I purposively recruited more rural than urban participants because the Mekong Delta was primarily a rural region. I also interviewed rural participants in three different types of cultivation (rice, animal and orchard) to understand how CC knowledge and information is obtained and utilized for each type. Other factors such as age and gender are relatively equally distributed among participants. The detailed demographics of the interviewees are demonstrated in Table 3.1. below.

	Age groups	Gender	Location	Education	Types of cultivation
U1-M35	30-49	Male	Urban	Bachelor	
U2-F18	18-29	Female	Urban	Bachelor	
U3-F21	18-29	Female	Urban	Bachelor	
U4-F23	18-29	Female	Urban	Bachelor	
U5-F41	30-49	Female	Urban	High school	
U6-M40	30-49	Male	Urban	Master	
U7-M40	30-49	Male	Urban	Master	
U8-F35	30-49	Female	Urban	Bachelor	
U9-M42	30-49	Male	Urban	Master	
U10-M36	30-49	Female	Urban	Master	
R1-M60	50+	Male	Rural	High school	Orchard
R2-M57	50+	Male	Rural	High school	Orchard
R3-F80	50+	Female	Rural	High school or less	Rice
R4-M50	50+	Male	Rural	High school	Animal
R5-M72	50+	Male	Rural	High school	Animal
R6-F44	30-49	Female	Rural	High school	Rice
R7-M60	50+	Male	Rural	High school	Orchard

R8-M28	18-29	Male	Rural	Bachelor	Rice
R9-M40	30-49	Male	Rural	High school	Rice
R10-M39	30-49	Male	Rural	High school or less	Rice
R11-F39	30-49	Female	Rural	High school or less	Orchard
R12-F38	30-49	Female	Rural	Some college	Orchard
R13-F42	30-49	Female	Rural	High school or less	Orchard
R14-M60	50+	Male	Rural	Some college	Animal
R15-M45	30-49	Male	Rural	Some college	Animal
R16-M49	50+	Male	Rural	High school or less	Mix
R17-M65	50+	Male	Rural	High school or less	Mix
R18-M55	50+	Male	Rural	High school or less	Orchard
R19-F43	30-49	Female	Rural	Some college	Rice
R20-M37	30-49	Male	Rural	Some college	Orchard
R21-M40	30-49	Male	Rural	High school	Animal
R22-M61	50+	Male	Rural	High school	Rice

R23-F52	50+	Female	Rural	High school or less	Mix
R24-M47	30-49	Male	Rural	High school or less	Rice
R25-F38	30-49	Female	Rural	High school or less	Orchard
R26-M46	30-49	Male	Rural	Some college	Animal
R27-M40	30-49	Male	Rural	High school	Orchard
R28-F55	50+	Female	Rural	High school or less	Rice
R29-M47	30-49	Male	Rural	High school	Mix
R30-M56	50+	Male	Rural	High school	Orchard
R31-F53	50+	Female	Rural	High school	Rice
R32-M41	30-49	Male	Rural	High school	Mix
R33-M62	50+	Male	Rural	High school or less	Mix

Table 3.1. In-depth interview case classification

In addition to lay citizens, I interviewed four climate specialists to gain specialised opinions. These include three scientists from Can Tho University's Research Institute for Climate Change (DRAGON-Mekong) and an experienced science and environment journalist at Tuoi Tre, one of Vietnam's most respected daily newspapers. They were chosen because they had been working with local residents in various CC initiatives, with valuable experience and insights that would provide insights on the context of CC situation in Vietnam (its causes,

impacts and adaption), and shed more light on what participants told me. The data collected from scientists is analysed alongside with ones from lay participants. In several cases, they were asked to comment and validate some of the facts that were stated by my lay participants. Together, these expert interviews help me to frequently cross-check my observations across multiple sources to ensure I had an accurate understanding and interpretation of what I observed from other lay interviews. This additional verification through these expert interviews allowed me to be confident that the findings are robust and trustworthy.

3.2.2. Interview procedure

Prior to the data collection, I designed a detailed interview schedule, with a set of guiding specific questions and topics to address. However, during the interviews, the interviewees were given significant flexibility in their responses and I myself would decide whether to skip questions when the need to get to the depth of certain answers and responses arose. Conducting the interviews in this approach allowed me to extract as much data as possible from the participants' responses for later thematic analysis, while retaining the focus on the primary aims of the research. To provide participants with some assurance, gatekeepers from the local authorities helped me to approach them face to face in the first instance. This was their only job; other than that, they had no role in interviewing or analyzing the data.

The guiding questions cover two blocs of questions, one covering CC engagement and the other CC information and communication. The language of questions is comprehensible and relevant to the participants that I interviewed. It is important to note that the terminology of CC could be somewhat technical and abstract for lay participants, in order to not risk overwhelming and distressing them, I began my interviews by asking them several introducing questions on their general experiences with the weather and climate in recent times, as well as their encounter with the concept of CC. I then asked participants to reflect on their

understanding and concern with the CC causes (naturally and anthropologically, individually and socially); as well as CC impacts on their life particularly and the society as a whole. I was specifically interested in their adaptation activities to the changing climate and the individual and structural barriers to these activities.

Following this, a transition question on whether I can move on to the next topic is delivered, so that participants can feel ready for their next responses. I then asked participants questions on the various sources of CC information that they receive from. I was particularly intrigued on where they receive the information, what kind of information they receive and how do they appreciate the information in supporting their engagement efforts with CC. The chronological narrative served as a framework for the interview, while we encouraged participants to expand on their thoughts on the topic, as participants recounted and recalled their stories in dealing with CC.

It is important to bear in mind that, in a qualitative study, the depth and richness of the data enable “researchers to unpack multifaceted, temporally unfolding situations and causal mechanisms in a detailed and sophisticated manner” (Graebner et al. 2012, p.279). The semi-structure interview approach helps me to achieve this status of the data through promoting the flexibility during the interviews. The questions weren’t asked precisely as outlined in the guidance. However, all the questions were covered with slight adjustments based on each interviewee’s responses. This approach allows the inclusion of intriguing themes that arise in earlier interviews into subsequent ones, enriching the amount of quality data. The research initially focuses on examining CC engagement and the impacts of different CC information sources on the engagement. But as the interviews evolving, it became clear that participants intensively elaborated on the indispensable role of lay information and knowledge in their adaptation. The research had to be broadened to more rural participants to obtain further data on

lay information and knowledge and probe more deeply in which way this information source supports the CC adaptation to the fullest.

The interviews are carried out at places that convenient to participants such as their houses, coffee shops, offices. Moreover, to better illustrate the application of lay knowledge and information on their adaptation, they chose to be interviewed in their farming sites such as orchards, rice paddy fields, shrimp and fishponds. These places are ensured to be quiet and private, so that there is no or little noise that could affect the quality of recording; and the interviewees can feel no pressure to express their opinions.

The interviews are recorded by using Voice Memos App on iPhone. The duration of the interviews ranged from 30 minutes to 1 hour and 56 minutes. This time is only dedicated to Q&A section of the interviews. Introduction and acquaintance before starting the formal interview was not included in this calculation.

In addition, after the formal interview, I followed some respondents to their farms and orchards for direct observations and further elaboration. I had the opportunity to immerse myself with the community to witness their adaptation efforts with CC, so that I was able to gain more contextual understanding. There were a few times when I already finished the recording or turned off the recorder to go to the farming fields, the interviewees start to reflect on interesting points and ideas about lay knowledge and information. In these cases, with their permission, I tried to take written notes on valuable points as detailed as possible while they were talking. As soon as I got home, the relevant recordings were reviewed attentively to compare and refine the fieldnotes and to modify questions for subsequent interviews. This practice prevents the unexpected missing of any significant data from the interview, including the interviewee's tone and emotion. Further, it supports to identify new findings and arguments, allowing me to incorporate further interview questions for more valuable data.

3.3. The data analysis process

In this study, the data analysis followed an iterative process where I interviewed some, analysed data, then interviewed more until theoretical saturation – i.e. the point when I decided that more data would be unlikely to reveal more than what I already had. Although O'Reilly and Parker noted that the attainment of data saturation may not be feasible (O'Reilly and Parker 2013) (as the themes generated from the data are theoretically infinite), the relatively sizeable and heterogeneous sample in this study allowed me to closely engage with participants to be able to determine that more interviewees would provide me with few new themes. In other words, “a reliable sense of thematic exhaustion and variability within data set” (Guest et al. 2006, p.65) was obtained.

In any stage during the process, my data analysis involves a strategic combination of deductive and inductive thematic analysis that involves the six phases depicted in Table 3.2. It is important to note that these six phases are not strictly linear, but a recursive process. During the analytical process, I encountered a substantial number of thoughts and observations that are sideways, backwards and sometimes even rounded in circles. This encourages me to revisit the data to further understand its semantic and latent meanings.

Phases	Description of process
1. Familiarizing yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.

3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic ‘map’ of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story from the analysis, generating clear definitions and names for each theme.
6. Producing	The final opportunity for analysis. Selection of vivid, compelling examples for final analysis and write-up, relating the analysis to the research question and literature, producing a scholarly report of the analysis.

Table 3.2: Phases of thematic analysis (Braun and Clarke 2006, p.87)

The first phase of analytical process is familiarisation with the dataset, which involve an iterative process of reviewing text-based data items in the transcription and listening to the audio recordings for multiple times. In addition to these practices, I critically engage with the data by taking brief notes on analytical ideas and themes, enabling the notice of various arguments on CC engagement and CC information sources. Yet alongside these intellectual and cognitive interpretations, I witnessed strong emotional responses from participants as they talk about their adaptive course, the frustration in seeking for help and also hope for more effective adaptive measures.

In the next stage of data analysis, which is data coding, I noticed more important insights and information from the dataset that would to be systematically captured for both semantic and latent quality. In order to achieve this, I cultivated both deductive and inductive coding approach. As mentioned, my initial analytical

coding was primarily deductive, shaped by discursive ideas of the theoretical approach of public CC engagement and of habitual media use patterns. This theoretically deductive approach indicates a broad pattern of meanings of how participants engage with CC socio-economically, politically and morally, as well as the challenges to an effective engagement. For CC information sources, this approach embraces the overarching ideas of the prevalence of CC information that participants acknowledged from each information source, their appreciation of the information quality and its impacts on the subsequent engagement.

Deductive coding, basing on existing theories or frameworks, allows me to maintain a focused and organized approach to my data analysis. While this method promotes consistency, it could also cause me to miss important patterns that fall outside the scope of my original theoretical framework. The inductive coding approach, therefore, helps to avoid such situation. By “giving voice” to participants and tell their stories in a straightforward way (Braun and Clarke 2021), I manage to attain some unexpected codes such as the socio-economic fragility in business activity, the central role of government in channelling CC information from other sources, and especially the combination of lay and scientific knowledge in CC adaptation.

However, we can never interact with the data entirely in inductive approach, as we cannot merely "give voice" to the data. Our perspectives inevitably influence what we observe and how we construct narratives around the data (Fine and Vanderslice 1992). This underscores the importance of researcher reflexivity. Braun and Clarke emphasize that the researcher plays a crucial position in shaping the inductive analysis, acknowledging that the researcher's biases are always present and somewhat influence how data is interpreted, and themes are identified (Braun and Clarke 2021). Instead of seeing it as a hurdle, I consider the involvement of the researcher in identifying themes as an essential element to enhance the depth and credibility of the research's findings. By embracing

subjectivity, remaining contextually grounded, practicing self-awareness, and adopting a questioning approach to fostering transparency and critical reflection throughout the research process, a rich and insightful thematic analysis is achieved. This is further strengthened through the inclusion of fieldwork and detailed notes during data analysis process (Appendix). In fact, while collecting data, I have constantly kept the fieldwork notes of each participant in order to fully grasp the emotional side of participants. This action together with the detailed reading of participants' interview enable me to produce a categorization of themes and sub-themes which show the depth and breadth of the data.

After reviewing the codes in relation to the full set of data, I progressed to the third phase of analysis – “Generating Initial Themes”. In this phase, I began working with the data codes to identify areas of shared meaning. This involved grouping potentially related codes together to uncover candidate themes (Braun and Clarke 2021). During this process, each theme was examined individually in connection to the research question, and within the broader context of the analysis.

By collating data together, I initially cluster codes into themes and sub-themes. Those include the perception of CC causes and impacts, the behavioural responses to CC, individual and structural barriers to CC engagement. The themes for CC information sources were categorized by sources – namely government bodies, mainstream media, NGOs, business, scientific information sources and lay information and knowledge. These themes and sub-themes are selected from the coded data that revolve around a central idea or concept and have the potential to offer meaningful insights into the research questions. As mentioned earlier, the phases of thematic analysis are not linear but rather a recursive process. Therefore, in phase 4, I evaluated the suitability of the provisional candidate themes with the data and assess its feasibility within the overall analysis by revisiting the entire dataset. This phase focused on reviewing the dataset, revising themes, and occasionally re-check the transcription and recoding, along with the challenging

task of “letting things go” (Braun and Clarke 2021, p.35). This process extended into and overlapped with phase five, where I worked on refining, defining, and naming the themes. I then met with my supervisory team several times to review and agree the final themes, before going into the phase six where I started the writing-up process of the analysis.

In this research, I collected the data from urban and rural participants at different locations. I then separately analyse them in various themes and sub-themes to identify differences and similarities in how they engage with CC, how they perceive CC information sources and how distinctively these perceptions affect the subsequent engagement. The overarching analysing ideas and patterns in themes and sub-themes apply to both urban and rural participants. Although the distribution of urban and rural participants in the sample was uneven, significant differences between them were detected and reported as the themes are presented. An issue that I spent the greatest amount of time to deal with while writing up the analysis is the contradictory sense within the dataset. In my research, almost all analytical themes and sub-themes contain the contradictory tensions between different data items.

In order to make sense of this contradictory meaning, I approached the analysis with attention in mind. First, the data presentation and interpretation do not conflict with the central organizing concept of the theme; it should convey the key meaning of the theme, instead of telling a single story. For example, when analysing the theme “Perception of CC causes”, I have encountered both arguments that “CC is predominantly human caused” and “CC is caused by the Earth axis” or “by the act of God”. This is the contradictory tensions. In the analysis, I elaborate the norm first, which is “the majority of participants acknowledged that CC is man-made”, and then present the exception later, which say “It is not the consensus among participants, there are a few misunderstandings over the CC causes”. The second way that I employ to deal with contradictory

sense in the dataset is to consider it as an analytical theme. This often occurs within the analysis of the quality of CC information from various sources. For example, in the theme of mainstream media, the analysis exhibits the contrast factor of this information source, in which participants receive CC information the most from the mainstream media, but its information has little impact on their engagement due to certain limitations.

I used NVIVO to support the process of data coding and thematic analysis. I find the software is very useful, as it helps me to clearly categorize the data by participants' groups. Having the data in one place makes me feel the analysis more manageable at the first place.

3.4. Evaluation of the qualitative method approach

Evaluating qualitative research quality differs significantly from quantitative research. Qualitative researchers have debated the applicability of reliability and validity criteria to their work, suggesting that these terms require reinterpretation. For instance, the concept of measurement validity inherently implies a focus on measurement, which is typically not a primary concern in qualitative research. As a result, the traditional notion of this validity appears to hold limited relevance for qualitative studies. In light of that, for this research, I would use the other four alternative criteria with similar meaning to reliability and validity, which are credibility, transferability, dependability and confirmability to assess the quality of the research (Guba and Lincoln 1994). Each of them has the equivalent criterion in quantitative research.

Credibility, comparable to internal validity, involves two key aspects: conducting research in alignment with established best practices of qualitative research and seeking confirmation of findings from interviewed participants of the research. This process, known as respondent validation, entails sharing my findings with the participants to verify that the interpretation accurately reflects their contribution to the research as well as their knowledge and experiences of the

research subject. My goal is to ensure a strong alignment between the findings and the participants' perspectives and experiences, thereby reinforcing the validity of the research.

Transferability is similar to external validity. As the research focuses on the intensive study of a small size of samples, it aims at producing rich details on contextual and cultural uniqueness of the chosen research participants and sites. These pieces of information provide other researchers the unique background data so that they can have a possible transferability of the findings and research procedure to do research qualitatively and quantitatively in other milieu, such as places with severe climate impacts. In this study, the data has been collected from the most CC-affected areas in Vietnam. In these areas, people not only adopt specific cultivation, such as rice planting in severe saline situation; but also, special approach to climate adaptation which is how the communities mutually connected and supported each other to promote the climate resilience. The research results could be references for other research conducted in places with the same climate situation.

Dependability parallels with reliability. For this qualitative research to attain the reliability, I have applied an 'auditing' approach put forth by Lincoln and Guba, in which I kept and elaborate the complete record of research phases, especially the data collection procedure (i.e. the selection of participants and sites, interview process, interview's transcription, fieldwork notes, data analysis procedure). These are considered as an audit trail to validate the reliability of the research process and results.

The last criterion is confirmability, which parallel with objectivity. While understanding that an absolute objectivity is impossible to achieve in qualitative research. I have used my subjectivity, not to alter the conduct of and the finding of the research, but to connect various data points to persuasively establish an

analysis that is deep, nuanced, insightful, thoughtful, rich, complex in interpretations.

Finally, I would here stress the powerful combination of deductive and inductive thematic analysis that considerably helps this study obtain the above. Deductively, as mentioned, I used existing theoretical frameworks to analyse data from a 'top-down' approach, providing a structured viewpoint from the outset. According to (Braun and Clarke 2021), this approach offers a systematic way for data analysis, in which predefined concepts or hypotheses are explored and tested extensively within a robust theoretical framework. It facilitates the (re)examination of existing literature, both empirical and non-empirical, to either reinforce, refine, or challenge ideas in varied contexts (Gilgun 2014; Pearse 2019; Casula et al. 2021). Moreover, it helps establish clear objectives from the outset of the interviews, providing structure to both the interview process and subsequent analysis, ensuring alignment with the research goals. This approach is particularly advantageous for studies that seek to evaluate existing theories in novel settings or to analyse categories, concepts, models, and hypotheses across various regions and timeframes (Elo and Kyngäs 2008).

For this research, the literature review has shown much evidence about the public engagement with CC socio-economically, politically and morally, and the sources of CC information that they receive from around the world. The evidence is unfortunately underrepresented in Vietnam. The deductive analysis approach with theoretical applications will help me to understand these aspects in Vietnamese context. The deductive approach provides a clear pathway for analysing public CC engagement and perceptions of CC information, leveraging well-established theoretical assumptions identified in the literature review. However, this method has its limitations. By focusing primarily on pre-existing theories, it may hinder the discovery of novel themes or insights within the data. To address this, I incorporated a thematic analysis using an inductive approach, following the

recommendation of (Elo and Kyngäs 2008) to analyse any unrelated data inductively and generate new concepts.

Inductive thematic analysis involves methods that focus on closely examining raw data to identify concepts, themes, or models through the researcher's interpretation. This approach follows Strauss and Corbin's principle, which states that "the researcher starts with a specific area of inquiry and lets the theory emerge from the data" (Strauss and Corbin 1998, p.12). Unlike its deductive counterpart, it begins with the dataset itself, taking a data-driven approach to uncover meaning. Themes naturally emerge from the data and are not overshadowed, reshaped, or overlooked due to pre-existing theoretical frameworks during data collection or analysis. This "bottom-up" method fosters the discovery of new insights from the data by prioritizing its inherent narrative. It lets findings arise directly from prominent, recurring, or significant themes present in the raw data.

For my research, the natural emergence of themes also occurs during the iterative data collection process. Approaching the data inductively allowed me to remain free from preconceptions or a fixed coding framework. Consequently, I was able to identify and develop themes and codes in a flexible, natural manner, allowing them to evolve throughout the analysis process (Braun and Clarke 2021). By applying the inductive approach, I was able to identify some unexpected themes and issues, such as the significant difference between urban and rural participants in their CC engagement and perception of CC information, the facilitating role of the government and the combination of lay and scientific knowledge for CC adaptation. Together, combining inductive and deductive analysis contributed significantly to the credibility, transferability, dependability and confirmability of my findings.

3.5. Challenges and limitations

The benefit of qualitative research with thematic analysis in producing a deep and insightful interpretation within a unique social context has been proven across academic research. However, there remain certain challenges and limitations that inhibit its applicability.

A major limitation of qualitative research is the generalizability of its findings. It is frequently argued that the outcomes of qualitative studies are limited in scope. The execution of qualitative interviews with a small group of individuals from a specific organization or community has raised the criticism that it becomes challenging to determine how these findings can be applied to a broader population in different contexts. This is similar to the limitation in replication of the qualitative research findings, whereby critics have pointed to the particular influence of researchers in data collection and analysis process, as well as the fact that the findings are extracted from localities with uniquely socio-economic traits. These factors make it harder to achieve true replication in other studies, as there are rarely standardized procedures to adhere to. There are some aspects that are difficult to be replicated in other studies in other context. For example, CC communication approach in a country with one-party system like Vietnam might not be applicable for other countries with different political system. Even CC information comes from different sources, it is still be influenced by the political ideologies and approaches.

This study used the purposive and snowball sampling approaches. The first limitation is that snowball sampling may introduce potential bias in participant recruitment because individuals tend to recommend others within their existing social networks who share similar backgrounds, occupations, or viewpoints. This process may have limited the diversity of participants in the data. Another limitation of these approaches is that the data were collected from a small and non-random sample of the population. The disproportionate allocation of urban

and rural participants in this research is in part the result of the sampling approaches. However, it was a deliberate research decision. For one thing, most of the Mekong region is inhabited by rural communities that are dispersed around an urban – or more exactly less rural – area. For another, rural populations in Vietnam, particularly those in climate-vulnerable regions such as the Mekong Delta, are widely recognised as the most exposed to the direct impacts of CC. Their livelihoods frequently experience climate-related disruptions such as irregular rainfall patterns, flooding, saltwater intrusion, and declining crop yields. Given this vulnerability, prioritising rural participants allowed the research to capture in-depth analysis of how individuals living in this highly affected area perceive CC, interpret climate information, and develop strategies for adaptation in their daily lives. Unlike probability-based sampling techniques, these methods do not aim to produce statistically representative data of the broader population. Instead, they prioritize depth of insight and contextual understanding.

Following this, a challenge is directed toward the researcher's subjectivity in qualitative research. Some critics argue that the researcher is the primary tool for data collection, meaning that what is observed and heard is largely influenced by the researcher's personal preferences. The researcher's bias in qualitative research could affect the credibility of the findings. It is important to note that it is impossible to totally remove the researcher's subjectivity in qualitative research, as it is also an essential tool to produce a nuanced, rich and complex analysis. In this qualitative research, in order to ensure its credibility, I have communicated my research findings to the interviewed participants to earn their validation. This helps me to ensure the findings' correspondence to their previous responses.

Another challenge of qualitative research is the lack of transparency, by which sometimes it is criticized for being ambiguous about how people were chosen for interview and how the data is analyzed in process (Jacobs et al. 2019; Shufutinsky 2020). To minimize this limitation, I have elaborated clearly in the previous

sections on the process of sampling and analysis, whereby I selected participants not on the basis of my preference and ingenuity. By using both purposive and snowball sampling methods, I strategically chose participants that fulfil the requirement of research questions and theoretical approach. Furthermore, as explained in detail above, I carried out thematic analysis phase by phase to achieve an insightful and rich interpretation of the dataset.

The qualitative thematic analysis requires a great deal of skills and knowledge in data collection and interpretation. In this research, it poses a challenge for me as a new researcher who had to spend a considerable amount of time learning, practising and sharpening these skills. Due to the huge amount of collected data, occasionally, I encountered the state of ‘analytical paralysis’ (Braun and Clarke 2021) in dealing with a diverse spectrum of potential interpretation and themes for writing the analysis. Another challenge that emerged during the analysis process was to make sense of the contradictory meanings in the dataset. This is the skills that I need to master, not just for this PhD, but also for future research as well.

For this qualitative research, the data collection, transcription and analysis might be a lengthy and costly process. It is quite time-consuming for the interviews to be undertaken, transcribed, analysed and reported. Moreover, the research is rather costly for me as I have to travel to the research site two times. The reason I prefer to implement interviews in face-to-face context with participants rather than via phone or the Internet, is because of the research’s focus on the critical issues of CC impacts. By immersing myself in the most CC-affected areas, I was able to deeply understand CC impacts practically, physically and emotionally on participants’ life and witness their behavioural responses first-hand in where they live and work. It is important to note that this research was carried out during COVID-19 lockdown in Vietnam, which prevented me from traveling to the research sites for 18 months. This led to higher expenses and extended the time

required, ultimately prolonging the research timeline needed to complete the project.

3.6. Ethical consideration

Although there was no sensitive interview question in this research, the decision to participate in the interview sessions was left to the discretion of the participants. It was critical to inform participants their decisive role in the procedures of the research (Boyce & Neale 2006). To help them feel assured about the participating decision, the research topics, aims and objectives were provided prior to the interview. They were also informed about the anonymous analysis and storage of their responses. If they decided to take part, they would be given the research's information sheet to keep and be asked to sign a participant agreement form. Further, they are informed in advance that they can withdraw from the interviews at any time before the analysis, and/or wish not to answer any particular question in the interview.

The data collected about participants is used in an anonymous form to protect the confidentiality of participants. The anonymous data is analyzed and incorporated into the research findings or outputs, whereby participants' identity cannot be determined. The interviews are audio recorded with permission from participants. They were securely stored and carefully managed for the transcription and data analysis of the research.

Before my field trips, I obtained an ethical approval on all practices and procedures from Bournemouth University's Research Ethics Committee, which enabled me to carefully address and resolve all other potential ethical concerns. All the data I collected from participants will be kept strictly in accordance with current data protection legislation. Bournemouth University as a Data Controller of the collected data will be responsible for protecting the data and making sure it is used appropriately.

3.7. Conclusion

The use of qualitative in-depth interview method helps me to obtain both the depth and breadth in understanding public CC engagement and perception of CC communication in Vietnam – one of the most CC-affected countries in the world. The thematic analysis using both deductive and inductive approach has ensured the integrity of existing theoretical bodies to be tested in a new research context, as well as the flexibility to identify numerous unexpected and unexplored themes and insights from the data. Given the scarcity of research on this topic in Vietnam, this method is well-fitted to provide findings which serve as the foundation for more research to be carried out at a larger scale in Vietnam and beyond both qualitatively and quantitatively. Although there remain several limitations of a qualitative research project, the use of this method enables the achievement of deep, nuanced and multi-faced findings of how people engage with CC at multiple levels and how it is associated with the ways they receive, use and act with CC information from different sources in different socio-cultural contexts. These findings will be analyzed thoroughly in the following chapters.

Chapter 4. Vietnamese engagement with climate change issues and its barriers

This chapter examines how participants engage with CC issues socio-economically, politically and morally. The data show a substantial difference in CC engagement between rural and urban participants. Except for some similarities in their (mis)understanding about the CC causes, a significant difference emerges in how participants perceive and experience the impacts of CC in their daily lives, with rural participants especially facing more severe disruptions to their cultivation activities. They also express more concerns about the future impacts of CC on their livelihood. This difference is further illustrated in behavioural responses, in which more resilience and efforts to CC adaptation are noticed from rural participants. Despite of certain efforts to engage with CC, there exists various individual barriers (the lack of resources and climate-unfriendly habits, indifference to CC-related issues and responsibility denial) and structural barriers (limited policies, infrastructure and socio-economic fragility), which impede an effective CC engagement from participants. The chapter then moves to the analysis of these barriers among rural and urban participants, in which besides some similarities in individual barriers, rural participants have suffered more from structural barriers in their effort to adapt to CC.

4.1. Perception of CC causes

With a few exceptions, the majority of participants shared the understanding that CC is caused by human activities. There was not much hesitation in choosing human over natural causes. As seen in the comment of U1 (Urban Participant 1):

If I have to compare [human or nature], I will say 80% of CC causes are from human activities. There is a cycle of natural CC over time, but I think mostly it is from human causes.

However, participants' understanding of CC causes is based more on their local and daily life experience than an understanding of macro issues at the global level. Urban participants tended to attribute CC to industrialisation and modernisation. Extracting from his experience, for example, U1 commented on how industrial activities in his city such as coal mining affect the surrounding environment, with huge amount of dust concentration covered trees and houses that make him suffocated. Among other urban participants, there were constant criticisms and complaints on excessive exploitation of natural resources for industry, energy consumption, and the fast expansion of private transportation in big cities. Meanwhile, rural participants emphasised their agricultural activities, especially their cultivation practices, as threats to the climate. This can be represented by R5's comment (Rural participant 5):

It is true that my cultivation activities are one of the factors [...] Like improper management of animal sewage in breeding, it is insignificant to CC from a single household, but the impact will be much more evident from multiple households.

In addition, excessive deforestation, unchecked consumption of insecticide and fertilizer, uncategorized domestic waste was among the listed CC contributors. All this is in line with what S1 (Specialist 1) – a senior journalist of Tuoi Tre News reporting CC and environment issues – observed from his reporting experiences and knowledge. Lay people, he said, do not understand the causes of CC deeply; they just witness the actual circumstances happening around them without much comprehension of the true nature and global scale of CC.

It should also be noted that, while most participants accepted the nature of CC as a man-made phenomenon, it was not an absolute consensus. R7, for instance, thought that human beings have little impact on CC and that it happens primarily due to the change in nature and the earth's axis. In his conception, the “spinning position” of the earth determines how the climate will change:

Some people say deforestation has caused CC, but I think it is not the case. It's because the earth rotation or something that change the climate. People say it's human-caused, I think it's partly true due to the fact that humans can't change it. The climate is okay, that's part of the earth's cycle and we have to accept it. I find that CC happens 80% naturally. For example, the earth rotates on its own axis making the weather changes without our acknowledgement. I don't think cutting down protective forests has many impacts on the climate.

Such misunderstanding might sound absurd to CC experts but occurred more than once in my data. Another, R4, referred to CC as “the act of God” and has nothing to do with human activities. Further, some participants misunderstood CC as the result of the ozone layer depletion. As seen in this statement by U3:

Human has polluted the environment, exploited natural resource, and destroyed the forest which in turn deplete the ozone layer. This is the reason for the earth's increasing temperature and CC because nothing left to prevent sunlight.

4.2. Perception of CC impacts

There is a difference between urban and rural participants with regards to the understanding of CC impacts. Among the former, awareness of CC impacts was found to be lacking, generic or shallow, mainly in reference to extreme weather change, fickle temperatures and precipitation patterns. They either complained about disruptions to travel, infrastructure systems and daily schedules or unpleasant physical feelings induced by changing weather. Some comments on the health impacts are rather generic and vague, such as “CC impacts on human's health are sometimes making us sick”, “Health impacts are like sort of flu and coughing”, or “The hot weather affects health”. Similarly, little awareness of economic impacts is demonstrated. U3, for example, thought only of his income loss due to heavy rain (“When it rains heavily, I will lose money on a teaching session because I can't go”) while U5 does “not really think of economic impacts of CC”. Other than that, urban participants referred primarily to the

unpleasantness of the unusual pattern of weather with sweltering summers, frosty winters, or stormy years, which typically can be seen in a comment from U1:

CC has made the weather severely hot or cold. My family in the North calls me frequently saying about abnormal low temperature, they still feel cold even with 2-3 sweaters on. While here in the South, it was hot from the early morning until midnight. I still feel hot with just shorts on. It was horrifically hot that I can't take it anymore.

On the contrary, rural participants attain more sophisticated experiences with tremendous CC damages to their livelihood and income. CC has fundamentally turned their life upside down because their livelihoods considerably rely on stable weather and climate. Land in Mekong Delta Region used to be in good condition for cultivation. There is an old proverb of “light works, heavy earnings”, indicating the Mother Nature’s privileges for this region, enabling local people to do less serious, time and energy-consuming agricultural works but being able to live a snug life. This perception has been widely accepted by rural participants in their nostalgic memory of abundantly inevitable fruitfulness like “In November – fruits automatically grow” or “overflowing fish buckets in October”, or the experiences of “profuse amount of silt” on rice fields providing plentifully nutrition and minerals to raise fishes and other fresh-water animals. They, however, recognize that these natural advantages have been substantially shrinking in present days due to capricious weather and salinity invasion. Sea level rising has worsened the current cultivation practices together with lowering Mekong River flow. Some reports the struggle with CC situation with a wearied and disappointed mentality, as can be seen in R32’s comment:

Formerly, there were two distinct rainy and dry seasons here, each 6 months. Nowadays, there are no longer distinct seasons. Even the last dry season was flooded. Now, it rains whenever it wants to [...] Fruits here are losing their seasonal patterns, sometimes they bloom unexpectedly [...] Now we have to

find a new way to live, growing whatever plants without any certainty on consumption. CC has made our life so much harder, and we don't know what to do.

On another instance, R27 observed that agricultural planting now is only to withstand the weather. It is the game of chances, he said, and all would come down to nothing if it rains. This disappointed sentiment is also shown in R23's comment:

Nowadays, off-season planting is unable to harvest. With such harsh weather, is there any way I can increase productivity? I don't think so. I've tried every pesticide, but there's been no improvement. Farming is very difficult now [...] I planted 1000 m² of sugarcane but lost prices, I burnt it all.

4.3 Behavioral responses to CC

Different experiences with CC impacts lead to considerable differences in behavioral responses to CC between rural and urban participants. Specifically, a low commitment to CC actions was seen in the majority of urban participants. They demonstrate a lack of enthusiasm towards environment-friendly behaviors. They recognized the need for actions such as fossil fuel reduction, renewable energy use, tree planting, categorisation of plastic products or garbage. However, the actual execution of these actions is reported at a low threshold which can be seen in some urban participants' lukewarm expressions like "sometimes" or "I will apply the methods if I have resources".

Most rural participants, however, showed a stronger resilience and determination to take action to overcome unfavorable climate circumstances and to protect the environment than urban ones. Many endeavour to perform environment-friendly behaviours such as stopping littering in river and land, garbage collection and limited use of plastic products. R11, for example, shared her experiences on bio-

garbage practices to benefit both agricultural production and environment protection:

In my family, we often categorize different types of garbage. We raise shrimp and plant vegetable, so we usually separate recycle and biotic garbage and use bio-fertilizer for vegetable in return. Treating garbage in this way manages to not pollute the environment [...] There is no place to burn garbage, which would emit a lot of GHGs to the atmosphere.

Another example of bio-method use is R5. In the past, he left livestock frequently unchecked, releasing a huge amount of CO₂ and polluting the air condition; now his newly installed animal-waste categorization emerges as a double benefit for income and environment:

I have to change. I used to let my pigs roam freely in the garden. They would defecate everywhere, which have negative impacts on the environment [...] Here, I employ new methods such as collecting the manure in a composting area. It produces various useful gases for gardening from this manure product.

CC resilience was also seen through their adaptive practices. R12 shared that most rural people in Mekong Delta Region refrain from being frightened by CC impacts and modify farming activities in their own land. For example, some implement brackish cultivation [the mixture of salt and fresh water due to CC salinity invasion], like raising different kinds of fishes in brackish water or combining rice and shrimp in a field. Others perform multiple cultivations on their land like afforestation, rice plantings, and honeybee hiving. A few others take further steps to adapt their current farming products and practices to a different business like agricultural tourism. As R13 enthusiastically introduced:

Currently, I see many benefits of transition to the tourism model. Visiting payments are a source of income. I can sell fruits to tourists, and they consume

products on the spot. I have to connect with numerous sources to ensure frequent visitors, a lot of people know about our practices nowadays.

However, my observation from the dataset is that for the greater part of rural participants, regardless of their resilience and determination to adapt to CC situation such as using extra fertilizers and pesticides, frequently pH and water replacement or forcibly off-seasonal planting to compensate for the natural damages of CC, they fall short of achieving favorable results financially and environmentally, due to several challenges in the cultivating process as well as crop harvesting. Some blame the unsustainability of cultivation models, their reduced productivity, and low-quality outputs. Some mention their inability to maintain existing farming models but found it too hard to switch to a new cultivation or to perform practices of environmental protection. Others complain about the economic aspects of agricultural productions, in which they have poured a huge investment for cultivation, but in exchange, are stricken with the fluctuate selling prices and unstable consumption outlets.

Such perilous impacts on traditionally agricultural livelihood have led some, especially younger people, to leave their homeland for opportunities elsewhere. R12 expressed her grief for those who have to migrate as their hometown, being inundated by water and large cultivated lands, have become barren. They have to find other jobs in different cities or countries, hoping to earn better income to feed their family. R10, for instance, noted that he must bring his family to other places for new jobs, otherwise they have nothing to eat. R32 reflected on the forced migration that rural people are suffering from:

Rural people's lives are very difficult now. There are many nice houses, but these were built by income from elsewhere. The children go to work at companies or other places and bring money back home. Income from the land and agriculture is just enough to survive on; it doesn't allow for economic development.

With reporting experiences in CC and environmental issues, S1 agreed with these opinions, mentioning the migration tendency of rural people:

The story of migration in the Mekong Delta region is a hot topic, according to recent statistics, there are 11 million emigrants [...] These people must go away to work and earn money, which they send back home to support their family's economy.

These hardships have caused by triple barriers. In addition to natural barriers of severe CC impacts, the other two are individual and structural barriers, which overall caused most rural participants unable able to effectively engage with CC issues socio-economically, politically and morally. Some of barriers are shared with their urban fellows as well, as discussed below.

4.4. Individual barriers to climate engagement

This section will analyze individual challenges to an effective CC engagement. It points to the inherent limitations in working and living practices of the participants. These include, among other things, lack of resources, environment and climate-unfriendly habits, indifferent attitude towards CC-related issues, and responsibility denial.

4.4.1. Lack of resources

Participants reported not having enough material and intellectual resources, specifically land, money and knowledge, to effectively engage with CC. The majority of both urban and rural participants echoed these shortages in their responses. For the former, they raise concerns over resource shortages as barriers constraining their pro-climate actions such as renewable energy transition, fossil fuel reduction or garbage categorization. For example, U1 mentioned his inability to buy a solar power equipment because of his financial shortage and high prices of “green products”. Even though he understood the pollution problems, he was unable to take practical actions and pinned all his hope in the government’s

financial support for the change toward the affordable renewable energy. U7 said that he will change to electric vehicles if he has “enough money”. Likewise, U5 stated the constant burning of cheap coal to save money due to the high cost of gas and electricity. Further, the limited land area within the city is also alluded to as a reason for the inability to adapt CC. U9, for instance, mentioned the fact that in a few areas in the city where tidal floodings occur, people living here are unsure of what to do as they do not have “safe areas to be relocated”. Another issue raised by some urban participants is their lack of knowledge to engage meaningfully with CC. Some urban participants admit that they do not have deeper knowledge and understanding of CC for proper behavioural responses. For instance, U8 shared the fact that she doesn’t possess in-depth CC understanding, thus she fails to make fundamental changes like “garbage categorization or plastic reduction” to curb the greenhouse gases emission.

In a similar vein, the lack of material and intellectual resources is evident and critical for rural participants in their efforts to sustain cultivation in severe CC. Some rural participants confine that they still want to do agricultural practices on their own land such as orchard or rice planting to adapt to CC, but hindered by the “immense investment capitals” and “shrinking land area”. R2, for example, expressed disappointment:

My available land has decreased [...] There’s no longer enough land for farming. That was the main reason for the inability to do agriculture. In general, those who still have large amounts of land continue with farming. However, since I have a small amount of land, pursuing agriculture wouldn’t be feasible.

Others have tried to implement different agricultural practices on their land but fail to earn proper income because of high investment. For instance, R13 shared that in the past, he farmed shrimp, but then given it up and demolished the pond because shrimp farming instigates meagre earnings, while requiring high investment of capitals. Likewise, R9 noted that he is unable to invest in new

equipment for offshore fishing because of high expenses for maintenance together with low income from seafood markets.

Suffering from great loss of depreciated traditional crops, some are desperate to switch to non-agricultural livelihoods but also face material and financial resource challenges. For example, R1 underscored the challenges in land and money hindering his ability to undertake a transition to tourism:

Generally, I don't have enough land to do something more profitable than agricultural works, like planting or breeding. Also, I don't have money as well, so that I can't change to another livelihood, like tourism. This is for someone with good land area and position. I don't have any of those, so it is impossible for me to do what others have done.

Some others also take notice of the difficulties to perform tourism. Due to the shortage of land together with obsolete infrastructure and agricultural equipment, not every rural resident is able to convert their land into homestays and tourism ventures and combine eco-gardening for tourism. They do not have the ability to "open retail stores, sell fruit, or run cafes and guesthouses" to attract more tourists to be able to earn higher income than traditional farming. As R12 pointed out in reference to the dire financial conditions in some rural areas: "The poor do business with each other, no one has money to trade".

Studying rural people's agricultural activities for an extended duration, S3 who is working for Research Institute of Climate Change in Can Tho University shared the same opinion on how strained resources affect rural residents' effective CC engagement. To her knowledge, even if they are equipped with adaptive CC information, it depends a great deal on other factors such as labors, money and land areas for a successful application of adaptive methods. She elaborated:

If a person has 2 hectares of land and supporting family members, the story will be different. However, for a person with about half a hectare, their income is

very low, earning an average of 3 million VNĐ [£100] per rice season, about 6 million VNĐ [£200] in a year [...]¹. It will be very difficult for them to apply those things because they have no money.

Together with the lack of land and money, some rural participants further stress on the lack of knowledge in cultivation. They mention the low knowledge and skills to attain proper use of fertilizers and pesticides and accurate selection of planting seeds. Even when encouraged by the government to switch to another farming model for CC adaptation such as orchards, they are unsure what to plant and what kind of fruit is the priority. For example, R26 noted: “I also want to grow something suitable, but I don't know what to plant”. Similarly, the transition to other livelihood is also challenging to accomplish due to this lack of knowledge, which can be seen from R7’s comment below:

I don't venture into tourism or any other economic activities because I can't manage it. There must be a lot of knowledge about those fields that I don't have in order to implement.

Due to this lack of information and knowledge in agricultural activities, wrong judgements and approaches to cultivation practices are rendered, heightening the difficulty to enhance CC engagement socio-economically. R31 emphasized that rural residents are mainly low educated with limited intellectual capacity. Some people don't listen to the instructions because they don't understand. They oppose and do not comply the climate-benefited cultivating instructions. Additionally, the lack of cultivation knowledge has weakened the decision-making capacity and

¹ These figures are consistent with the most updated statistic in 2023 about “Planted area and production of paddy” in Mekong Delta Region from the General Statistic Office of Vietnam.

<https://www.gso.gov.vn/en/agriculture-forestry-and-fishery/>.

These figures are also confirmed by leading agricultural scholars such as Professor Vo Tong Xuan – Head of Can Tho University and other government officers of Mekong Delta Provinces such as Mr Tran Anh Thu – Vice President of An Giang’s People Committee, who said: “On average, farmers produce two rice crops. The profit is 30 million VNĐ [£1000]. With an average household size of 5 people, each person would earn just 6 million VNĐ per year [£200], or about 500,000 VNĐ per month [£25].” <https://www.qdnd.vn/kinh-te/cac-van-de/bao-gio-nong-dan-lam-giau-tu-nghe-trong-lua-732798>

facilitated a stronger dependence on unsuitable information or even plain imitation of other agricultural models without proper research on their limitations. R17 sarcastically noted that this uninformed dependence engenders more troubles in production process as rural people have to spend more money on fertilizers and pesticides to compensate for knowledge deficit. These activities have hurt their economic status and impose more pressure on the climate and environment.

Within the close contact with rural residents, S3 also deeply discerned the negative impact of the deficiency of authorized CC information and knowledge when referring to a group of rural people with little to no knowledge. This has made the delivery and reception of adaptive information almost impossible, exerting further burden on the effective engagement, she shared:

They don't have much information so they can't apply scientific information in their cultivation resulting in a lot of harder field works. Their cultivation activities will be relied on feeling and non-scientific based information primarily [...] If they see their rice field sick, they will buy unauthorized fertilizers without thinking about the proper amount and alternative cultivation methods.

4.4.2. Environment and climate-unfriendly habits

The environment- and climate-unfriendly habits that participants often perform engender harmful impacts and inhibit effective CC engagement. For rural participants, it is the haphazard habit of using fertilizers and pesticides – such as “impulsively buying medicines in pharmacies” immediately on seeing any sign of slow development of breeds and dispose them to the environment without any order or system. Perceptions from some rural participants indicate that these improper farming habits not only severely disrupt one person's but also the whole community's livelihoods. R12 bluntly criticized the excessive application and disposal of planting pesticides, to the point that “fishes can no longer live in the

river water”. Aligning with this opinion, R14 concerned the highly polluted environment, predominantly due to the reckless farming habits:

In this area, some rural residents’ awareness is very low. They throw anything that dies or is no longer usable into the river [...] The most dangerous issue is the reckless use of pesticides [...] People have the bad habit of dumping chemical waste either into pits or burned. Environmental pollution and CC we facing are largely the consequence of this habit.

Moreover, some rural participants expressed their disapproval for these harmful habits. They harshly denounced these habits, which disregard the governmental instructions and caveats on security of inclusively on-seasonal productions, and further affect other natural elements of land, air, and water, together with surrounding community. They urge the government to act, otherwise, as R23 feared: “They [rural people] will do whichever cultivation and use pesticide overly which affect others a lot”. Likewise, when being asked the societal impacts of these farming habits, R18 is morally worried about the ubiquitous danger of highly toxic pesticides on surrounding people’s life and health.

These detrimental farming habits not only inhibit a proper CC adaptation, but paradoxically sprawling on the communal scale. A number of rural participants demonstrate that this has become a collective pattern operating in numerous rural communities in Mekong Delta Region. They are living in the same community thereby susceptible to mutual influence in their respective practices. They have no other choices but to imitate each other to do the same destructive activities. R1, for instance, cited the collective usage of sand promoting the highly CO₂ emitted sand exploitation:

Sure, CC is caused by human activities, but that is because of livelihood needs [...] For example, sand exploitation activities are growing to meet everyone’s demand. Businesses will expand their production based on everybody’s needs.

The more sand people use, the more those sand exploitations increase. I also among the ones who need sand for construction.

This is also recognized by S3 who observed: “A community must maintain the same farming practices and they cannot do it differently”. The situation is exacerbated by the migrating exodus of young people into big cities. Youth with more flexible and open mindsets left their hometown, as R16 noted, leaving behind older residents with rooted communal mentality, less enthusiasm and knowledge for transformation, who cultivate with inimical habits.

For urban participants, the climate-unfriendly habits are reflected in their daily energy consumption. Most of them fail to engage in CC seriously by exhibiting their habits of prioritizing their present lifestyle and convenience above climate-related benefits. U3, for instance, frankly said: “I never use bus because I don’t feel comfortable and convenient”. Or U4 noted the fact that citizens normally neglect the habit of “saving energy or using energy-efficient appliance” because it is not convenient to them and “wasting their time”. These habitual perceptions have been ingrained in the metropolitan lifestyle. U6 criticized the “metropolitan” mindsets with simple habits and thoughts about CC, thus the daily basis behaviors represent a short-sighted view with minimal attention to CC impacts. They are reluctant and apathetic in reducing energy consumption, rationalizing with “that-is-life” reason as U1 commented:

I use up a lot of energy for daily activities. It is a necessity of life. If I don't use a refrigerator, I might end up hungry with nothing to eat [...] Or if I don't use air conditioner, hot air from neighbouring air conditioners makes me uncomfortable.

The rationale of “that-is-life” continued to be used to cover up the endurance of climate-unfriendly habits. This can be observed from U5, who deny altering her regular use of plastic bags, even though being advised otherwise and knowing

plastic bags taken so long to decompose, which negatively impacts the environment:

I am also part of that problem [using abundant plastic bags]. But that's just how life is. Sometimes when I go to the market, I usually use a lot of plastic bags, so I just discharge them to the environment.

These anti-climate habits from many urban participants are also worsened by the broader perception of community-characterized mentality, in which the pervasive engagement in CC-inducing activities within the urban community compels a collective adherence to the present climate-unfriendly habits. As U8 noted:

I believe I am one of those responsible for littering, untreated household waste, vehicle emissions. But that is life, there is no way to change it. I don't know how to change it either; the whole society also lacks specific solutions. For example, I don't know how to handle the waste, so I continue this living cycle of dirty emission.

These environment and climate-unfriendly habits are further aggravated because of free-rider effect denoting the avoidance of climate action because everyone else is doing the same thing and no-one else perform differently. This can be presented in the following responses from other urban participants like U7 and U6:

Personally, I also want to do what's best, like reducing personal motor vehicles, but everyone is using it. I can't use bicycle.

I acknowledge my own actions to the climate. But with the extreme climate here, I have to use lots of air condition [...] It's the same to everybody at home and at work. It's mandatory to use them. There are awareness and a plan for change, such as electricity saving, limited use of harmful materials like plastic bags. However, it is performed occasionally.

4.4.3. Indifference towards CC-related issues

The third individual barrier to an effective CC engagement is the indifferent attitude towards CC. Even though facing the same lack of resources to engage with CC, unlike their rural fellows, urban participants show more indifferent attitude towards CC. This is partly conceivable as I noted above that they are the ones who expressed less motivation and determination for pro-climate responses. For example, U10 demonstrated her lack of interest to learn about the issue and search for the information:

Actually, I don't have the time for CC topics and information. I only look into the work or issue that related to me. Otherwise, I'm not involved in that field, so I'm not interested and actively study it. I just hear CC information briefly, like most surrounding citizens.

This indifference is also shown in other urban participants' responses as follow: "I don't like and really don't care. I don't actively learn about CC issues" from U3, or "I focus on my professional work only" from U8. U9 emphasized that the indifferent attitude is embedded deeply within urban residents' characteristic. They're "careless" and easily accept living with CC as it is:

Residents living inside the city tend to be indifferent or neglectful, as they don't truly feel the CC impacts. They don't pay much attention to CC [...] They don't think about addressing the issue or calling on support from others.

For rural participants, they are not unconcerned about CC per se. As discussed, they profoundly worry about its impacts on themselves such as their cultivation and livelihood and actively seek ways to sustain them. However, there are a few of them exhibiting the indifferent attitude toward CC impacts on other people. They don't care about the CC consequences on others such as severe floods in mountainous areas due to abnormal raining because as R5 referred as "non-

resident in those areas and are living in a delta region”. This can be seen in R1’s opinion below:

I don't understand that [CC impacts on others], so I don't pay much attention to it. Here, I live on land, not like other riparian and sea-bordered residents who been directly damaged by CC and lived in constant fear of bank erosion or riverbank collapse. That’s why living here, I am unaware of their lives.

This is also confirmed by S4, who highlighted that there are a group of lay people who do not regard themselves as a part of CC efforts because of overwhelming and distant feelings. They see that CC is beyond their capacity which they have nothing to do with it or blaming on unsuitable policies from the government.

Further, there also exists the indifferent attitude toward the impact of self-farming activities on others’ health and environment, thinking spraying pesticides in open areas will pose no harm to the environment and people’s health. For example, when being asked how he would feel about the impacts of his excessive use of pesticides on future generations, R22 bluntly answered that he doesn’t believe that is the case. His rationale is that the chemicals are eventually evaporated within a few days, so they’re “no longer in the air and soil” and that when “everything is safe”.

The lack of concerns toward others’ climate misery is also demonstrated via the refusal to share effective cultivation methods to help others adapt to the fickle climate. Often, farmers just explain casually without detailed information and keep farming secrets for their own. As R21 said: “Some make the water very clean for shrimp farming, but I don't know how they do it. When I ask them, they won’t tell me”. This is also conveyed through R17’s straight answer when being asked how he feel about the adaptive information sharing of others: “They have secrets that I can only see on the surface. They can share 90% with me, but they never teach the remaining deciding 10% of the secret for success”.

The indifferent attitude towards CC impacts on others as well as the lack of interest in sharing effectively adaptive methods hinder a collective CC engagement within a community. The attainment of such engagement is further reduced by those who don't think the inclusive participation in CC campaigns as a foundation for an effectively collective engagement. For example, withdrawing from the local experiences, R4 mentioned that even though he has constantly participated in the government's advocacy and campaigns for public transportation and littering reduction, some locals deny joining, thus reducing the effectiveness of these events:

I advise people to take the bus and reduce their use of motorbikes, which would also help cut down emissions. I encourage local people to do that, but whether they follow through is not something I can control [...] I personally participated in campaigns to clean the environment, unblock water flow, and reduce littering. Some people don't attend, so they don't follow the advice.

In the similar vein, R17 underlined the ignorance to attend trainings and campaigns for CC adaptation observed from his community:

Currently, it is extremely difficult to mobilize the local farming community. It must be said that the local associations should not be blamed. The people here only start doing something when they see profit. They never welcome any change for their own good. the Farmer Association has to give them money for their attendance in training sessions. Very challenging.

4.4.4. Responsibility denial

Responsibility denial did not occur frequently among urban and rural participants. As mentioned, the majority of them recognized their responsibility in human-induced CC. However, there are a few exception, such as U4, who refrained from taking her own responsibility, and blamed the economic advancement and prosperity of previous generations:

Climate was normal in the past. Then the previous generation's development without considering the consequences of CC or fickle weather worsened the situation.

This refutation of CC responsibility can also be observed from a rural participant, R21, who thought Vietnam and its people have nothing to do with CC, other countries "should be blamed for CC due to nuclear pollution".

In addition to challenges posed by various individual barriers, there is another barrier which further dampens their spirit and motivation. This is the structural barrier, primarily referring to local/central government, businesses and industries' role in lay CC engagement.

4.5. Structural barriers to climate change engagement

This section examines the lay participants' perception on the barriers produced by macro-structural stakeholders to CC engagement, especially the government's responsibility in CC policy issuances and equitable benefit distribution all parties. In this dataset, higher recognition of structural barriers is notably found among rural participants than their urban counterparts. This is partly explained by the fact that the majority of rural participants have been vigorously interacting with the government and businesses, requesting assistances in the form of development policies, projects or programs as well as exhibiting some disapproval towards the excessive constructions of coal and electric factories that pose serious threats to their living conditions and environment. These structural barriers include, but not limited to, the limitation in political support, the shortage of enabling infrastructure and the socio-economic fragility in business activities.

4.5.1. Limited policy support

This barrier refers to the lack of CC-related policies and support from the government. There are significant differences in how urban and rural participants perceive this barrier. For the former, only a few participants mentioned this

limited support from the government. For instance, based on living experiences in both city and hometown, U4 expressed the disappointment toward the governmental dysfunction in issuing effective climate policy, which perpetuate the water and air pollution affecting greatly people's health. Particularly noteworthy is the insufficient support for lay people to translate climate actions into tangible outcomes, even in cases where these actions are undertaken voluntarily. Taking garbage categorization as an example, she harshly criticized:

I categorize waste in my hometown [...] However, there is no collection point for the waste, leaving me no choice but to burn them, which I find highly polluting. This issue is not only prevalent in rural areas but also in urban areas [...] People have categorized the waste, but collection vehicles often mix the segregated waste altogether. This indicates a systemic issue in waste management rather than a lack of awareness among citizens.

Other than that, almost every urban participant had little concern about climate and environmental policies with responses such as “I don't know about that [the climate policies], if they tell me then I know it” or “It is really not my concerns”.

In contrast, most rural participants discussed the limitation in policy supports and actions. They realized that while the government provides some solutions such as transition to organic products or new cultivation methods, it omits the provision of sufficient and proper policies on how to plant and raise, or worst, leaves the rural people to fend for themselves during the implementation phase. However, rural people are unable to implement independently. R17, for instance, noted that they will “keep sliding toward total failure” due to deficiencies in various areas, ranging from cultivation techniques to development strategies. This evaluation was also discerned by R24:

Not like other places, there is not much help here [...] There was a survey on rice field conducted at ward and provincial level but then no report was

published. Rural people get tired of an unresponsive local government, so we find a way ourselves.

Practically, some rural participants expressed their desires to have more policies to cope with inadequate environmental protection and economic difficulties. For example, R2 hoped for more financial support from the government's organizations such as "the Farmer's Association, the Veteran's Association or the Women's Union" to renovate orchards and raise pigs. Likewise, some demand assistances in securing markets for sustainable agricultural products to ensure their stable income. Some raise their requirement in researching long-term cultivation to prevent frequent crop changes. R17 depicted the dire need for government support to both transform rural livelihoods and preserve the health of climate and environment:

The government need to establish the ecosystems in our Vietnamese land and a governmental organization must in charge. Also, the government need to focus on project execution. This means that once someone has a project direction, regardless of its scale, we should support farmers until it succeeds. This is the strongest incentive for them, and sustainability needs to be locally driven [...] To deal with everything, not just CC.

Additionally, the lack of sophisticated support from the government imposes numerous troubles. According to some rural participants, without proper guidance, the implementation of haphazard farming practices at the expense of sustainable productivity, economic efficiency and climate protection is unavoidable. Saddened by this precarious situation, R23, for example, painfully shared the fact that the more she plants, the more bank loans for farming fertilizers are needed and the faster the business declines. R18 further reflected on the problem, citing the sometimes incompatible support from the government:

The government only provides general technical guidance; they determine to plant without specific directions on the most suitable crop. For instance, the government decides to plant cashew nuts here, which never bear fruit in the local climate conditions, and the soil is inapt for cultivation. The provided methods do not align with practical realities.

Not only offering very limited support, the government also issues unfair policy toward CC efforts of rural participants. The story of R17 best exemplifies how this unfair treatment from the government dampens the willingness to work collectively in CC engagement. Specifically, R17 successfully studies an aquacultural model suitable to the local area's climate and land, hoping to cooperate with local people and government to reproduce the model that help rural people sustaining their cultivation in the severe CC situation. During the research process, R17 has to loan money from the co-operative organization to further extent the model. However, instead of giving him the stable financial resources, the government sent the money to someone else who has no clue of the fundamental knowledge and practices of the model. Regardless of tremendous efforts to effectively study the model, he has no benefits from that. Traumatized by this unfair treatment, he expressed his disappointment toward the government's underestimation of "grey matter", referring to the unsupportive manner when it comes to financial assistance:

There is no support from the government [...] Coming for bank loans, the only thing they ask is where is the land [for deposit], not where is production plan. It shows that the loser side is 'grey matter'. The government doesn't know anything about 'grey matter'. They don't want to support because of the fear of losing money.

In spite of the unfair treatment by policies, R17 continues to work hard and learn from cultivating experiences for himself without counter-reaction to the government. He advocates distinctly supportive programs and policies for rural

people who are hardworking and capable of delivering the actual results. “It is like parent giving birth to a child, they will understand the child’s sickness or characteristics to have a better care plan” he said. Therefore, he said it is important to produce adequate supports for rural people with practical knowledge, so that they can earn a deeper comprehension of the matter, otherwise they will feel discouraged and reluctant to contribute knowledge and invention of new adaptive measures, which R17 refers as “utterly painful”.

Such courage to overcome government’s support deficiency portrayed by R17 is not common among rural participants. In fact, many expressed the feeling of discontent and disappointment from the lack of political support and actions, in which they struggle to live up their livelihood while waiting for government supports. For instance, R13 shows her angriness for not receiving any support from the government, even though she already paid to join the co-operative group (an organization aims at supporting farmer’s livelihood and cultivation). She burst out when making the following comments:

The cooperative holds several meetings, but they don't yield any results. Despite paying membership fees, there's no tangible assistance. It's very exhausted. Being part of the cooperative doesn't bring any benefits. After the pandemic, I hope the cooperative can help farmers here like in the North, but here they neglect the farmers and do nothing. There's no attention paid to the situation. Very dissatisfied.

This individual painfulness is shared by the interviewed specialists. According to S2, many rural people find it challenged to engage in CC issues. It is not that they refuse to make change, it is the government’s failure to have a policy change that compatible with their agony:

Now rural people in the Mekong Delta are growing rice, the government then suggests switching to farm something else but doesn’t provide a policy support

to change. The government tell rural people to farm shrimp but how they can switch and where do they get water to raise shrimp?

In the similar vein, as pointed out by S3, the government-organized CC projects bring good results at the start, but paradoxically the subsequent adoption of results is an unanswered question since there is no government's supports in supervision and guidance.

4.5.2. Lack of infrastructure

Not only traumatized by limited political support from the government, lay CC engagement is also dampened by another structural barrier: the shortage of enabling infrastructures. Urban and rural participants have shown a remarkable difference in recognizing the impact of this barrier to CC engagement. There is no comment from the urban ones criticizing the weakness of infrastructure as a challenge to their CC engagement. Instead, only several comments focus on denouncing “the quality of road” or “terrible housing planning” for other daily disadvantages such as traffic jam or crowded vehicles, like a typical comment from U7: “Flooded roads affect transportation, causing traffic congestion and damage to personal vehicles, which leads to time loss”.

On the other hand, for most rural participants, CC adaptation efforts in harvests and cultivation have become harder to achieve due in part to the reckless building of dams and irrigation systems. Citing on other provinces’ successful examples, R32 emphasized the importance of sealed embankments, which are marginalized in his province, to aid rural people’s adaptive endeavors such as salinity reduction or fresh-water storage for fruit planting. On another instance, according to R30, due to the low number of these infrastructure works, local people have to haphazardly self-build and manage hinderances. However, the quality of these self-constructed hinderances is low, which induce plants vulnerable to sickness and decay. R16 raised concerns over the deficiency of infrastructure projects in

favour of Mekong Delta Region to overcome CC impacts like flooding or salinity invasion:

Our government needs to pay more attention to the rural people of the Mekong Delta, as they are facing hardship [...] Currently, many CC adaptation projects and policies are not implemented thoroughly. For example, infrastructure policies for travelling during floods are not being executed effectively.

Additionally, a few recognize the lack of waste facility constructions posing a greater challenge to CC engagement generally and environment protection specifically. R21, for instance, realized that not everyone has favorably financial and material conditions to build high-tech farming with separate discharging ponds. Together with the lack of state-run waste infrastructure, they have no other choice but to discharge uncontrollably to the environment. The communication efforts on proper waste management combining with fines and prohibitions are in vain, as discharging facilities are scarce. R21 commented:

For example, if you want people not to park randomly, parking lots must be provided. If the local government want people to dispose of waste properly, there must be facilities for waste treatment. Now, when people ask where to discharge wastewater, there is no answer. So how can the government enforce regulations? It's a common challenge. This trouble has been lingering over, and I believe it will continue in the future.

The limitation of enabling infrastructure for CC adaptation is not only acknowledged at the domestic context, but also at regional landscape, which portray the broader picture of the incautious infrastructure development of dams and embankments from other riparian countries along the Mekong River. These activities have hampered the flow of freshwater downstream to Vietnam - the lowest country, which in return exacerbating the CC-caused invasion of salt water. R17 reprimanded the hinderance of silt flow reducing his farming capacity:

The upper stream of the Mekong River is blocked in China, Laos, and Thailand, where they build about 100 dams, blocking the sediment flow. Without sediment, how can we maintain the fertility of our Mekong Delta?

Intrinsically, the shortage of enabling infrastructure is attributed to the incomplete general infrastructure planning. This leads to a paradoxical circumstance in which some areas are flooded or dried while others are protected. Experiencing the problem first-hand, R32 highlighted that the government often releases temporarily patched solutions such as installing water-pumping machines. Yet, they fail to address the floodings thoroughly, since it is not the holistic installation in all areas:

It is only a temporary measure. Pumping water out in one area while causing flooding in another does not provide a sustainable solution [...] Each district has its own planning; each commune has its own proposal. A comprehensive planning at provincial level must be included to address the CC problems.

4.5.3. Socio-economic fragility in business activities

The third structural barrier is the socio-economic fragility of business activities, which further dampen the efforts and motivation to better engage with CC issues from the public. A significant contrast between rural and urban participants in perceiving this barrier and its impact is realized. Among urban ones, only U6 pointed out the social fragility of enduring climate-unfriendly activities of businesses. This participant cited the example of Can Tho's cement industry that constantly emits tremendous amount of dust and pollution to the environment, considerably affecting the life of residents. Such production activities, U6 said, could cause urban residents to "feel futile" in performing environment and climate-friendly actions.

While businesses may acknowledge the importance of proper environmental practices, they often overlook or downplay these acknowledgements with the

justifications of production and profitability pressures. Businesses consider profits as their main priority, U6 mentioned, driven by pressure from shareholders who expect nothing less than the immediate interests. Emphasizing on this matter, he continues to give an example on waste and emission treatment activities to show the cost-benefit compromise:

Industrial zones are required to have a common wastewater treatment center. But in reality, each factory handles it alone, often superficially. They may build wastewater treatment facilities, but do not operate them regularly. During intense inspection periods, they might run the treatment facilities for a while. But afterward, due to high costs, they reduce operations to maximize profits.

Most critically, the social fragility of these production activities is exacerbated by “the loose supervision and administration” by the government, due to its deficiency in the regulatory and monitoring system. This creates loopholes for business and industries to persist their harmful activities to the environment and climate. As he witnessed, they willingly accept fines to persist their activities. The penalties in place for violations are insufficient to deter their continued operations; the fines are “way cheaper” than the cost they have to bear for fully stopped operations. Businesses handle the CC-related issues casually such as relocating their facilities further away from resident locality, chiefly to avoid lawsuits from the community, not for the sake of climate and environment protection. “They are doing it because they become afraid of conflict, not for the issues of environment or CC,” U6 said.

For most rural participants, socio-economic fragility is experienced in agricultural business operations. They patently feel and understand how this barrier becomes the major economic hinderance toward CC adaptation and mitigation. Some rural participants mention the economic difficulty lingering years and years for many rural people. They invest a great fortune into expensive fertilizers and medicine to raise plants, but coming up short in equivalent income as they are unable to sell

their products. R18, for instance, shared that in an on-seasonal harvest, it is less than a penny/a coconut or a penny/a kilogram of guava. Or R26 mentioned that although Vietnam is one of the world's biggest banana exporters, banana price in rural areas is extremely low with less than a penny/kg, the income would be around 80 pounds per month. This income is significantly decreased, if the harvest is lost to extreme weather change.

One of the reasons for the declining agricultural business is the frail coordinating mechanism among various parties, including the government, investors, businesses, transporters and farmers. As R12 noted that rural residents refuse to scare of CC impacts, they can adapt to the changing climate by switching to different plants or adjust to different agricultural policies. But all their efforts will be of no avail, if other parties fail to work together to receive, deliver and sell their products. The steering position of local/central government is the most critical to ensure equal economic benefits among different parties, including the farmers. This frail coordinating mechanism is the rooted reason why the strategy of cultivation transition is not economically effective. R27, for instance, concerned that it generates extreme challenges to sell a new agricultural product:

If I and others develop a specific crop, we need assistance from government agencies to find markets. It's certain we won't find any market ourselves [...] If I cultivate 100 hectares now, without support, I'll inevitably incur losses.

This evaluation is empathized dearly by some other rural participants who raise specific flood-proofing crops, but suffering from economic inefficiency due to the lack of organized resource area for on-site purchases of investors and traders. For example, R26 desired the government to work with businesses for a stable market through agricultural programs:

The regional planning is designed for individual scales which unable to attract investors. Every household should form alliances to establish resource areas for

the arrival of investors for purchases [...] The local government can encourage people to do so through plan building and community meetings for certain crops with stable outputs and prices.

Due to the lack of collaborated and organized on-site markets, a few rural participants venture to bring their products to big cities hoping for a higher income. However, these ventures aggravate the economic fragility of their agricultural businesses, as they end up losing money and being in debt due to the lack of market knowledge, the fluctuating prices and, more importantly, the products' low credibility. R18 talked about his efforts to find his own outlets:

I bring it to Can Tho to sell by myself, and nobody buys it, as there's no credibility or assurance. Many people say they don't know where these fruits come from and whether they were sprayed with pesticides, so they don't dare to consume them. Therefore, the authorities need to establish marketplaces for traders to come and purchase. If you sell it randomly, nobody will buy it.

And because of this risky self-trading, they face price gougings from businesses and traders, who bargain agricultural products at the lowest bids possible but resell them with higher prices. R18 shared: "Income is unstable. Sometimes traders force selling prices as low as 7,000 to 8,000 VND/kg" (around £2.5/kg). This leads to critical situation which R26 painfully noticed that rural people are incapable of selling their own farming products, relying on fluctuating market prices, making their livelihoods insecure and unstable.

Insufficient coordinating mechanism among stakeholders results in a vicious cycle of "good harvest-low price, low harvest-high price", which R30 referred as an oft-occurred scenario in rural agriculture (low price in abundantly on-seasonal crops and high price in scarcely off-seasonal crops). This cycle not only fails to help improve economic status but also poses more challenges to the climatic environment. To compensate for the losses, they continue to borrow money from

the banks to plant off-seasonal crops haphazardly with excessive fertilizers, which produce destructive impacts on the environment and climate.

Drawing from his reporting experiences in CC and environmental issues, S1 also agreed that rural people are suffering from the double challenges of CC impacts and fragile mechanisms among all different parties:

Life has become increasingly challenging for rural people due to CC impacts, farming is more difficult. However, the main reason is the poor management in the Mekong Delta region which discourages investors.

4.6. Chapter summary

This chapter has presented a varied degree of CC engagement between rural and urban participants. It showed that rural participants engage better than their urban counterparts socio-economically, politically and morally, given the fact that they are the hardest hit by CC. Further, they have been suffering more from structure barriers, in which less policies are provided to practically address the cultivation challenges in the fickle climate such as cultivation changing or farming integration; less infrastructure constructions to prevent the CC consequences such as severe floodings and saline invasion; and the inability to sustain income from agriculturally commercial practices. Despite of all these impediments, participants (dominantly rural ones) refrain from giving up on CC adaptation and remediation. Evidence from the data indicates that they demonstrate more resilience and determination to overcome CC challenges. It is just the matter that they cannot do this task alone, due to their inherent shortage of resources and knowledge. They direly need supports and information from other sources. The question is which sources they achieve CC information from, to what extent the information from these sources is appreciated, and most importantly, how this appreciation will contribute to their CC engagement subsequently. In the next chapter, I will explore these issues based on the responses from participants. Similar to Chapter 3, I will also examine whether rural and urban participants are

different in their reception and appreciation of CC information from different sources.

Chapter 5. Formal information sources and their perceived impacts on Vietnamese engagement with CC

This chapter aims at exploring the overall picture of sources that participants receive CC information from, their reception and evaluation of the information and to what extent the information impact on their subsequent engagement. Based on the responses, I found that there are five frequently mentioned formal information sources, namely mainstream media, government, NGOs, businesses, and scientists, each playing a certain role in facilitating and/or impeding CC engagement. For the majority of participants, CC information from these official sources fail to facilitate a fundamentally effective change in their CC engagement, due to the limitation in information's quality such as shallowness, superficiality, irrelevance, exaggeration, and constrained applicability. I will also explore the similarities and differences between urban and rural participants in their perception, evaluation and application of the CC information from the above sources. The chapter demonstrates that the former provides less serious thoughts over the information as well as the desire to be informed, while the latter expresses deliberate perception and evaluation on the information sources and its content, trying to use the information for CC adaptation not just for themselves but for other people and generations.

5.1. Mainstream media

The mainstream media emerged in my interview data as the most frequent source of CC information that both rural and urban participants seek for. One of the reasons mentioned by a few participants is the convenience of the mainstream media, which allow them to receive CC information whenever they want. For example, R4 refers to his use of online mainstream newspapers like Dan Tri and Tuoi Tre to search for CC information anytime he wants. Or R7 expressed his sole preference to VOV (Voice of Vietnam) as he just has to listen to the information. In the similar vein, U4 mentioned that the swift coverage of CC related incidents

on the media assists audiences like her, who want to research about CC issues, to be informed at the short amount of time. Thus, she doesn't have to go directly to the field.

The other reason that makes most participants receive CC information from the mainstream media is their general trust in this source. Most urban participants express their believe in what mainstream media say about CC issues. U1, for instance, indicated that he predominantly searches and trusts CC information from mainstream media and deliberately avoids news and information on social media. Some of his most trustworthy media sources – Vietnam Television 1 (VTV1), the Vietnam News Agency, the People Daily (the Vietnamese Party-run newspaper) – were also mentioned by other interviewees.

Among rural participants, some emphasize other media characteristics such as professional and conventional traits that helps to enhance their trust in mainstream media. By comparing with social media such as Facebook or YouTube, they trust the mainstream media more because of the news selection process with proven data and evidence. R8 commented:

I trust the media because I think the CC information has already been established, and journalists would be extra careful before publication. Some of the credible media sources are like VTV [Vietnam Television], the People Daily, the News, the Pioneer or Zing News, they will check the accuracy of the information prior publication.

Working as a climate and environment journalist in Tuoi Tre Newspaper for nearly 20 years, S1 agreed with the opinion that the mainstream media is trusted thanks to its active coverage on CC issues such as erosion, flooding and subsidence in some Mekong Delta provinces. He further stressed on the media's role to inform audiences about political efforts, scientific advice, and manufacturing precautions on CC remediation and adaptation:

The press provides information about the government's CC policies and scientist's measures to ensure that the community is well informed. The process of disseminating this information has relatively effective, especially recommendations in agricultural production. Scientists and authorities cannot visit each locality to spread the word, so they rely on the media for public communication.

Participants might receive CC information mostly from the mainstream media and believe in what it says about the happening of CC; however, whether the information is beneficial to their engagement, particularly behavioural responses, is another story. This is conveyed through R11's comment: "CC information on the media is good but no one reads, listens or watches because they don't understand the implication of CC danger and impact that the media is presenting". In fact, the dataset shows that there are certain issues, identified by the majority of urban and rural participants, about the information quality that fail to enhance their CC engagement, specifically the shallowness, superficiality, exaggeration, and irrelevance of the content.

5.1.1. Shallow and superficial coverage

Some urban participants criticised CC information on the mainstream media for being too shallow, superficial and event focused, such as news about excessive waste emission or environmental destruction without detailed explanation about the causes and possible preventive solutions. U9, for example, gave an example of news about tree removal in her city because of severe weather: "They [journalists] report about trees falling due to storms and CC, but the news only covers the incident without in-depth research on why and how to prevent".

Complaints about the generic CC-related news presentation are also directed at "mundane climate information" such as the heat waves, high temperature or fickle raining pattern, which become too familiar and somewhat repetitive to some urban participants. They reported that exposure to these information leads them to

mainly associate their CC understanding with daily weather changes. Their exposure to CC news on TV or newspapers makes them only think that “CC is only abnormal weather phenomena”. They note that the amount of analytic information on climate events is insufficient, which in return bring minimal impacts on the subsequent awareness and behaviors. U6 expressed his concern over this kind of information on the media:

The audiences are not clear on the issue. They haven't seen a critical analysis. The information remains highly generalized and lacks depth in analysis. People want to know about monthly and yearly changes to understand the climate and weather patterns.

Superficial CC information seems to produce meagre impacts towards CC perception and behaviour. U10, for instance, said she watches CC-related programs on TV such as tidal floodings but does not gain much in-depth information. She referred to the fact that lengthy television programs contain a lot of other information, while CC news only briefly mentions about “rain and tidal floodings” providing little benefit on her awareness and actions. The other example is from U8 disclosing that she fails to obtain thoughts and feeling for urgent responses when learning CC information on the media. She confessed that she does feel concerned about what will happen to her city due to the rising sea water level by one meter in a few years. However, these worries “are fleeting and do not provoke the motivation for concrete actions to change”. While R1 said that he understands the general news that Vietnam is one of five most CC affected countries with abundant floodings and other environmental impacts. Other than that, he doesn't comprehend anything further and inclines to leave the issue for other social stakeholders, such as scientists and government.

Although manifesting that the media have earned a certain level of trust from lay audiences, S1 did not contest with the opinion that the media should provide more specific messages for audiences. In his opinion, the media must keep improving

the way of reporting CC news. He strongly underscored that it is imperative to generate effective and precise coverage with practical cautions and solutions for people to apply, not just “simply mention about the situation”.

5.1.2. Lack of direct relevance

Another issue of CC information on mainstream media is its lack of relevance to daily life. Some urban participants expressed their frustration and disappointment over news coverage of CC because of its deficiency of actionable solutions. The information is ineffective because it is conveyed in a general manner with limited application in daily life. For example, illustrating the issue of plastic bags, U7 raised the concern that the media needs to provide more relevant information within the scope of individual actions. He disapproved the general presentation, which he found lacking in relevance to personal solutions:

The use of plastic bags affects the environment and climate. However, the media mention the issue without analysis; no practical alternatives have been communicated. To eliminate the use of plastic bags, related alternatives must be provided so that individuals can gradually change their behavior.

Such perceived irrelevance is further strengthened by the frequent portrayal of CC issues as abstract and distant events. Research around the world have showed that distant CC information exerts negative impacts on how people act on CC issues. Such CC presentation in the news continues to resonate with several urban participants’ responses. It reinforces their perception that these issues are distant and irrelevant to their daily lives and local communities. For instance, clueless on how to effectively respond and adapt to the situation, U2 commented:

The provided information is too broad. I want closer, more relatable, and easy-to-digest CC information which I can utilize for my life. When I watch the news about melting icebergs, I can understand rising sea levels and flooding will be

the consequences. However, it doesn't grant me any clue on what I should do and how can I do it on daily basis to make changes.

Distant and irrelevant feelings towards CC issues are also demonstrated by some rural participants. They learnt about the general CC impacts such as sea-level rising, iceberg melting, and Amazon wildfire on the media. However, it fails to give them any understanding about direct impacts on their life as well as self-responsibility to respond to the climate problems, as they think the information is too far away and it is the job of others. R2, for instance, commented: "It doesn't affect my behaviour at all because I think this is something for scientists to deal with". In a similar vein, R23 received information about CC impacts such as rising salinity invasion, heat waves and ice-melting in other countries. However, this reception has no substantial changes in his climate comprehension:

I see on television that there might be more intense salinity and heat. The media also show other countries experiencing ice melting and rising sea levels. But I'm just a farmer and I just take life as it comes. That's something for the government to worry about.

This distant feeling due to the remote CC information, as R4 criticised, prompts audiences to overlook news about time-lagging CC impacts and prioritize other immediate and sensational news. He also emphasized on the media-fueled belief that it is the job of government to deal with climate problems and "they have nothing to do with it".

The perceived irrelevance becomes more evident in participants' perception of scientific CC information on the media, which was described to be convoluted and difficult to relate to daily activities. Some participants underline the unattractiveness and repetition of "the same old scientific content" on the media. For instance, U7 referred it as boring and unnecessary to the extent that he "preferred to switch to entertainment programs". Or R11 found that the scientific

information is not practical anymore. For this reason, some rural participants preferred to receive scientific CC information directly instead of via the media. For instance, R7 shared that it will be better to listen to scientific CC news in face-to-face settings. R4 noted that the information practicality will be better through “in-person or on-site information dissemination context”.

The interviewed specialists from Can Tho University also agreed with the lay view that mainstream media haven’t managed to provide relevant CC information for audiences adequately. S3, for instance, disclosed that global CC issues portrayed on the media fail to provide enough relevant sense to impact lay people’s awareness in Mekong Delta Region. What they care more about are matters that directly affect their livelihood like agriculture or fisheries. Similarly, S4 also stated that the world’s CC news stories such as the Arctic ice melting or Amazon wildfire do not form a strong connection between CC and lay people’s daily life. They concern more about local issues such as water in Mekong River:

They can’t relate CC issues in broader context [...] They watch ice melting in the Arctic on TV, but do not care and are unable to make connections. However, they can understand CC-related issues in Mekong River such as the water shortage for irrigation partly due to the lack of raining.

He conveyed the same evaluation on scientific CC communication on the media, that it is somehow “over-academic” with technical jargons, making it hard for audiences to follow. In the similar vein, S2 portrayed the scientific information like salinity and floodings forecast as “noisy and clumsy” on the media, which only has a little impact in the sudden occurrence of natural disasters. On the normal basis, it feels overwhelmed and pressured to listen to because of its convoluted sense, he indicated. To bridge the gap, S3 suggested that the media should reduce the prolific coverage of complicated and distant climate matters, replacing it with more stories in the Mekong Delta River. Extended programs on the local CC impacts should be produced to benefit the fellow residents’ local

awareness and association. In her conception, local residents are well acquainted with what is happening in their local areas such as affected agricultural activities. Therefore, the attention paid to local CC issues is greater than to the broad global issues:

They can't make the connection; it's very difficult for them to link an event happening on another continent. However, when it comes to issues like upstream water or hydroelectric dams, if you listen to the farmers, they can make connections regarding CC impacts on water sources.

5.1.3. Exaggeration

Another CC coverage problem that a few participants mentioned about is the news media's tendency of exaggeration and sensationalisation. They felt many news publications exaggerated CC information to boost ratings. For instance, U4 mentioned various stories of one landslide incident from different news agencies, which confused her about CC impacts

There is a lot of exaggerated CC-related information on news websites these days. For example, there are only one or two landslides due to heavy raining in An Giang and Ca Mau. But this information has been reported across different websites in different tones which make people think there are a lot of landslides.

Exaggeration in CC news was also expressed by interviewed specialists. They disclosed their unwillingness to discuss CC issues with journalists because of their "exaggerated and sometimes erroneous reporting". For example, S4 underscored the journalist's attempt at all costs, including exaggeration, to find sensitive and shocking news articles about CC to retain the interest of audiences. He further pointed out the CC misrepresentation on the media when sometimes wrongly accuse CC of other problems such as infrastructure destruction:

They [the journalists] misunderstand about CC and sometimes take advantage of it. For instance, a structure is damaged, they blame it on CC. Or an urban

area is flooded, they claim it's entirely due to CC while it is partly the responsibility of the authorities for not clearing clogged drains [...] Similarly, if a building is collapsed due to poor quality, they shift all the blame onto the storm. There have been cases like this where a structure was designed to withstand a Category 12 typhoon, but it collapsed in a Category 10 or 11 typhoon. This indicates poor construction quality. I told journalists that not everything is caused by CC. While CC has a significant impact, it cannot be blamed for every destruction.

That is not to deny the importance of the news media in climate communication. Although most responses criticised the quality of CC information from the media and its negative impacts on subsequent CC engagement, there was some positive appreciation. Several rural participants said that CC news presentations, such as vividly on-the-scene videos and pictures of ice-melting in North Pole, sea-level rising and tidal flooding, improve their understanding and concern about the gradual CC impacts in their locations and many other parts of the world. For example, R8 pointed out that powerful and attractive headlines with carefully editorial selection before publication facilitate his curiosity, interest, and concern for CC subjects. R4 also mentioned his opinion on this aspect:

I receive CC news on TV and mobile phone everywhere I go. It is very easy to understand with pictures. The media show graphical evidence of land and forest losses when talking about them. I feel fascinated when reading the 24h news reporting system with images and analysis on the causes.

5.2. Government bodies

CC information from government bodies refers to the information delivered by governmental agencies and officers. Several participants mentioned that they received CC information from government's online information portals, such as U4, who cited information portals by several ministries like Ministry of Natural Resources and Environment or Ministry of Agriculture. For the majority,

however, engagement with the government's CC information is often through participation in government-organized meetings at their local areas. Such engagement, however, is not equal between urban and rural participants. For most urban ones, their engagement level is very poor. This is in part because of the low number of the organized meetings in urban areas which was described as "sometimes", "very rarely" or "one/two times a year". For example, U7 expressed the fact he has never seen official CC workshops where he resides, only several meetings that briefly mention about environmental problems. Also, there is a low thirst among urban participants for participation in these CC-related meetings by government agencies. U10 abruptly commented below:

I don't work in that field [CC], so I don't care [...] That has to be of the people in rural areas, because they go to meetings with the local government. Here, I only go to work and join local meetings twice a year [...] From then, I have never been heard about that issue.

On the contrary, most rural participants mention their frequent attendance in these government-organized meetings. For example, R18 and R19 stated their active participation in "face-to-face meetings at communal centers" with government officers hoping to attain more socio-economic CC information. Further, several others take full advantages of these meetings to seek for information about alternative livelihoods in case their traditional agriculture is deteriorated by frequently severe weather changes. They use local meetings with People's Council to express their transition purpose and ask for supports from the government. A typical example is R20, who seek supports in ecotourism:

I attend tourism meetings with 19 other households to practice newly developed forms of agricultural tourism [...] For now, I only have tourist huts. Later, I hope there will be a system of boats on the river to take tourists around the island [...] And ecotourism experiences like monkey watching, trees planting and canal fishing, and snails catching.

Although rural and urban participants are different in their engagement level in the government-organized meetings, both groups agreed that CC information in these meetings is lacking in quality and quantity. Most urban participants stress the limited and generic provision of CC information that bears no specific link to their life. U8, for instance, noted the occasional encounter of information such as garbage categorization and recycling in government's documents, which is also communicated superficially and for the large part, fail to be realized in everyday activities. Information on severe climate events is also delivered without detailed analysis. Furthermore, direct CC communication by the government often aims at delivering a large amount of generic information and expects simultaneous "wholesale reception" by audiences. However, it fails to achieve the expected ends, as lay people want to consume bits of practical information that they can apply in real life. This communication method reduces the effectiveness of CC information. U5 noted:

CC information is disseminated without evaluating its effectiveness. Directive documents sent from the central to the grassroots local levels just to remind general CC-related information. The documents are written in fixed old forms with nothing novel; one can quickly grasp the content by skimming through them. CC related documents at both central and city level are general in nature, without specific local solutions.

A few urban participants criticized shallow CC information from the government, attributing it to the lack of knowledge among government's officers and their fear of jeopardizing official political stances, which leads information to be often delivered in "general and politically correct manner". Explaining more on the issue of information shortage, U6 blamed it for the inconsiderate mindset which only concerns about CC issues when needed:

Government officers only seek information related to their vested interests [...]
On a daily basis, there will be no pro-active search for knowledge, thus their

CC understanding is correct but very generic. Only when CC issues are directly addressed in directives, there will be action. There is no deep understanding, just superficial discussion. While reports and forecasts do mention CC, they do not delve into it.

Such negative evaluation on the CC information is also highlighted by most rural participants. Although attending government-organized meetings regularly, R11, for instance, straightforwardly said: “There is no CC information from the government’s officers”. Or R3’s blunt comment on the information scarcity about environmental and climate protection, she highlighted the fact that she didn’t hear anything from government’s officers at the local meetings. Disappointment in the ignorance of government and its absence of CC information provision can further be seen from R12, as she said: “I don’t see any specific instructions from the government [...] I feel very lost and confused”.

The government is not only being criticised for its little provision of CC information in rural areas, but also for the superficiality of its provided content, mixing with administrative documents and regulations either on other issues or barely touched on CC issues, as R2 shared:

Usually, there is little detailed CC information from the government because it is integrated with other activities [...] They only talk about general issues like maintaining hygiene, preventing environmental pollution, without delving into these matters. The limited integration provides less appealing information, mainly focusing on general environmental policies.

A few other rural participants share the fact that they don’t receive sufficiently clear instructions and information on CC issues from government officers. R13, for instance, noticed that officers usually talk about something else other than advice on adaptive cultivation. R19 saw them as no different from other local people: “They are also local farmers, and they don’t know anything [about CC]”.

Totally agreeing with the above, interviewed specialists raised concern about the CC information deficit of government officers, as reflected in how their speech and documents are composed and delivered, such as the over-reliance on sources with specialized CC knowledge for speech, or the repetition of pre-composed content like slogans without much comprehension. As S4 commented: “They only care about propaganda. They can’t advise anything on people’s cultivation or planting methods. Nothing”. Furthermore, S2 raised his concerns over the shallow information in CC-related events such as “Environmental Days” or “Earth Hour” which diminish the public’s interest in the importance of the issue. Contributed to this opinion, S4 thought that the top-down political structure from the central is the main reason for ineffective CC communication as it eliminates local culture and differences. He elaborated:

The government's CC communication methods remain largely unchanged, as it is still top-down. Whatever changes mandated at the central level must be mirrored at the local level, with little room for independent actions. Our state system does not allow for effective CC communication [...] In Vietnam, regulatory amendment is very difficult and time-consuming as it is nationwide. Our country is long and diverse with significant differences between regions, and centrally imposed CC policies are not suitable for all regions.

Even though the government and its officers are being criticized for the quantity and quality of their CC information, the dataset shows that rural participants highly appreciate the role of government in facilitating CC information from other sources to the lay public. These meetings provide opportunities for lay people to directly communicate with scientists, NGOs and businesses. Under Vietnam’s legal requirements, meetings like these must be organised or at least authorised by local government organisations, and our participants were highly appreciative of the role of government officers in such orchestration efforts. Rural participants attend on-the-field workshops and trainings with scientists and other stakeholders

to receive both “scientifically mitigative information” for traditional cultivation or “marketing and hospitality skills” for livelihood transition. For instance, R16 shared that he has usually been to commune-level meetings which often are informative sessions on adaptation to the changing climate. Additionally, governments help facilitate lay communication, where ordinary people gathered to share their own knowledge and experiences in CC adaptation and mitigation; especially what achieved, what haven’t been done and what can be developed in the future.

My expert interviewees, who have been working with the local government over a long period of time, endorsed rural participants’ opinion and emphasized the major influence and efforts of government in organizing public discussions on CC-related issues. This also helps establishing connection between the lay public and other stakeholders. In addition to inviting CC experts to public discussion, the government also resorts to the assistance to local opinion leaders, who understand the circumstances of local people comprehensively, thus delivering the information in a more familiar and effective way. As S1 described:

Currently, each commune has a person who maintains a very close relationship with the local residents, knows everyone personally, and is familiar with their circumstances. This person knows which families are the best at farming, which ones are the best at coping with CC, and which ones are most affected.

5.3. NGOs

Climate-related NGOs seem to play a role in CC communication, especially with regards to actionable advice. Three of my expert participants appreciated NGOs’ role in disseminating adaptive CC information for locals (again, often through the facilitation of government agencies as gatekeepers). They cite NGOs’ long-term surveys on land subsidence due to flooding, whose findings are then used to produce adaptive solutions for local people. S2 highlighted some scientific development models that transfer scientifically adaptive knowledge to locals, so

that they can observe and follow. He mentioned an example of a local NGO – ABAVINA – who share knowledge about mitigative prototypal models, so that local people can improve livelihood by themselves and reduce their dependence on government's support:

They have many new models where they implement the projects first, and then show the people the results. Those who want to learn can then be guided. This approach doesn't rely on anyone's support. Instead, it involves self-initiative and mutual cooperation [...] It is not totally a matter of the governmental funding provision.

Such endorsement for NGOs' CC communication efforts, however, was not found in participants' responses. For urban participants, there was reportedly scant to no information intake. Some typical answers are "I don't hear CC issues from NGOs" (U1) or "I have never received CC information from NGOs" (U2). A few rural participants also showed less appreciation of NGOs' CC communication efforts. R11 criticized their communication practices as superficial movements, coping with on-the-surface problems only. Sharing the involvement with several NGOs' climate movements, she expected a deeper communication at grassroots level, ascertaining an adequate comprehension of the movements from members of each household:

There are some organizations from the Netherlands helping to collect garbage on the river. But I don't think that's good. What they should do for local residents is to communicate the fundamental solutions, such as plastic bags limitation and awareness raising among the locals. Launching campaigns to do works for them is not effective. It's just a superficial movement.

Within the group of specialists, an absolute consensus on the NGO's effective CC communication cannot be reached as well. Differed from the opinion of the other three specialists, S4 mentioned some deficiencies in the ways NGOs communicate

about CC issues. To him, NGOs have been launching numerous campaigns expecting to change local people's CC awareness and actions. However, these campaigns are often carried out in a short period of time and neglect to alter the inherently climate-unfriendly behaviors. The additional problem is the short-lived effectiveness of its adaptive methods. S4 pointed to an example of NGOs' dissemination of "new crop seeds and agricultural models" for local people, which are "effective temporarily". Taking another example on fishing activities, he stressed the provision of unsuitable methods in the present livelihood condition, such as the provision of new fishing tools and techniques in a declining seafood livestock:

I don't think that strategy is appropriate anymore. What are they basing on to teach fishing techniques when fishes are becoming scarcer, and natural resources are dwindling day by day? They should educate local people on preserving the environment and creating various sources of fishes. Only then can exploitation be effective.

5.4. Business

CC communication also comes from businesses, especially those in agriculture. However, responses in the dataset indicate that the businesses' communication practices are perceived to focus mainly on using CC rhetoric to augment their money-making activities, such as their agrochemical products exposing no threat to the climate and environment. Using their engagement and contact with the businesses on regular basis, most rural participants evaluate the business' communication to be profit-oriented and shallow. For example, R12 received information about supporting tourism transition for CC adaptation from several businesses. Nevertheless, it doesn't gain much appreciation from her, as she realized they are more about seeking for profit. She noted the "prolonged investment from businesses in natural tourism projects" in her hometown, as they waited for higher market revenues before official investment. Her perception on

profit-driven businesses is shared by other rural participants. R28, for instance, after attending some on-the-field CC workshops with businesses, realized that their sole purpose is financial gains:

There are no scientists, only people at the drugstores advertising these products are very good and persuade local residents to buy them, with the aim of competing with other stores.

Likewise, R16 underscored the corporate aims to maximise revenues and profits. Businesses abstain from communicating proper adaptive activities as well as the social impacts of their products on environment, climate, livelihood, and health. He reprimanded that seminars are organized for businesses to “advertise and sell their products”, instead of CC discussion and training on scientific and technical cultivation. For R16, the unwavering effort from businesses to deploy all kind of communication is merely to convince local residents to buy their agricultural products. They advertise that using their fertilizers and pesticides has no harm to the climate. They even provide loans for locals with financial insufficiency and accept their return payments after the harvests. However, for this respondent, the true nature of these ‘kind endeavours’ brings about detrimental consequences on rural people’s livelihood, especially when harvests fail to deliver. Specifically, R16 said, instead of assisting the rural residents to deal with the impacts of failed harvests, businesses offer them two options, either returning the invested loans right away or settling debts with next seasons’ livestock. Eventually, rural residents earn nothing and fall into repetitively disadvantageous circle of lending money for cultivation, selling products to pay debts and then lending money again:

The capital is initially provided by businesses. However, if farmers are unable to repay right away after the harvest, the businesses then make things difficult, using harsh words. When the next fish harvest comes, businesses collect the fish stock to settle the debt.

Such circumstances raise cautions among some rural participants whenever hearing businesses' supporting programs or communication to cope with CC consequences. They realize the true colour of financial supports from businesses. For instance, R17 shared his experiences that businesses are unwilling to invest in experiments of adaptive CC solutions, if they do not appear to generate interests. The businesses prefer to observe tangible achievements such as "growing 10 kg of sweet potatoes and sell them at a high price immediately", before committing to investment:

Funding sources need to be scrutinized, as they are not always free and contain many hidden issues. They [businesses] communicate various capital resources, but what is their ultimate purpose? [...] Approximately 80% of the time, the investment is primarily for the benefit of the businesses themselves.

5.5. Scientific information sources

Another CC information source for lay participants is scientists. Through government-organized meetings, scientists are able to communicate their complicated and perplexing CC information to lay people in a more comprehensible and lively manner. Several rural participants highlight the government's vital role in disseminating scientific CC information to the public. For instance, R11 noticed that scientists have never come to the local areas alone and only being invited by the local government. Or R8 elaborated his preference to receive governmentally authorized scientific knowledge:

Scientists' credibility depends on how their CC information is disseminated. Scientific organizations with certification and introduction from the government are the ones I will trust [...] If they do not have documentation proving they are credible scientists, my trust will decrease.

Such recognition of scientific CC information via government-organized meetings, however, is not equivalent between urban and rural participants. This is

predominantly due to their difference in engagement in these meetings. For the former, most reported little to no reception of scientific CC information. U10, for example, plainly commented: “I have never been in contact with scientists”. Or U8 indicated her unwillingness to participate in meetings with scientists:

I don't hear from scientists [...] There are social development workshops in the Mekong Delta Regions linking to environment and CC issues. My city's People's Committee collaborates with the Mekong Delta provinces and Can Tho University, but I do not want to attend these meetings.

On the contrary, the engagement level is found to be much higher in most rural participants. They often participate in seminars and conferences to meet top-tier scientists to seek for practical information and adaptive methods in animal breeding, orchard planting, and agricultural extension, and to prepare in advance severe climate events. For example, R4 commented that these local meetings offer him and others an opportunity to communicate directly with scientists about their livelihoods:

The government often invites scientists and engineers from Can Tho University to come here [...] Mostly, we focus on crop science and animal husbandry because many people here raise chickens. They often meet directly. A group of about 30 people will gather around and speak to experts in face-to-face context.

In addition to formal meetings, some rural participants informally converse with scientists through on-the-field workshops and lectures, such as R15:

The commune authority collaborates with scientists to give talks about the implementation of high-tech shrimp farming models [...] They organize on-site visits to teach the new farming models.

By providing examples, all interviewed specialists affirmed the bridging role of local government in diffusing scientific CC information to lay people. They illustrated their direct collaboration with the local government. S3, for example,

mentioned the training for “local officers from Farmers’ Associations or Women Unions” to become opinion leaders at local areas, so they can work directly with farmers and facilitate the effectiveness of scientific CC information. Likewise, S2 elaborated the hierarchical collaboration from scientific institutions to local agencies, such as the delivery of comprehensive agricultural guidelines to the district’s then commune’s agricultural offices. Based on this, the commune agricultural officers will advise rural people and monitor their cultivating implementation:

There are projects that seek or develop farming models to suit local conditions in drought and rainy seasons. We approach this in a very orthodox manner, starting from the district to commune level, where officers collaborate with local farmers to test and implement farming models to see if they are suitable for their livelihoods.

Explaining further on the reason they have to contact local officers before encountering local people, S1 referred to the alert of locals when meeting a group of scientists. Without the authority’s collaboration or authentication, the direct delivery of scientific information is ineffective. Additionally, S3 mentioned the scientists’ self-safety when going to the fieldworks alone:

Here, we always follow the conventional approach from the local level and rarely go on our own. I’ve tried going alone before and almost got invited by farmers to work with officers. Normally, in the rural areas, local people are very cautious. If we approach them without prior notice, they’ll pick up the phone and call the officers.

Such high engagement in government-organized meetings with scientists from rural participants, however, does not equally reflect in their perception and evaluation of scientific CC information’s quality. The data reveal a mixed picture of how direct scientific information delivery is perceived and assessed. While a

few express affection and fondness toward direct information reception as they can effectively apply the CC information first-hand, most participants criticise the limitation of scientists in helping them effectively understand and deal with CC problems.

5.5.1. Limitation of scientific information

The majority of rural participants do not feel direct scientific information greatly assists their CC engagement. They noticed several limitations of the information, including, among other things, the limited applicability in both time and space, the low number of recurring scientific meetings and the cost-inefficiency of scientific methods. For example, R29 described information provided by scientists as “purely theoretical with minimal real-world use”, saying it neglected to address critical agricultural problems such as the absence of resilient cultivation in a larger community. Some mentioned that various cultivation methods proposed by scientists and agricultural engineers only work for a limited period of time. They painfully shared the fact that they applied all scientific methods from roots stimulants, water pumping, to fertilizers and chemicals to reduce soil acidity, but can’t endure. As R9 recalled:

Scientists came to talk about adaptive solutions but ineffective. We followed their advice to time rice planting with the rainy season but then experienced prolonged heat, and the acidic water caused more plant deaths. Some households got a few bags of rice, while others lost everything. Scientists came to check salinity and acidity levels, even gave us saline-tolerant rice varieties but they only work for a short time.

In addition to time limitation, another applicability-related problem is spatial limitation, denoting to the aspect that the scientific information is incapable of producing the same results in different areas and cultivation practices. For instance, when being asked whether possible to apply the knowledge, R23 bluntly

said “can’t” as it does not work in his local area. R13 also rebuked the inapt application of scientific methods in his hometown:

The scientists have visited here, but their efforts aren’t effective. They apply methods suitable for other regions. The scientific information they use doesn’t fit for the soil here. For example, they suggest growing grass, but it doesn’t work here. During the severe rainy season, the tree roots would turn white and die. It is possible in other regions like Dong Thap [another Mekong Delta province], but not here.

Even within the micro space like a family or household, some realized a disadvantage of scientific information which only provides extra pocket income for temporary hardship relief and excludes sustainable economic development. They receive abundantly scientific information from various courses for CC adaptation like innovative farming, animal husbandry, and basic veterinary training for household. However, these trainings have not been truly effective, neither generate grand benefits for their farming works, nor reduce their financial burdens. One example is R26, who received advice on soil improvement, but still unable to earn fruitful results:

The soil here is acidic. Although it can be improved to grow vegetables, the sale of these crops does not cover the cost of soil improvement [...] Vegetables can only be grown in small plots or yards, which is solely sufficient for daily consumption, but not for economic development.

The short-lived effectiveness of scientific CC information is partly attributed to the limited number of recurring scientific trainings on the field to ensure the correct application in a longer period of time. R24 noticed that even though the information is understandable, but it was “only one training course for a week”. Some criticized limited visits from scientists, thus they fail to gain more detailed instructions and information in their agricultural works. For example, R16

reprimanded the shortage of scientists' returns which create challenges for local farmers to continue or further develop their applied cultivation models:

Very few scientists come back to teach and farmers face difficulties with this. For example, a farmer might successfully grow crops, then dig a pond to raise shrimp, but there's no specific guidance on technical issues. The first couple of seasons might be fine, but without continuing scientific and technical guidance, the pond becomes polluted causing economic loss. Scientists are not regularly brought back for technical training and education.

Scientific training is not only limited in quantity, but also in its quality. This can be seen from a comment of R22, who said with absolute certainty that these trainings are organized superficially, not for educational purposes but for PR and advertisements:

There have been scientists who came down here to guide me, but it wasn't effective [...] They come occasionally to film and take pictures, not for a deep guidance — they just do it superficially. They only film those who have successful harvests as examples, not those who lost ones. I'm absolutely sure of this. I'm not speaking carelessly.

Another applicability-related limitations of scientific CC knowledge, according to a few rural participants, is the substantial investment for actual implementation. R15 is a typical example of implementing shrimp cultivation with fully equipped scientific and technical methods and achieve high productivity. However, he emphasized that these scientific models require huge capital investments, creating financial challenges for anyone who wishes to implement and “not everyone can follow”. He urged funding supports from higher governmental levels so that other rural residents can attain an easier access to high-tech scientific solutions. Similarly, as comparing with other areas, R16 highlighted the fact that newly scientific models for shrimp farming aren't suitable for all locals in his areas, as

he said: “Only 2-3 out of 10 persons are successful”. Some locals have imitated the model but ending up in huge debt. Due to high expenditure for maintenance and diseases control, most can’t sustain its benefits in extended duration:

A few years ago, business was going well, but this year they have less budgets. Many households have old ponds that aren't clean and infected by diseases, so they failed. Other areas like Bac Lieu, some use new technology lining the ponds with aluminum foils instead of nets. However, doing so is very costly. Rural people in this region cannot afford it. The 10,000 square meter model is too expensive for them to undertake. [...] The local people are very eager to invest, but the investment costs are excessively high.

Continue elaborating on the financial burden of scientific solutions, R16 shared that the expenditure is likely increased significantly to offset the changing climate. Eventually farmers suffer substantial losses from double challenges which are severe climate conditions and expensive farming practices.

Criticizing the limitations of direct scientific CC information, two of my expert participants, S2 and S3 disclosed some irritation and disappointment from rural residents over the ineffectiveness of scientific knowledge. In their opinion, rural people sometimes reject to follow the instructions from scientists because the experiments are conducted in ideal conditions, which are not always ideal in practices. Scientists occasionally overlook the contextual factors of local people in their studies such as natural, social and financial factors. Recalling his embarrassing experiences, S2 suggested rural people to stop the use of undergrounded water in the context of salinity invasion, without the provision of the alternative resources:

I once presented a scientific report on water usage. Rural people praised it highly, but they asked me a single question that made me break into a sweat:

“So, if I don't use groundwater, what water should I use?” This shows that scientists’ advice sometimes is very disconnected from reality.

Moreover, S2 complained the ineffective communication approach of scientists to lay people. Occasionally, the scientific information is delivered without deliberate evaluation on how lay people receive and respond to the information. Citing another incident of communicating scientific knowledge to farmers, he regretted thinking of them for being stubborn and unwilling to change. In fact, he overlooked the significant and irreplaceable position of local opinion leaders to talk and convince fellow farmers:

At that time, the village chief advised that you have to work with the monks at the temple; otherwise, no one will listen to you because they only listen to the monks. If the monk says something they agree with, they will change over time. That is cultural factors. It's not because farmers are resistant to change, but because we don't know how to effectively communicate the information to them.

The picture is not all negative, however. Although most rural participants criticize the scientific CC information’s quality, a few did acknowledge the effectiveness of scientific CC information’s in these face-to-face meetings in helping them to better adapt to CC. For example, R2 compared scientific sources with other sources in a bid to bolden its credibility and practicality. He emphasized the stronger impact of scientific CC communication via face-to-face context:

Information from scientists is studied and researched, so I surely trust it. The on-site talk and explanation of scientists would make CC more relevant and grounded in reality. If the scientific information is solely communicated via the media, some might understand, some might not as people have varying levels of education.

The positive responses towards direct scientific CC information are also credited to the way scientists present their information. R5 shared that scientists and experts transform their professional and technical knowledge such as ozone layer depletion, indicators of air, water, or greenhouse gases, into a normal, friendly, and everyday language when conversing with local people:

The information from scientists is very clear and helpful for me. If I integrate it with practical experiments, I can achieve a clear-cut comprehension of what the information means in real life.

Such down-to-earth presentation motivates R11 to meet scientists regularly, which helps her “to be less panic about the tidal flooding and salinity invasion” and learn more about adaptive solutions. She found the scientific CC information is relevant to her. It accelerates her behavioral changes in daily life, as she said: “Having previously-known information clarified by scientists helps me to grasp the issues more deeply”. Another example of behavioral change thanks to direct scientific information can be witnessed from R6 who transform her traditional cultivation to scientifically agricultural works to ensure a sustainable development and environment protection. She proudly shared:

I used to do traditional gardening and husbandry. Now I work in biogas digester installations for livestock farms, where they ferment the manure to extract biomethane gas for burning [...] This way, I won't need to buy gas. It also helps to clean up the environment. I learned this model from scientists' guidance at Can Tho University.

Similar to rural participants, within the group of expert participants, they also exhibit contrast responses towards the quality of scientific CC information. While S2 and S3 highlighted some limitations, the positive impacts of direct scientific CC information are acknowledged by the other two interviewed specialists. For S1, who often accompany scientists to the field, the fondness and close connection

scientists have with locals are owing to the use of simple, familiar, and accessible language to demonstrate what farmers have heard and seen, instead of theory and abstract knowledge. Thus, “rural residents are enthusiastic to engage with scientists” and foster close relationships with them, he recorded. Likewise, S4 emphasized on the compliance of rural people when receiving his advice:

They listen to and trust my information and evaluations. For example, I encountered a farmer who was preparing to build a house. I talked to him and provided some evidence. The next day, he raised the foundation of the house. Some people thought he was being excessive, but when flooding occurred, he realized that what I said was correct. After that, those around him follow his example.

5.6. Chapter summary

Overall, the chapter showed that all official sources of CC information have failed to initiate fundamental change in lay participant’s CC engagement. While CC information from the government organizations and its officers is reported to be shallow and administrative-driven, the information from other sources also exhibits no substantial improvement, such as superficial CC communication from NGOs, profit-oriented communication from businesses, and scientists with its information’s limited applicability in terms of time, space and finance. For mainstream media, despite the trust that it has gained from participants, the effectiveness of its CC news and information remains low due to the superficiality, irrelevance and exaggeration. The chapter demonstrated a paradoxical situation in which there is an abundance of official CC information sources, but none of them truly provides essential information for participants to enhance their CC engagement. The most affected of this lack of effective information is rural participants, as they lack appropriate guidance and solutions to adapt their livelihoods to the fickle climate. From the dataset, however, there emerges another information source that participants, especially rural ones, tend

to rely heavily on for their CC adaptation: lay CC knowledge and information. However, there are questions about its efficiency. The next chapter will explore the extent to which this source of information exert impact on CC engagement and whether it fosters or inhibits effective engagement.

Chapter 6. The crucial importance of informal information and knowledge sources

This chapter first explores the extent to which lay expertise affects CC engagement, focusing on how it is exchanged among participants as well as the benefits and limitations it brings about. It will then examine how the combination of lay and scientific knowledge can be beneficial to CC adaptation efforts. Overall, the chapter finds that the exchange of lay CC information and knowledge is much stronger in rural participants than their urban counterparts. However, there are certain limitations of this information source that reduce its application to rural participants' climate adaptation, specifically its low credibility, constrained efficiency and its possible harmful impacts on climate and environment. The data also show that integration of lay and scientific knowledge can provide the most effective way to adapt to the changing climate.

6.1. The exchange of lay CC expertise

Lay CC expertise refers to the information and knowledge obtained over the time through experience, observation, and intuition of people in their daily living and working activities. It is achieved via the process of self-learning or information exchange with family, friends and neighbours. In my interviews, such exchange was found to be more prevalent among rural participants than their urban counterparts. While the latter seldom talked to or received CC information from friends, family or neighbors, all of the former affirmed their frequent exchange of daily farming practices and CC adaption experiences with close peers. Many learn about CC impacts through their own and others' direct observation and experience with things that they rarely encountered in the past, such as unusual rain reducing rice productivity, a sudden temperature spike eradicating the whole shrimp harvest, or an abnormal cold weather budding flowers. They support each other to deal with CC by sharing knowledge about local agricultural adaptation practices, such as livestock breeds and crops, or long and short-term plantation.

R13 noted that because her local people understand their collectively precarious farming practices in the fickle climate, morally everyone is willing to share self-knowledge to help one another:

There are many people who come here to learn and ask questions, and I also guide them. As farmers, we help each other. We assist each other in selling and harvesting. Everyone is going through the same hardships, so whatever I know, I share with them. Here, there is no situation of keeping cultivation secrets; we actively teach each other.

Even farmers with different cultivation products can also share lay expertise. R15 mentioned that salinity-related knowledge in his area mostly comes from shrimp farmers, but information on shrimp breeding activities provides reference points for him in developing his own plant cultivation and adjusting his orchards.

Lay expertise exchange is embraced further in the course of CC adaptation. Rural participants regularly exchange adaptation knowledge and experience for preserving cultivation and harvesting practices in orchard, rice and animal farming. For instance, they share a method of raising freshwater duck and rice in a mix pond of salt and fertilizer to gradually shift their habitats to the brackish condition, in that way they still can preserve their existing cultivation in case of saline invasion. On another example, R33 mentioned that the shrimp farming in his local area is extremely susceptible to the rapidly changing saline level of the water. If local farmers want their shrimp to live, they have to constantly monitor the level by using checking devices or seeking advice from scientists. However, they can't keep contacting scientists every time the saline level alters or are financially insufficient to regularly buy a new device. In that situation, to protect the shrimp farming from the fickle saltwater, R33 and other fellow farmers have created another adaptation method which demonstrate the effectiveness to their farming. Proudly he shared:

Take water from the sea and test the saline level on the spot — I have done it many times so I can taste it to figure it out. We even urinate into the pond to estimate saline levels.

On another instance, R25 noted that since there's been no infrastructure support from the government like water reservoirs or dams to remedy the flooding situation, lay measures have been more frequently exchanged. Local residents tell each other to self-build reinforcement banks, raise house foundations, and plant flood-proof crops.

Working with rural people for a long period of time, the expert participants also agreed with the assessment that rural residents actively exchange their experience, knowledge and information with others in everyday life and work. They witness the mutual support of rural residents to raise crops and livestock in the acute condition they are facing. For example, S1 mentioned:

In some regions with extreme conditions, they grow crops suited to those conditions. Currently, farmers are planting salt-tolerant rice varieties in areas that frequently experience saltwater intrusion. In places like Bac Lieu and Kien Giang, they used to grow only rice, but due to changing conditions, they now tell each other to grow rice alongside shrimp and crabs [...] They no longer practice monoculture as they did in the past.

The exchange of lay CC expertise occurs in both informal and formal settings. Many meetings are facilitated by government agencies or state-owned businesses, such as local cooperatives gathering large numbers of rural residents on a monthly basis to discuss their agricultural practices and methods. Most rural participants report that these monthly meetings help them share and be informed about agricultural successes and failures that are based primarily on daily experience, and their possible application to others' cultivation activities. R20, for instance,

participates in these local meetings to spread his intuitive expertise in mango production to others:

Here, I started it first, and other households follow the same practice this year [...] Every one or two months, I share my farming methods, the amount of fertilizers and pesticides, ensuring that everyone in the local cooperative is informed.

Informally, local residents communicate with each other in any place convenient to them on the daily basis. Public places like coffee shops, *quán nhậu* (Vietnam's most popular type of local drinking spots that serve both alcohol and food in casual settings), or farming fields are referred as the most common spaces where rural residents gather to discuss CC-related issues, its impacts on health and environment. As R6 commented:

Usually, friends meet up for drinks to talk and exchange CC information. The information about climate issues provides references for local farmers to protect health and environment.

These informal meetings also help to facilitate the exchange of lay expertise about cultivation activities such as animal breeding' size, raising periods and affected diseases. R16, for instance, took advantage of these informal meetings to share his knowledge in farming orchards:

Here, I do things in certain ways, and the neighbors learn from it as well. Occasionally, I also teach them. For example, when we are together for a cup of tea, I invite them to visit the garden and take a tour. They might change and follow my example when seeing my orchards.

6.2. Limitations of lay CC information and knowledge

Such active involvement in lay expertise seems to have helped rural participants to understand more about CC causes and impacts as well as potential adaptation

measures. However, my impression from the data is that rural participants who rely exclusively on lay expertise for agricultural activities are unable to instigate a fundamental change in their livelihood and farming productivity in the increasingly severe climate context. Although they use the same ways of farming, plants and crops' productivity has been rapidly decreasing. For example, when asked about the application of farming knowledge and experience learnt in the past, R10 bluntly said: "It can't work, and it depends on the weather". R16 mentioned that his years of experience of "using the Southwest and East monsoons" for shrimp farming activities have become irrelevant due to sudden changes in climate. Or R23 desperately utilized all kind of lay knowledge and experience that he gathered but were unable to save her harvests. Painfully she shared that growing crops in the fields never failed in the past, as she just had to use her experiences in water circle and suitable amount of fertilizer. But now, these experience no longer works:

I used to farm and plant bananas or various crops without issues [...] Back then, growing rice was easier because the water is stable. It didn't rise like it does now. There was much less flooding.

The expert participants also agree, saying that a total reliance on lay expertise to adapt to the current climate is no longer suitable. For example, S1 noted the rural residents' previous use of experience – such as "water rises on the 15th of the 7th Lunar month" – doesn't work anymore.

The reduced applicability of lay expertise, on the one hand, is due to the acute impacts of CC and, on the other hand, is attributed to some limitations including its low credibility, constrained efficiency as well as possible harmful impacts on climate and environment.

Some rural participants cast doubt on the credibility and accuracy of lay CC expertise, considering it as a poor source to use because they think the people who

providing it have no formal education and knowledge to be able to offer proper CC adaptation. For instance, R7 stated that he simply doesn't believe CC information from his friends and peers, because they predominantly "implement cultivation spontaneously" and base on "unverified lay experiences and pass-down knowledge". Meanwhile, R8 emphasized his need to cross-check things from verified sources whenever he receives information from his friends and family:

Whatever anyone says, I filter that information and research it further rather than believing it 100%. I listen and take notes, and I have to verify whether that information is true before I share it with others [...] Sometimes there is false CC information from lay people.

A few urban participants, while acknowledging rare use of CC information from friends and peers, also raised scepticism towards its trustworthiness, qualification and accuracy. They hear much CC information from close people but are unsure of its validity. U2, for instance, doubted CC information from friends even if they attain that information from the authorized sources such as the media:

The information from my friends is only partly trusted, I need to double check later. Sometimes after reading the news, they only vaguely remember the details and share it with others, the information may not be accurate.

On another instance, U10 indicated that CC information from her peers is shallow and/or weather-focused. They only touch on the issue without exchange of deeper views; therefore, she doesn't give it much credibility:

People around me such as parents and siblings often say [simplistic] things like, 'This time of year it used to be cold, this is because of CC' or 'Why haven't the flowers bloomed yet this year?' or 'Why is there so much rain or so much sun?'

The second limitation of lay expertise, as hinted above, is its limited effectiveness in agricultural production. Lay expertise is often disseminated through inheritance

and words of mouth among family, or friends, neighbors, residents in geographical and social proximity. Its effectiveness is reported to be restricted to specific areas and times. For example, R28 revealed that residents in her local area mostly learn adaptation knowledge from each other but it fails to generate long-term benefits for the plants. This comment is in line with R25's concern that using lay expertise to adapt to CC is just a temporary and short-term solution: "We grow short-term crops like vegetable, but it only lasts for 45 days".

Studying agricultural production for a long period of time, S2 indicated the time limitation of lay expertise-based cultivation activities. She found that cultivating activities vary from one season to the next; therefore, any long-term plan is quite difficult to achieve. The cultivating plans can't extend too far into the future. They only work for one or two seasons at a time. S4 also mentioned the use of lay expertise takes tremendous amounts of time to be effective. He noted the local specificity of lay expertise:

If farmers rely solely on lay expertise, it's a process of trial and error that takes a lot of time to work. They cultivate based on feelings and intuitions, and sometimes feelings and intuition cannot be passed on to other farmers. A farmer's feeling of salinity or acidity in one region will differ from other farmers in another.

The third limitation of lay expertise is its potential harmful impacts on the environment. In a stable climate, thanks to abundant natural resources in Mekong Delta Region, lay expertise-based cultivation would generate a great fortune and fruitful harvests for rural people. They would just have to rely on the understanding of circular traits of nature such as rain, wind, land, and sunlight to decide when, where and how to implement their cultivation. However, in the currently fickle climate, this strategy does not deliver the continuously productive results and frequently incur heavy loss of harvests. To compensate the economic loss in on-season harvests, off-seasonal cultivation relying on self-belief and

experience is rashly implemented. Agricultural practices normally should follow the standard seasonal schedule, but since farmers couldn't get good prices, they farm during off-seasons to earn more money. In addition to relying on self-experience and preferences, there is a tendency of imitating others' off-seasonal cultivation without deliberated thoughts on its appropriateness. "If anyone's fruit orchard has a good price off-season in one year, the next year people would flock to grow it", R30 observed. This opinion is endorsed by S1 whose reporting experience demonstrated that a group of rural people adopt each other's benefit-driven cultivations unregulated without prior consideration on its impacts:

They learn from each other a lot. When they see their neighbor successfully raising shrimp, they follow the same [...] There's no planning or regulation, they just rush to do what they experience. For example, if they see certain varieties of rice grow and yield better, they will plant it next season. They follow whatever they perceive as beneficial.

Under the urge to maximize the harvest's productivity off-season and to offset its natural disadvantages, some farmers prioritise a kind of lay information that R17 labeled "instant-noodle knowledge". It metaphorically implies a desire for immediate and short-term financial gains, rather than adopting scientifically verified measures for sustainable livelihoods. This kind of lay knowledge often encourages the uninformed and reckless use of agrochemicals for the rapid increase of agricultural products and profits. The aggressive application of agrochemicals occurs in many kinds of cultivations such as shrimp farming, snail raising, rice planting. For example, R13 noted that she learns from others' work and her own experience to utilize aggressively fertilizers and pesticides in every stage of her longan orchard from flowering to harvest to earn more money:

If it starts blooming, then I spray it with a treatment to prevent the flowers from falling off. I use a lot of chemicals for the longan trees to bloom [...] If I want bigger longan fruits, I use more fertilizers.

However, according to most rural participants, lay knowledge and experience to off-seasonal cultivation with excessive agrochemicals is not beneficial to their cultivation quality and financial status. On the contrary, it has caused precarious financial status for some rural residents, as they have to spend extravagantly on agrochemicals without certainty on equivalent earnings. R28 shared that she attempted to do the same after observing neighbours' farming orchards, but now her orchard is dying because of abundant chemicals and fails to generate any sort of income: "The orchard hasn't produced any profit, and now I have to cut it down". Likewise, R14 criticized the practice of sole profit gaining and excessive fertilization for incurring significantly financial and social burdens such as the loss of reputation to domestic and international business partners:

The demand for eco-friendly shrimp is high in supermarkets worldwide. For German partners, they purchase it at very good prices, but it cannot be sustained for long. Farmers see the high profit, so they keep mixing rice-raised shrimps with industrial ones and use excessive fertilizer in the wrong time of a season, which undermine the shrimp's quality. The business is then canceled.

This kind of cultivation not only exerts detrimental impacts on the economy, but also engenders the widespread diseases affecting a wider population's health and environment. R16 pointed out that off-season farming can easily spread diseases, as farmers spray herbicides and other agricultural chemical carelessly to the environment:

After raising shrimp for 2-3 seasons, the ponds become infected with diseases, so they dredge the sludge and dump it into the river. The rising tide then transports the contaminated river water onto the land, causing pollution for many other people.

In addition to the abundant agrochemicals in off-seasons, there is the problem of unregulated and unplanned cultivation in rural communities. Here, rural residents

rely on their own preferences and intuitive knowledge to decide what to farm rather than follow any broader planning. They farm anything on their own land as long as they think it is good for the sake of economic purposes – some raising saltwater shrimps, some raising freshwater rice, while others raising orchards. This has deteriorated collective cultivation and land quality as people use different kinds of fertilizers and pesticides. R23, for example, conveyed that she and other locals farm whatever feel economically viable and profitable. There exists no uniform cultivation of crops; each household grows what they like, such as guava, dragon fruit, or other fruit plants:

If I see a tree that I think might be profitable, I'll plant it. If you like a different tree, you plant that one [...] If my land grows coconuts but then the yield is low, I will change to lemons, guava, or even betel nuts in a hope for a higher yield.

That is not to say lay expertise always fails to engender successful CC adaptation and economic empowerment for most rural participant. In fact, the data reveal a number of intriguing cases in which the exclusive application of lay knowledge does help farmers to achieve excellent outcomes. These cases are related to the use of generational knowledge and experience that allows people not to feel panicked or and intimidated by the fickle climate and to be able to preserve their cultivation. For example, R11 adapted to salinity invasion and floodings by building reservoirs to store water at the end of the rainy season, thus saline water can't get in. And in the dry season, the stored rainwater will be used for rice farming and fruit planting.

Other successful examples of putting lay knowledge to good use for the purpose of CC adaptation were found from the testimonials of R5 and R27. These proudly shared the establishment of unique models of agricultural practices that are based on their own and their peers' knowledge and experience. Particularly, R5 has farmed snail which requires only clean water comparing to the costly breedings

of fish, eel and shrimp for food and fertilizers. Proudly he highlighted that after “9 years of running the business model”, it has proved the efficiency by standing firmly in the market, generating a stable income for his family while being environment-friendly. Similarly, R27 implemented a clean vegetable model with a total reliance on his own experience and friends’ farming knowledge:

I know some friends doing the vegetable model productively, then I buy a land to do the same. In general, I don't rely on scientific knowledge; I just maintain the water level so that the vegetable can survive. I only farm based on farmers' experience.

With effective application of peer knowledge and experiences, all he has to do is to choose the right seeds of vegetable. Unlike other CC-susceptible farming models like “flood-susceptible banana with the excessive agrochemicals”, his vegetable model, as he claimed, is “an organic vegetable farm” that can endure in critical weather patterns and be raised by bio-fertilizers, thus reducing emissions. Some applied lay methods are the periodical fertilization for strengthening roots and soil quality or the combination of fertilizers and water to minimize impacts on environment and local people. In addition to being pro-climate, this model has enhanced his economic status greatly, thanks to the significant consumption of clean vegetable from customers and supermarkets. The income is much higher and more stable than earnings from other agricultural products, and is not vulnerable to other things, such as “the plummeting price of afforestation”:

This vegetable is now easy to sell, fetches a good price, and can be harvested every 2-3 days. Growing rice can earn about 30 million VND [£1000] a year at most, but this vegetable can bring in over 200 million VND [£7000] a year. Overall, the income is more stable and much higher than rice, especially since rice is more affected by CC consequences such as severe floods.

The exclusive application of lay information and knowledge in CC adaptation not only improve the economic status for both R5 and R27, but also enhance their moral engagement as they expressed the desire to transfer the gained knowledge and experience from their farming models to other local fellows, so that they can adapt better to CC. Both hope local farmers can follow and earn a similar success in livelihood development. From their achievements, they believe their farming models are “far more effective” than other crops like melaleuca forests, mangoes, or bananas. Further, they demonstrated the desire to “recommend the local authorities” so that they can help to multiply the models and support local people to operationalize them. R27 enthusiastically conveyed:

A few people have asked for help, and they've asked me to provide seedlings, which I agreed to do. Now that I have them, I want to share them with the community. The locals are also very excited to receive this shared information to earn new livelihoods.

6.3. The combination of lay and scientific knowledge

As each informal source of information and knowledge has its own pros and cons, some rural participants considered the integration of lay and scientific knowledge to be the most effective way for people to engage with CC. Both lay and scientific knowledge have limitations when used in isolation, they said, but combining them could lead to more effective CC adaptation. In this process, farmers select the scientific knowledge suitable for their financial situation, labour resources and cultivated land sizes, then combine it with their own experience and judgment to carry out cultivation. Several participants do not value one knowledge source over the other and believe both play fundamental and practical roles in cultivating practices to deal with the fickle climate. As R21 said, experience is important but science is also essential, so they have to go hand in hand: “Even if you have scientific knowledge from books and training courses, you still need experience to succeed in farming”. For him, only “about 60%” of his farming practice relies

on scientific knowledge. Similarly, when asked whether he will only use his experience for cultivation, R17 rejected, highlighting the need to integrate scientific knowledge in farming:

Scientific knowledge is very important, much like the difference between someone with a high school education and someone with a university education. Or considering two people growing flowers — one relying solely on experience and the other combining it with scientific knowledge. Whose flowers would look better?

For my expert participants, lay and scientific knowledge play equal roles in cultivating practices, as S2 said: “Each accounting for 50%”. Their approach is to apply scientific methods to existing farming activities and find a formula that improves its efficiency. Usually, scientific knowledge will play the supporting role, so that rural people can take a full use of lay expertise. Scientific knowledge is used to improve the strength of lay expertise and reduce its weaknesses. Rural residents develop farming models based on local knowledge, and then as S3 noted: “Scientists will optimize these models with verified knowledge”. These supporting activities are performed mainly through observing lay methods and then explaining in a scientific way to local people. For instance, if a farmer notices a certain colour in the water, scientists will then measure the turbidity, pH, and salinity levels and provide an optimal solution. S4 elaborated:

Scientific knowledge continues to build upon the foundation of lay knowledge. With this existing foundation, scientists come to measure, collect data, and identify optimal parameters. From these parameters, they create models that help local farmers improve their cultivation efficiency. When local knowledge changes, scientists adapt and modify their research models accordingly.

Based on close contact experience with rural residents, S1 witnessed that they will have their own models to adapt to CC first in order to save their livelihoods. It is

then followed by support and guidance from scientists in planning and executing these models more effectively. Scientists create an optimal model based on local knowledge, which rural residents can observe, follow, compare and evaluate against other regions.

This combination of lay and scientific knowledge in fact does support some rural participants to adapt their farming practices to CC impacts more effectively. They no longer rely solely on chemical pesticides and learn how to combine them with biological fertilizers. This helps them to protect the health of environment as well as surrounding community. R24 mentioned his transition in cultivation:

Previously I only used chemical fertilizers, but they desiccated the land and polluted the environment. So, I gathered scientific knowledge to combine microbiological and chemical methods. For rice under 40 days old, I occasionally use chemical fertilizers, but after 40 days, I mainly use microbiological fertilizers. This also contributes to environmental protection.

In another instance, R11 noted that she had self-supplied and self-learnt the usage of animal manure and its composting methods, but did not know its useful impacts on the environment. After receiving the explanation of “organic and inorganic concepts” and “the categorization of their matters” from scientists in various universities, she was able to improve what she had been doing and perform more environmental protection with pro-climate actions like “plastic reduction”.

Secondly, more importantly, the combination of lay and scientific knowledge helps rural participants to be more capable of adapting their traditional cultivation and enhancing its productivity in the capricious climate. One participant who fruitfully transformed traditional cultivation by using this combination is R17. After failures in cultivating “more than 100 agricultural models” of orchards and livestock, he realized that he needed to combine experience and science to improve his living and working condition, which eventually allowed him to

achieve the double target of CC adaptation and livelihood improvement. He first used his understanding and knowledge to study available resources in his homeland and concentrate on developing them. According to him, it is easier to apply local knowledge to develop local resources, because they already have “the uniqueness and suitability to the local climate and soil”, which reduce difficulties in cultivating process. The inclusion of scientific knowledge is to make “necessary adjustments”. His integrated polyculture model implements multiple levels of cultivations within two intertwined saltwater and freshwater ecosystems in a single land area. The former is shrimp, crab or fish, and the latter is rice and orchard. The cultivation has three levels which can tolerate saline and acidic conditions – the top level for dragon fruit on mangrove roots, the second for rice seafood, and the third for mushroom. His approach is both long-term and short-term, enabling him to farm all year long regardless of CC impacts. As he shared with enthusiasm:

To adapt to CC and improve my family’s livelihood, I implement this multi-levels models. Instead of renting three pieces of land to do one thing, I only need one to do three things. With just me, it’s possible to manage three types of cultivation. First, I’ll focus on the long-term, like growing dragon fruit, which takes four years. During this time, I need a way to sustain myself, so I’ll plant crops that take only a year, and then I’ll look for crops or livestock that take only a few months. This way, regardless of how much climate changes, I’ll have three systems that suit this piece of land.

All of his cultivational levels contain a high volume of both lay and scientific knowledge. For the dragon fruit on mangrove roots, he cultivated scientific knowledge to understand how the dragon fruit can live “symbiotically with mangrove roots”, in which area of the root that the fruit attach to so that it can become healthier. Then, lay experiences and knowledge are applied to make the most effective use of natural elements such as water and sunlight. He knows that

it is absolutely necessary for dragon fruit to expose to “sunlight for 14-16 hours” to bear fruit. He said: “10-12 hours won’t suffice, no matter how healthy the plant is. This has remained consistent for years and years”. Also, R17 relied on understanding of the fruit through years of cultivation experience to trim leaves and branches so the plant grows and adapts better to saline conditions, as he emphasized: “For a plant with 10 branches, you can’t cut all 10. You need to know which part to trim and in which month”. Based on knowledge and experiences gained from growing dragon fruit on mangrove roots, R17 is inspired to think of various products for additional income. Proudly he shared:

I have creatively developed more products such as mangrove leaves that can be used for salads or as fertilizers, and the wood, which has a beautiful grain, can be crafted into chopsticks.

In addition to seeking out local resources for development, R17 also brought in plant and livestock varieties from other regions and applied lay knowledge to adapt them to the saline condition due to rising sea level. This has been carried out in his second and third levels of cultivation, in which he developed models of “a small rice-growing on mats on the sea” and “mushroom”, following Japanese and Korean scientific standards. However, the saline level in local sea limits the models’ development. He then combined them with his own knowledge and experiences, by creating multiple containers with regular soil to grow rice and gradually habituate it with saltwater. After rice cultivation, the containers are used for “raising saltwater fish, shrimp and snail” to restore the original nutrients of soil, allowing for sustainable rice and seafood farming. Following this, various types of mushrooms are naturally grown for medicine, such as “Reishi Mushroom, Brazilian Sun Mushroom and Queen Mushroom” which can’t be nurtured on Korean’s saline soil. This circular approach based on both indigenous and scientific knowledge is not only a measure to counteract CC impacts like saline

intrusions on cultivation, but also ensure food and income security for his family from yielding clean rice and exporting fish, shrimp, and mushroom.

Several other rural participants also stated that by combining scientific knowledge with practical experience, they have adapted their cultivation to CC and achieved certain achievements. For example, R15 said that he used to cultivate with dense chemicals which ruined the underneath water and soil, making it unusable for farming practices “within 1-2 years”. However, by listening to scientists’ advice to integrate “biological fertilizers and small amounts of chemicals within appropriate timeframes”, the water and soil have restored and maintained its cleanliness for nurturing plants and animals. It not only helps to protect the environment in his local area, but also enhances productivity of his shrimp farming:

I also have on-site experience such as using grasses and vegetables as food for the shrimp. Additionally, I observe and anticipate issues affecting the shrimp’s quality based on long-term experiences, then I apply the recommendations and advice by scientists. I also integrate the Vietnamese Good Agricultural Practices (VietGAP) standard set by the Vietnam Shrimp Association. Thanks to this integrated method, all of the shrimps produced are eligible to export.

Another example that can be looked at is R20, who in the past, exclusively used traditional knowledge for orchard cultivation, such as “non-protective covered mango”, or “sole application of chemical pesticides”. This led to aging mango orchards with pest infestations, resulting in lower market values. However, by integrating scientific methods – such as pest control, fertilizer use, and water irrigation systems to manage saltwater and freshwater levels – with traditional methods such as trimming techniques or soil improvement, he had enhanced productivity, lowered cultivation costs, protected fruits from pests and ultimately fetched higher prices of fruit crops in the market. He shared:

Covered mangoes now sell at 1,5 times higher than several years ago, making them suitable for export. The fruits have grown larger; for example, a single tree can yield around 50 kilograms. The larger fruits sell at a higher price and have a more appealing colour. Since integrating scientific knowledge, the harvest has significantly improved compared to previous years.

With research and work experience in rural communities, my expert participants agreed that integrating lay and scientific knowledge enhances rural residents' traditional cultivation practices. Rural residents used to cultivate based primarily on experiences, such as observing water levels over a set period to assess water quality, or using weather patterns to predict and determine the best time for planting, or observing the surrounding plants to anticipate the arrival of dry and rainy seasons. However, due to the changing climate, they can't do these activities anymore. S2 emphasized the fact that rural residents nowadays need scientific knowledge and information for their cultivation to cope with CC:

There were hard-learned lessons for the farmers. During 2015-2016, when salinity levels increased, they were not yet accustomed to following scientific advice. They would assess the saline level on the surface based on intuition and experience. As they didn't perceive it as salty, they pumped water in. However, they later noticed their orange trees' leaves turning yellow. After consulting scientists, they learned that the saltwater is below, not on the surface. These costly lessons teach them to listen to scientific guidance for better cultivation.

In the similar vein, S4 and S3 underscored that after the reception of scientific knowledge, rural residents exhibit a high level of creativity and adaptability in their traditional cultivation to CC, such as innovation of farming techniques:

When they have access to scientific information, they learn rapidly, process it quickly, and apply it flexibly to their farming practices. They combine the knowledge we provide with their own experience [...] I've observed firsthand

when working with farmers. This adaptability is one of the reasons why rural people in the Mekong Delta are able to be resilient to CC.

The combination of lay and scientific knowledge has initiated a significant benefit and support for traditional cultivation to adapt to CC. From the dataset, its advantages are not only limited at traditional cultivation, but also help to create a new type of farming-based business called agriculturally communal tourism. A rural participant who has cultivated both lay and scientific knowledge to successfully operate this tourism model is R12. Differed from other types of agricultural tourism which are designed to benefit a household, the communal tourism champions the idea of multi-households' participation to promote inclusive development and mutual benefits. Grounding on traditionally cultural traits such as “the antique voice of Southern Land”, “the antique cuisines” or “the antique ways of living”, unique and attractive tourism-based stories are composed to attract tourists to experience local values. This model has helped local people to “get two birds with one stone”, namely livelihood improvement and preservation of traditional cultivation in a severely changing climate. Enthusiastically, she shared the nature of communal tourism:

This is a good model for adapting to CC [...] I gathered 7 households: one makes Bánh Xèo (Vietnamese savory pancakes), others grill fish, make sour soup and so on. I thought it would be best for each household to do a different task because no single one has the capacity [to do everything]. So, I assigned each household to a specific activity.

To initiate and successfully sustain the tourism model, she has utilized both lay and scientific knowledge. R12 builds the model upon, first, her own experiences in her family's tradition as she conveyed that each family member has a different food vendor like rice noodle, soup, or porridge and is mutually supported. And second, she spent five to six months living with rural people, meticulously

observing and studying the strengths and weaknesses of their cultivation and lifestyle:

Originally, I thought it is enough to listen to specialists and government's officers' directions and instructions, but after a while, I find myself the need to stand back to study and observe the life of people and their cultivation [...] We need to rely on local knowledge, by following them and learning from their experiences and indigenous knowledge.

She also resorted to the understanding of traditional culture in her local area, in which its residents live interdependently to fight against CC consequences, as she gave an example: "If the dike breaks over here, they will come to help patch it up to avoid flooding together". Therefore, the affective bonds among local residents within tourism community remain strong, supporting each other with everything they can in case of climate difficulties. This further strengthens the success of the communal tourism model, as they can operate the model as a whole and help each other's farming practices. For instance, R25 shared that her traditional longan orchard is benefited profoundly from joining the community:

I have farmed longans [...] Other households raise fish, grow rambutan, plum, vegetable and grapefruit orchards [...] The community here holds discussions about ways to improve livelihoods and living conditions together. For instance, they allocate customers among the various orchards. If my longan orchard is ripe first, the cooperative will prioritize customers to my orchard.

The initiation of the communal tourism model is mainly originated from lay knowledge and experiences. However, for the sake of sustaining and safeguarding the model from CC impacts, whenever R12 learns about possible occurrences of severe climate events, such as storms or saltwater intrusion, that could affect the operation of tourism model; she actively seeks for adaptive information from

climate scientists to stay ahead of the situation and to provide appropriately adjustments for local residents to protect their orchards and animals. She said:

It is imperative for this tourism model to always have the presence of orchards and fishponds. Without that, it won't attract visitors. The rising saltwater due to CC will kill our trees and fishes.

Thanks to the communal tourism, socio-economic and moral CC engagement of local residents in R12's vicinity is improved. A couple of rural participants acknowledge that this tourism model has enhanced awareness on environmental protection. They notice a huge amount of trash and seek ways to collaborate with the local authority and other residents to solve the littering issues. R11 is the pioneer in this action by initiating a plastic reduction project. She worked with other households to communicate environmental protection to locals and tourists, such as waste categorizations at the source where plastic bags and bottles are dried and sold for charity; leaves and vegetables are thrown to feed the fish; and fish corpses are transformed to organic fertilizers. Further, she has cooperated with tourism enterprises to restrict the carry-on transportation of plastic products into visiting sights. As she proudly shared:

I find the project very effective. Now, even after 10 days without collecting trash, I still see a reduced amount of waste. Tourists also join me in protecting the environment; they don't bring plastic bottles. Even with 700-1000 tourists a day, I can ensure a supply of drinking water by boiling water here. Working with tourism companies, I often remind them not to bring water bottles. Here, every household boils water to ensure there's enough for tourists to drink.

The communal tourism also helps to improve household economy. It contributes further to the course of poverty eradication by creating extra jobs and saving travel expenses for rural residents as they are able to sell agricultural products for tourists on-site. R14 passionately talked about the achievement:

Since opening up for tourism, we've been able to sell fish to many people, and they've come to know about us [...] Doing tourism well has huge benefits. At the end of the month, we receive 100-200 million VND [£3000-6000] from the travel agencies, creating jobs for hundreds of people here. There are already 60-70 tour guides, and around 30 garden households.

The communal tourism not only exerts positive impacts on socio-economic engagement, but also enhances moral engagement. R14 and R11 recognize that since the operation of communal tourism, they and some others have become good examples in protecting the environment. R14 emphasized that with his credibility and voluntarily actions of categorizing garbage, part of local residents has mirrored his actions and raise their own environmental awareness. Protecting the local environment is an effective way to maintain tourist's return. "If this place turns into a garbage dump, no one will travel here anymore", he stated. Further, R11 stressed on the role model displayed by adults to raise youngsters' awareness on environmental protection and CC remediation. It is a method to educate younger generations:

The plastic use limitation campaign educates young people to refrain from using plastic products. Their awareness of environment protection, tree planting and organic uses is improved [...] All my children learn from the family's living habits and their parent's examples to maintain the value of previous generations.

Moreover, the moral engagement is also expressed through the sympathy for rural residents who suffered from forced migration due to CC. R11 hoped that communal tourism will create new jobs and locals will return and contribute their labour to their hometown:

I have escaped poverty, so I feel sorry for people who have to leave children behind with grandparents to work in other provinces [...] Therefore, I do

communal tourism with the hope of helping such people to come back and work here.

6.4. Chapter summary

Overall, the chapter shows the important role of lay expertise in the course of CC adaptation. It finds that rural participants attain higher perception and reception of lay CC information and knowledge than their urban counterparts. They have exchanged the information via official government-organized meeting and informal gatherings with friends, family and neighbors. Although lay CC expertise has a certain benefit for cultivation, a complete dependence on this source of information is not prevalent across rural participants, due to its certain limitations which are low credibility, constrained efficiency in prolonged duration for plants and cultivation, as well as harmful impacts on climate and environment as abundant fertilizers and pesticides have been used unchecked to compensate for the crop loss. This activity, evidently, lays more detrimental burdens on the climate and environment. The chapter then finds that the combination of lay and scientific knowledge emerges as the most effective way to adapt to CC. Its effectiveness is not only exhibited in agricultural practices, but also contribute to create a new livelihood of agricultural communal tourism.

Chapter 7. Discussion

This chapter aims at bringing together the empirical findings to answer the two research questions: **“How do Vietnamese engage with CC issues?”** and **“What are the impacts of CC information sources on public CC engagement in Vietnam?”** By summarizing and positioning this study’s findings in the context of previous research, this chapter presents the overall picture of Vietnamese’s engagement with CC issues, how different CC information sources are used for and influence such engagement, and some implications of such uses and influences.

7.1. Summary of findings

The extent to which Vietnamese people engage with CC socio-economically, politically and morally is the first focus of this research. By employing the theory of public CC engagement, the findings found a substantial difference between urban and rural residents in socio-economic, political and moral engagement with CC. Rural residents not only understand and experience CC impacts directly, but also engage adaptive actions individually and collectively through local cooperatives and community networks. They also display higher political engagement by actively seeking government support and demanding concrete policy actions. Rural residents articulate a stronger moral obligation to protect the environment for future generations, expressing a desire for conservation and a call for greater fairness in global climate responsibility. On the other hand, urban residents tend to have a superficial understanding of CC, associating it mainly with discomfort from weather changes and minor disruptions. They remain less involved politically and morally, partly due to a more detached experience of CC impacts.

By examining the engagement level of Vietnamese rural and urban residents, this study identified various individual and structural barriers that hinder effective CC engagement. Individually, the lack of resources, climate-unfriendly habits and

indifference limit the ability of many Vietnamese people to adopt sustainable practices and discourage them from both individual and collective action. Structurally, inadequate government support, uneven policy implementation, and infrastructural deficits hamper sustainable adaptation, especially in rural areas. Additionally, fragmented coordination among various stakeholders undermines market stability and collective resilience.

This study took a further step by looking at the impacts of formal information sources on public CC engagement. By applying the concept of media structure, five official sources of CC information – namely government, mainstream media, NGOs, businesses, and scientists – are identified. Overall, these official information sources fail to facilitate a meaningful CC engagement from the public due to several limitations, such as shallow and short-live content, irrelevant and exaggerated presentation, benefit-driven communication practices and information with limited efficiency in time, space and functioning cost. These kinds of information contribute to public CC disengagement and confusion. It undermines public trust and fails to meet the diverse needs for long-term adaptation in Vietnam's varied geographical regions.

Failing to obtain useful climate information and knowledge from formal sources, residents in Vietnam's climate-vulnerable areas turn substantially to informal sources of lay expertise (i.e. CC knowledge and information gained from family, friends and neighbours, and/or from self-experiences in working and direct climate contact), especially in rural areas. While lay expertise is a critical informal source of CC information, it has certain limitations, not only lacking rigorous verification and efficiency but also leading to harmful practices to climate and environment. However, the study finds promise in integrating lay expertise with scientific knowledge. Such integration enhances adaptive capacity by combining local, context-specific insights with scientifically validated strategies. This collaborative model not only improves the credibility and practicality of CC

information but also fosters collective action, leading to more robust and sustainable adaptation strategies.

7.2. Discussion of key findings

7.2.1. Rural-urban disparities in CC engagement

As stated, this study investigates Vietnamese's climate engagement through the lens of public CC engagement theory to understand how Vietnamese understand, feel and act on the issue socio-economically, politically and morally. In doing so, the research has found the significant differences between rural and urban people.

7.2.1.1. Socio-economic engagement

This research shows that Vietnamese urban and rural residents have substantial differences in how they perceive CC impacts and respond socio-economically to them, although they share the increasing concern and acceptance of human-induced CC. Specifically, urban residents have obtained a generic and shallow understanding of CC impacts. They mainly refer CC impacts in relation to uncomfortable weather or minor inconveniences, such as disruptions to travel and daily routines due to tidal flooding frequency in summer days, or health impacts such as respiratory diseases to elderly and children, especially in flu season. This shallow perception aligns with international research suggesting that many city dwellers – who do not directly rely on stable climatic conditions for daily income – often express only moderate urgency about CC (Wolf and Moser 2011; Fatti and Patel 2013; Marlon et al. 2019).

In contrast, rural residents have attained more sophisticated understanding and experiences on CC impacts. They have frequently witnessed the unusual pattern of temperature and precipitation, salinity invasion, rising sea levels, stronger El Nino events and other social and economic consequences. They not only witness the impacts, but also experience them first-hand on the daily basis. For instance, severe rainy and dry seasons have devastated agricultural cultivation,

undermining local livelihoods for many farmers. As agricultural activities in rural areas depend heavily on stable weather, elevated temperatures limit fieldwork hours and reduce overall productivity. Meanwhile, rising sea levels and subsequent land subsidence have displaced millions of rural residents in Vietnam, further exacerbating their vulnerability. This finding is in line with previous research on farmers' CC perception and awareness in Vietnam that shows that 92% of respondents in rural area of Red River Delta, 98% in Central Coast and 93% in Mekong Delta Area feel increasing heat in their local areas (Nguyen-Thi-Lan et al. 2021). They also notice a fickle pattern of precipitation; rainfall has become less predictable either in its regular seasonal period or in its intensity, which affect tremendously on their cultivation.

Difference in experiences with CC impacts often leads to significant difference in how urban and rural residents act on or are willing to act on CC. The perspectives from my participants suggested that Vietnamese rural residents exhibit a stronger resilience and determination to take action to overcome the climate adversary. In line with research that has shown rural farmers transform their practices to cope with climate variability in areas such as “green consumerism”, waste management, and energy efficiencies (Spaargaren and Mol 2008; Young et al. 2010; Carvalho et al. 2017), this study also finds that Vietnamese rural people perform various environment-friendly measures, including littering stoppage in river and land, garbage collection, bio-garbage, limited use of plastic products, and water storage, to protect the local environment and climate. Economically, rural residents have applied more robust adaptation strategies (e.g. switching from monoculture rice farming to brackish aquaculture or integrated agriculture-and-tourism ventures) to save their existing cultivation and continue to earn money from it.

In addition to taking pro-climate measures individually, rural participants also value “bottom-up” social collaboration, in which they and fellow farmers actively

participate in organized community networks and local cooperatives for CC adaptation such as agricultural tourism initiatives, orchard cooperatives, or communal shrimp-farming schemes. In these settings, they frequently exchange farming tips to improve harvest and discuss the other methods to mitigate climate impacts. This is somewhat similar to contexts like the UK, where a multitude of “Transition Towns” or local CC groups have proliferated (Wang et al. 2018). These local networks mirror the “green niches” and grassroots movements that scholars recognize as crucial arenas for social and economic innovation in CC, that can promote stronger CC engagement by uniting people around shared climate goals (Whitmarsh et al. 2013). This active social collaboration for CC, on the other hand, wasn’t reported from urban participants, suggesting a more superficial level of behavioural responses from urban dwellers. They are aware of solutions like energy-saving devices or plastic reduction but admit the lack of enthusiasm to undertake. Urban residents typically exhibit more lukewarm or fragmented actions, unless specific incentives or structural changes (e.g., policy support, easily accessible green products) are introduced.

7.2.1.2. Political Engagement

A recurring theme in the global literature is that the public often expects governments to take the lead on CC, whether through regulations, infrastructure development, or subsidies for green products (Carvalho et al. 2017). This is also echoed in this research’s results, where both urban and rural participants believe that the government should be the key catalyst of climate mitigation and adaptation; and shoulder central responsibility for offering political support, especially to vulnerable farming communities. However, the difference is situated in how they engage with the government and its climate policies.

The research’s findings suggest that Vietnamese rural residents express a stronger political engagement than their urban fellows, who exhibit very little concern about climate and environmental policies; and displaying minimal involvement in

climate policy process. Rural people have frequently attended government-organized meetings to achieve new information about adaptation policies, and discuss their advantages and disadvantages on actual agricultural works. Through these meetings, they articulate a strong support for more policy assistance materially and financially, from protective infrastructure (e.g., dikes, drainage systems) to CC education and subsidies for alternative agricultural activities (Wardekker et al. 2009a). They also request assistance in establishing markets for sustainable agricultural products to maintain a stable income, and the need for policies into long-term cultivation methods that reduce the frequency of switching crops. This finding contributes further to several other research showing that politically climate involvement drives positive emotion toward CC behavioural changes such as empowerment, righteousness and sense of urgency (Smith and Leiserowitz 2014; Ogunbode et al. 2022). Empowerment is a particularly crucial element in the fight against CC. People who are empowered to tackle CC, are capable of and willing to execute pro-environmental actions. People feel motivated to act on CC because they are consulted for the issuance of CC policies that could exert noticeable impacts on their daily life (Smith and Leiserowitz 2014).

Engagement in CC is not only limited to the support of CC policies, but also often involved demands for tougher regulations or direct confrontation of environmentally detrimental policies (de Coninck 2022). Such engagement is also identified from this research's findings, suggesting more disapproval and contest against policies and management that pose harmful threats to the environment and climate from rural residents. They criticise for the Vietnamese government's superficial supervision and administration on industrial emission which greatly affect their life, and express frustration at perceived injustice or mismanagement from CC policies. The frustration with these policies underscores the "governance gap" (Francis 2015) that arises when state initiatives fail to reach the local level effectively. One subtle identification from the finding is the way Vietnamese rural

residents express their contestation towards climate-destructive policies and management. Rather than expressing the contestation through overt protest or organized public campaigns, Vietnamese rural people describe more individualized expressions of dissatisfaction, such as complaining at local meetings or urging local authorities to consider better drainage. Comparing this to global examples (e.g., mass protests in Europe or climate marches in the Americas) (Dang 2020; Arnot et al. 2023). It appears that Vietnamese communities primarily rely on interpersonal and small-group channels to signal discontent. This could reflect socio-political norms or constraints in Vietnam where large-scale “bottom-up” protests against climate-unfriendly policies may not be practical.

7.2.1.3. Moral engagement

Another aspect of CC engagement that exhibit the difference between Vietnamese urban and rural residents is moral engagement. This research’s finding shows that experiencing CC impacts first-hand, Vietnamese rural residents are the ones articulating moral obligations to preserve the climate and environment for future generations. Their moral engagement is residing in between “conservational stewardship” and “pro-development” (Wardekker et al. 2009a; Morrison et al. 2015). By which, they, on the one hand, align with pro-environmental views that humans should reduce greenhouse gases and protect the environment; on the other hand, exercising adaptive measures. From this adaptation, they wish to transfer the gained knowledge and experience from their farming models to other local fellows and younger generations, so that they can follow and earn a similar success in livelihood development to better adapt better CC.

Other research has found that the reason for a higher moral attitude toward CC from rural people because they tend to thinking about nostalgic reminiscence and past experiences of natural weather to describe human impact on today's unnatural weather (Rishbeth and Powell 2013; Smith and Joffe 2013). The function of past

experiences and nostalgia are crucial in the fight against CC as people remember the nice weather and climate for their families and works, thus willing to cope with the current uncertainty of strange weather phenomena (Beck 2016). In line with these studies, this research also finds the expression of nostalgic memory from rural participants about the natural advantages that they enjoyed in the past such as “profuse amount of silt” or “plentifully nutritious rice field”. The disappearance of these advantages has saddened rural residents, but at the same time, encouraging them to modify farming activities to adapt to CC, so that they can preserve the cultivation for their children.

Further, this research shows that rural residents call for more equitable resource distribution and stronger structural assistance, especially from developed nations, emphasizing the developed nations’ moral responsibility for creating and solving climate challenges. This is in line with research in other countries where many people argue that historically high-emitting nations must do more for CC remediation (Paavola and Adger 2006; Baatz 2013; Kelbessa 2023). They express a feeling of compassion for poor and developing countries in low-lying areas and that these countries have been suffered unevenly from CC consequences as compared to other developed countries.

7.2.1.4. Reasons for rural-urban disparities

The study has revealed how Vietnamese rural people’s socio-economic, political, and moral CC engagement exceeds that of their urban fellows. Several initial explanations for this difference have emerged from the discussion.

The first explanation for higher public engagement with CC of Vietnamese rural people is their frequent contact with severe climate impacts. Consistent with previous studies examining how frequent exposure to sea-level rise, erratic rainfall, salinity intrusion and coastal erosion heighten farmers’ climate risk perceptions, compelling them to adopt both individual and collective adaptive measures (Adger 2003; Mortreux and Barnett 2009; Bertana et al. 2022), this

research's findings also demonstrate that the more frequently Vietnamese people experience climate disruptions, the more engaged they tend to be. Recurrent exposure shapes how Vietnamese rural people perceive CC as an urgent and tangible issue, rather than distant or abstract; thus, encouraging them to undertake adaptive measures. This research's findings challenge certain studies with the assumption that city dwellers are more climate engaged. For example, a study in Vietnam argues that people who live in urban areas – owing to better education level, higher media exposure and financial status – are more likely comprehend CC impacts and act (Wolf and Moser 2011). However, in this study, rural people demonstrate deeper concern and more consistent adaptation attempts. This suggests that proximity to CC impacts can outweigh other factors as a driver of engagement, aligning with another research (Moser 2010; Spence et al. 2012; Myers et al. 2013). This nuance expands scholarship on how different socio-economic and climate contexts underscore the complexity of public engagement with CC.

A second, and perhaps most critical, explanation for heightened CC engagement Vietnamese rural people is the profound impacts of climate disruptions on their livelihoods and income. Unlike urban dwellers, who often perceive CC mainly as discomfort from rising temperatures or periodic tidal flooding with limited economic consequences on their lives, Vietnamese rural people depend heavily on stable weather for agricultural production and livelihood. Indeed, erratic rainfall, growing soil salinity, and frequent extreme weather events have significantly undermined farming outputs, leading to heavy financial losses for farmers who can no longer rely on predictable planting and harvesting cycles. This sentiment echoes findings from (Le Dang et al. 2014) in the Mekong Delta, where farmers reported salinity intrusion and irregular precipitation patterns as a direct threat to their subsistence. Such existential perils have encouraged Vietnamese rural people to adopt adaptive measures that protect both current and future livelihoods. In particular, shifting from monoculture rice farming to

brackish aquaculture or diversifying crops illustrates a strategic pivot aimed at surviving the existing cultivation in erratic climate conditions. Similar transformations are noted by Mortreux and Barnett in Tuvalu, where local communities adapted fishing and gardening techniques to offset rising sea levels (Mortreux and Barnett 2009). In Vietnam, adaptive efforts also encompass collaboration in farming ventures, the use of bio-waste to enhance soil fertility and reduce emissions, and the development of orchard-based tourism that take advantage of the current agricultural resources while mitigating reliance on single-crop harvest. These findings align with Adger, who underscores how collective action in climate-exposed regions can strengthen social capital and bolster resilience in ways that isolated efforts cannot (Adger 2003).

Even though Vietnamese rural residents demonstrate considerable efforts in adapting to CC, many individual and structural barriers limit their engagement. For urban residents, who feel less severe climate impacts and whose livelihoods are not directly threatened by CC, these barriers contribute further to their already low climate engagement. All of these aspects will be discussed in the following section.

7.2.2. Seven individual and structural barriers to CC engagement

7.2.2.1. Lack of financial, material and intellectual resources

The findings of this study clearly show that financial and material constraints inhibit pro-environmental behaviours in Vietnamese context. This echoes other research (Young et al. 2010; Whitmarsh et al. 2011)2013; Badole et al. 2024) that demonstrates how financial and material challenges led people to failure in taking climate-friendly actions, such as green transition (purchasing solar panels or electric vehicles), despite that they acknowledge the environment benefits. This resonates with the viewpoint that high costs for green technologies dissuade households from sustainable choices, especially for lower-income population and

countries (Badole et al. 2024). It reflects a wider issue of “green inequality”, obstructing a more collective climate engagement. This situation is more critical for Vietnamese rural people, whose land areas is either shrank or deteriorated by CC impacts such as rising sea level, salinity intrusion or extreme weather, preventing them to shift to or maintain climate-resilient forms of agriculture and business; and further exacerbates their financial shortage to purchase green technologies.

In addition to financial and material shortages, another deficiency is the knowledge and information regarding CC adaptation and mitigation. Like others highlighting a lack of climate literacy hinders both individual and collective efforts to adopt sustainable practices (Moser and Ekstrom 2010; Whitmarsh et al. 2011), this study also identified the knowledge insufficiency among Vietnamese people limiting their engagement efforts. Some examples are the lack of knowledge in doing garbage categorization properly, selecting the right cultivation practices for adaptation, or utilizing the proper amount of pesticide and fertilizer. This situation echoes the “knowledge deficit” issue, which particularly more problematic in Vietnamese rural societies where education and outreach on CC are underdeveloped. This deficit is not merely about a lack of facts but also involves gaps in understanding the relevance of these facts to everyday life’s works and decision-making. As highlighted in previous studies the knowledge deficit perspective can lead to oversimplified or ineffective solutions that fail to address the complexities of climate adaptation and mitigation (Suldovsky 2017; Hulme 2018). This research’s findings also suggest that, in Vietnamese agricultural contexts, insufficient knowledge about sustainable practices often results in wrong judgements and approaches to cultivation practices. For instance, the over-reliance on chemical inputs like pesticides and fertilizers, while providing short-term benefits, contribute to long-term environmental and climate degradation.

The other cognitive problem identified in the findings is the misconception of CC within Vietnamese population. There remain opinions that CC causes are the hole in ozone layer, the spinning position of the earth's axis or the act of God; or the atmosphere is so vast and human's contributions with small amount of CO₂ emission cannot make any difference. Research in other countries also report the CC misconception and misunderstanding in the public, such as in the US and Australia where people are mistaken about the main sources of CC (Leiserowitz et al. 2019); or in some developing countries like Ghana or Singapore where they think the depletion of ozone layer, aerosol or the debris of space programs are the causes (Nyarko and Petcovic 2021; Hung 2022). These kinds of misunderstanding limit the public's willingness and capacity to engage effectively in democratic discussions about the issue, to comprehend the impact of their actions on the climate, and to thoroughly and accurately grasp how CC will shape our future (Seacrest et al. 2000). Although misconceptions were recorded only among a minority of my participants, this must not be overlooked, given the sheer speed and scale of mis/disinformation in our age.

The lack of financial, material and intellectual resources has revealed that CC remains a complex and abstract problem for Vietnamese people to deal with. Without sustainable resources, it is difficult for Vietnamese people to convert general climate awareness into practical mitigation or adaptation measures. Even when people want to adopt better methods, they are unable to implement changes on their land. The lack of these resources has become more acute for Vietnamese rural communities who facing a more severe climate impacts, but must adapt their agricultural livelihoods rapidly.

7.2.2.2. Climate unfriendly habits and lifestyle

Another individual barrier to CC engagement is the climate-unfriendly habits and lifestyle. Similar to previous studies pointing to ingrained habits and social norms, such as daily car use or meat-heavy diets, as persistent blocks to climate-friendly

lifestyles (Whitmarsh et al. 2011; Gifford and Chen 2017), this study also found that habits among Vietnamese population inhibit their CC engagement both individually and collectively. Individually, excessive energy consumption for the modern lifestyle and convenience negates any inclination to save energy or use energy-efficient appliance. Likewise, unchecked use of a fertilizers and pesticides for quicker harvests discourages Vietnamese rural populations from adopting more sustainable, climate-friendly cultivation methods.

More importantly, these environmentally and climate-unfriendly habits not only constrain individual engagement but also have implications at the collective level. This dynamic reflects the free-rider effect, wherein individuals fail to alter their habits because they observe others maintaining the status quo (Bostrom et al. 1994; Whitmarsh et al. 2015). Similar to findings of these studies in Western contexts, this research also found the free-rider effect from both Vietnamese rural and urban residents. Living in the same community, they learn harmful practices to the environment and climate from each other, such as fertilizer overuse, plastic waste disposal, or high-energy consumption, especially when no strong counterexample emerges to challenge such activities. A subtle, yet powerful, implication here is the force of social norms, by which people tend to conform to the prevailing ways of life around them, even when they are aware that these behaviours contribute to ecological harm. This collective inertia reinforces a shared mindset that “everyone else is doing it”, effectively diminishing any sense of personal responsibility or urgency for CC engagement; and at the same time, instigating common adherence to the existing environment and climate unfriendly habits.

A further reason for the persistence of the climate-unfriendly habits, as identified by this study, is the acceptance of them as a given in daily life. The “That is life” attitude in the data reflects that climate-unfriendly behaviours are too entrenched to be easily changed and should be taken for granted, whether it is the frequent

use of air conditioning in cities or the reckless application of chemical products in rural areas. In Vietnam, the desire for immediate convenience or economic gain often surpasses the motivation to adopt more sustainable alternatives. For instance, a rural household might recognize the long-term ecological benefits of organic farming but still opt for quick chemical treatments to maintain steady yields and immediate profit. Similar scenarios occur in urban households, where the short-term comfort of running multiple air conditioners trumps concerns about rising energy costs or long-term carbon footprints. Such collective way of thinking reinforces the persistence of detrimental habits, making individual adjustments seem negligible and ultimately discouraging meaningful shifts in CC engagement.

7.2.2.3. Indifference to CC

A third individual barrier highlighted by this research is indifferent attitudes to CC. Despite a notable rise in global awareness, many people continue to perceive CC as a temporally and spatially distant and abstract challenge that does not demand immediate personal commitment (Scannell and Gifford 2013; Keller et al. 2022). This understanding of CC as a “future-oriented problem” fosters a psychological disempowerment and detachment, wherein individuals prioritize day-to-day responsibilities like income generation or family needs over seemingly remote environmental and climate concerns (Spence et al. 2012; Whitmarsh et al. 2015).

Similarly, this research has found an indifferent attitude towards CC within Vietnamese society. Such indifference is more pronounced among urban people, who often complain about local inconveniences due to weather change but rarely feel a direct threat, thus showing little motivation and determination for pro-climate responses. Further, there is a disinterest in learning about CC and search for its information among them, simply because of the neglectful and distant sentiments towards CC issues. They only concern about immediate personal tasks. This observation is consistent with other research which found that urban dwellers

often rank CC low relative to day-to-day concerns such as career advancement, income security, or family obligations (Satterthwaite et al. 2012; Satterthwaite and Bartlett 2017). Although Vietnamese rural people exhibit a stronger sense of climate concern due to their direct and livelihood-related vulnerabilities, indifference still exists in their agricultural activities. A prime illustration is unregulated pesticide use, where some farmers show little regard for the broader ecological ramifications, essentially distancing themselves from inclusive environmental and climate engagement. This resonates with prior works indicating that while certain groups might accept the reality of CC, they continue practices harmful to collective well-being, often rationalizing that individual acts are too trivial to exert influence on global climate (Whitmarsh et al. 2011).

The indifferent attitude towards CC holds major effects on public engagement. First, it highlights the difficulty of mobilizing communities around mitigation or adaptation strategies when climate threats are perceived as remote or primarily someone else's burden. Policy initiatives, no matter how robust, may fail if citizens do not internalize the need for behavioural change. Second, this attitude inhibits collective CC engagement, by which a widespread disengagement weakens the public pressure needed to have stricter regulations or better allocate resources toward green development.

7.2.2.4. Responsibility denial to CC

Responsibility denial represents a critical psychological barrier to CC engagement. This research found that a minority of participants expressed denial of personal or national responsibility, attributing blame to historical emissions from industrialized nations (e.g., the U.S., China) or past generations. Although this is not the dominant view in my sample, we do not know how prevalent, “contagious” and influential they are in the population. It is still worth mentioning that responsibility denial undermines the shared effort required for meaningful climate action. By framing Vietnam and its people only as a “victim” of global

inequities rather than a contributor, such attitude risk absolving individuals and communities of agency, fostering complacency, and eroding the moral imperative for local mitigation efforts (Shi et al. 2016; Jorgenson et al. 2019). Other scholars have shown how attributing responsibility solely to “bigger polluters” cultivates the mentality that local or personal efforts appear unnecessary (Tvinnereim et al. 2017; Goodhart 2023). This can diminish practical incentives for pro-environmental behaviour, making significant segments of society remain disengaged.

The responsibility denial is often rationalized with the defence that current activities, such as small-scale agriculture or personal transportation choices, are negligible compared to massive global industries. This attitude diminishes moral responsibility for adopting climate-conscious behaviours, perpetuating a sense that meaningful change must come from outside forces. Over time, widespread adoption of this view can engender collective inertia towards CC engagement, as people become increasingly convinced that their carbon footprint is too minor to require action. The impacts of responsibility denial extend beyond individual inaction. When communities perceive CC as a foreign problem, they are less likely to support locally climate policies and programs, such as carbon taxes or restrictions on highly GHG-emitted farming practices (Hornsey and Fielding 2020). This mindset undermines grassroots initiatives, such as community-led reforestation or waste reduction programs, by devaluing their global significance. Moreover, it perpetuates a cycle of dependency, where communities await external solutions like international aid, rather than leveraging local knowledge for adaptation (Giddens 2015; Tschakert et al. 2019).

7.2.2.5. Limited political support

Effective policy support and governance are indispensable for fostering public engagement in CC mitigation and adaptation. In Vietnam, where the one-party system centralizes decision-making, policy frameworks on CC plays even more

critical position. However, this study has found that political support from Vietnamese government often falls short in practice, being criticized for its insufficiency and inefficiency. For example, rural farmers criticize the lack of robust policies that provide specific directions and guidance on proper cultivation and environment protection. Urban dwellers, though less vocally demanding of direct political support, still criticize the government for not providing effective waste collection systems or incentives for renewable energy transitions. Vietnam's governments, as described in the findings, often propose policies like transition to organic methods, but fail to supply the training or financial supports needed for successful implementation. The finding underscores how policy deficiencies undercut effective climate engagement (Ockwell et al. 2009; Giddens 2015). This deficiency in policies and guidance results in the implementation of haphazard farming practices that undermine sustainable productivity, economic viability, and climate protection. In the Vietnamese context, rural people who receive no concrete guidance on managing salinity or selecting adaptive crops may adopt short-lived solutions, which are often detrimental to both environmental quality and long-term sustainability. Such short-term solutions, like unregulated pesticide use, can foster unintended consequences, such as soil degradation or reduced productivity, thereby perpetuating a cycle of environmental damage.

In addition to the limitation in providing efficient practical policies, this study also found the Vietnamese government's unfair distribution of resources, particularly for rural people's adaptive measures (e.g., funding that went to the "wrong" person who does not clearly understand how to operate the adaptive measure properly). This indicates the ineffective issuance and management of CC policies that dampen both individual and collective efforts. Individually, this unfair treatment not only hinders sustainable productivity and economic resilience, but also instigates the feeling of discontent and disappointment. It erodes trust and motivation among rural residents to continue their adaptation. This frustration resonates with (Ockwell et al. 2009) on low political efficacy in CC policies,

which shows that if government agencies do not fulfil their role in dealing with CC issues, people will gradually lose faith and remain inactive. Over time, it accumulates into deepening apathy, in which people come to believe their efforts are futile if state authorities fail to uphold policy commitments. This erosion of trust ultimately weakens the societal momentum needed to address CC at scale, as individuals are less inclined to take personal or collective action when institutional support is perceived as unreliable or inconsistent.

Collectively, the unfair allocation of resources dampens the willingness to work with others in CC adaptation. People might feel discouraged and reluctant to contribute knowledge of new adaptive measures. If certain individuals or groups benefit disproportionately, perhaps due to personal connections or administrative mishandling, while others are overlooked, it can create social resentment. Rather than pooling knowledge and innovative solutions together, community members who feel marginalized may withdraw from joint initiatives. This aligns with other research suggesting that perceived injustice undermines trust and collective efficacy (Adger et al. 2013). The shared willingness to experiment with new farming techniques or co-develop resilience strategies diminishes, as people doubt whether their contributions will be fairly recognized or rewarded. Over time, this discouragement reinforces individualistic strategies, by which farmers prioritizing immediate survival rather than exploring more ambitious and communal adaptation. Consequently, community-wide resilience suffers when critical mass for collective action is lost, leaving households and communities more vulnerable to the intensifying impacts of CC.

7.2.2.6. Lack of infrastructure

Infrastructure is widely recognized as a cornerstone for effective CC engagement, determining how readily communities can adopt new technologies and more sustainable practices (Spaargaren and Mol 2008; Günther et al. 2025; Rana et al. 2025). Yet, as the findings indicate, urban and rural participants experience

infrastructural deficits in markedly different ways. It indicates that for many city dwellers, infrastructural inadequacies such as road destruction, terrible housing design, and insufficient public transport are perceived predominantly as daily inconvenience – a matter of prolonged commutes or loss of time – rather than any relation to environmental or livelihood security. This observation parallels research showing that, in urban environments, climate-related issues often manifest as minor lifestyle disruptions rather than living challenges (Wolf and Moser 2011; Satterthwaite and Bartlett 2017). Overcrowded streets, for example, might engender frustration rather than provoke deeper reflection about carbon emissions or adaptive capacity.

In contrast, infrastructural deficit is directly linked to Vietnamese rural people's struggle for climate adaptation. Many rural participants complain that partially constructed or poorly maintained embankments fail to protect their farmland from flooding or salinity, thus undermining attempts to shift to more climate-resilient agriculture such as salinity reduction or fresh-water storage for fruit planting. The absence of reliable irrigation systems or sealed dikes compels farmers to haphazardly self-build and manage hinderances. However, these improvised solutions risk significant economic losses of crops and harvests as they lack the technical know-how or resources to do so effectively. Moreover, the lack of other infrastructure system such as waste treatment facilities pushes rural people to burn trash or discharge pollutants into waterways, harming local ecosystems and eroding the benefits of any climate adaptation attempt. It is clear that the incomplete infrastructure planning not only fails to mitigate climate risks but also exacerbates their impacts, compounding the challenges faced by Vietnamese rural communities in their efforts to engage with CC issues.

Another important point is that the building of infrastructure in the neighbouring Southeast Asian region also exerts considerable influences on CC adaptation of Vietnamese rural people. Infrastructural decisions in neighbouring countries, such

as upstream dam construction, alter the flow of freshwater and silt downstream, intensifying salinity intrusion and reducing the deposition of nutrients vital to fertile croplands. Here, Vietnamese local farmers encounter a dilemma: while they seek to adapt to CC through technological or operational changes, the broader hydrological shifts induced by external infrastructure projects hamper any standalone efforts at resilience. This dynamic echoes the view that infrastructure development policies must be integrated into multinational developmental planning, given that water management, sediment flow, and flood controls often transcend national borders (Timmerman et al. 2017).

7.2.2.7. Socio-economic fragility in business activities

This section highlights socio-economic fragility in business operations as a key obstacle to effective CC engagement, underscoring two interwoven issues of how profit-driven enterprises impede climate-responsible practices, and how market vulnerabilities hamper farmers' adaptation in rural areas. Though these two issues differ remarkably, both illustrate how insufficient monitor and coordination can undermine collective efforts of the public to mitigate or adapt to CC. First of all, it is the manufacturing activities of industries which emit significant pollution to the climate and environment. Their operations often prioritize production efficiency and profit margins while employing minimal environmental and climate safeguards. This cost-benefit compromise exemplifies how businesses neglect climate responsibilities when the immediate economic return from manufacturing activities is favoured.

Exacerbating this issue is the lack of rigorous governmental monitoring. This research finds that due to the loose supervision and administration of the government, the highly carbon-emitted activities of industries linger on. Some examples are that the fines remain so low that it is often cheaper for industries to keep polluting than to invest in sustainable reforms, or token actions to bypass the government's regulation (e.g. postponing dirty activities when being supervised,

or moving activities to other places to avoid lawsuits). Businesses prioritizing profit, running fleeting environmental compliance checks, and paying fines instead of improving operations echo other research on how corporate cost-benefit calculations can discourage serious environmental stewardship. This dynamic not only worsens local air and water quality but also disheartens local communities, making it harder for residents to see the value in small-scale climate-friendly action campaigns orchestrated by businesses. Ultimately, such practices erode public trust and reinforce the sentiment that climate solutions rest solely with higher authorities rather than individual or collective initiatives. This finding parallels with Gifford and others, who point out that seeing inaction or wrongdoing among major stakeholders fosters a climate of scepticism and cynicism (Gifford et al. 2009; Gifford et al. 2018).

This socio-economic fragility is even more critical for Vietnamese rural people, as it directly affects their livelihood and environment. This fragility takes shape in their agricultural activities, in which the research's findings show that Vietnamese rural people are unable to earn sufficient incomes from their farming operations. The main culprit behind this precarious situation is the lack of coordination among various parties, including the government, investors, businesses, transporters and farmers to ensure sustainable profits for rural people. Coordinated efforts among these parties are increasingly recognized as fundamental to improving agricultural sustainability and profitability (An et al. 2024; Maryono et al. 2024). From a practical standpoint, such coordination ensures that market demands are communicated effectively to producers; infrastructure is sufficiently developed to transport goods; and policy frameworks provide consistent support and incentives. In many Western economies, this collaboration may manifest in formalized contracts, cooperatives, or certification programs, guaranteeing stable returns to growers while meeting consumer demand for environmentally friendly products (Whitmarsh et al. 2011).

However, in Vietnam's rural areas, the findings reveal a coordination gap in which these key parties operate in isolation, ultimately undermining stable market access and predictable pricing for climate-friendly production. Due to this lack of coordination, the absence of stable on-site market for rural people to trade their agricultural products is unavoidable, thus they have to struggle with fluctuating selling prices every year, leading to unstable income. Even when Vietnamese rural communities are keen to pivot toward climate-resilient agriculture, like diversifying crops and planting, they lack the reliable networks of buyers, government support, and distribution channels necessary to secure stable returns. This finding differs from that of Western studies, whereby the emphasis often lies on consumers not having enough green product options or on corporate greenwashing (Pedersen et al. 2024). In this research, contrarily, Vietnamese rural people themselves struggle to market climate friendly goods.

To compensate for the loss of income, from the findings, it can see that Vietnamese rural residents have attempted to cultivate off-seasonal cultivation. However, this activity brings more harm than good as they have to bear the financial burden of excessive fertilizers and pesticides, which at the same time, generating further climate and environmental harm in the long run. Not mentioning to the vulnerability of falling into a vicious cycle of “Good harvest–low price, low harvest–high price” trapping households in perpetual financial uncertainty. In Vietnam in recent years, this vicious cycle has more and more proliferated. Many rural households have spiralled into debt as they attempt to repeat subsequent cycles with further loans and unsustainable practices.

Another significant structural barrier is the fragmented nature of CC communication. The dissemination of climate-related information often varies in quality and accessibility, leading to inconsistent public understanding. For example, while scientific reports provide valuable insights, their technical nature can alienate non-expert audiences. Conversely, media portrayals of CC frequently

sensationalize the issue, focusing on catastrophic scenarios that can induce feelings of helplessness or apathy. These mixed messages contribute to a lack of cohesive public awareness, undermining efforts to foster engagement. In an effort to enhance the public CC engagement as well as address the individual and structural barriers, an in-depth understanding of the role of information sources that influence the engagement is essential. This will be discussed in detailed in the following section.

7.2.3. The deficiency of formal CC information sources

7.2.3.1. Shallow, irrelevant, and exaggerated CC information from the mainstream media

This study reveals significant gaps between CC information from the Vietnamese mainstream media and public engagement with CC. Of primary concern is the quality of the news and information that Vietnamese people receive from the media. One prominent shortcoming, as identified in the interviews, is its superficiality, especially its tendency to focus on isolated climate events without providing adequate contextualisation regarding root causes or preventive measures. CC-related news often emphasises mundane and repetitive content, such as heatwaves or high temperatures, which Vietnamese audiences perceive as overly familiar and ultimately dismiss as mere weather change. This finding lends support to claims by Arnold and colleagues that mainstream journalism too often covers systematic and long-term issues of CC as immediate events (e.g., disasters or political crises), thereby diminishing the salience of CC's impacts on long-term development (Arnold 2018). CC stories are frequently overshadowed by sensational or breaking news about natural disasters or, occasionally, political climate contestation, leaving insufficient room for prolonged analysis and stories that elucidate the enduring impacts of CC, as some Australian media consumers have also reported (Schäfer and Painter 2021). Such shallow coverage is problematic because it reinforces the perception that CC is primarily about one-

off incidents or seasonal discomforts rather than a long-term challenge requiring collective and sustained action. As a consequence of receiving such shallow information, Vietnamese audiences are unable to develop a deep understanding of CC issues, find it difficult to cultivate an urgent sense of response, and tend to dismiss the significance of CC.

A second shortcoming is the lack of direct relevance to daily life. CC is frequently portrayed in the media as a distant and abstract phenomenon; extensive narratives tend to analyse CC information at global and international scales at the expense of local and communal relevance (Hak-Soo 2011). This situation poses a triple challenge. Firstly, it fails to attract audiences to CC stories because the information appears disconnected from their personal lives. Secondly, it obstructs the process of formulating political policies that address specific local CC problems. Thirdly, the absence of local reporting practices gradually undermines the public's ability to translate global CC impacts into the local context, thereby contributing only marginally to a comprehensive public understanding of the issue (Pham and Nash 2017). While the literature documents how distant and abstract coverage can lead to public disengagement (Seacrest et al. 2000; Whitmarsh et al. 2013; Pham and Nash 2017), the present research reinforces this point in the Vietnamese context by demonstrating that references to phenomena such as melting glaciers, Amazon wildfires, or global carbon budgets seem too remote for many Vietnamese people to integrate into their daily decision-making. The coverage of rising temperatures or heatwaves are repeated; however, there is often no accompanying explanation linking these events to anthropogenic greenhouse gas emissions or to potential personal behaviours that might mitigate the situation.

Another important point emerging from the findings concerns the portrayal of politically charged climate conflicts. For example, interest and responsibility conflicts among nations during international meetings on CC in the United Nations Climate Change Conferences (Conference of the Parties, or COPs) (Lück

et al. 2016) serve to increase the remoteness of CC issues. As R4 remarked: “I see on TV that nations argue with each other over CC. That is their business. I don’t have any thoughts. I do my own things”. Such political conflict presentation fuels the perception of CC as a remote issue. International research has highlighted that conflict-based coverage, whether through spotlighting international blame games or by attempting to balance the views of climate scientists with sceptics, can engender public confusion and ignorance regarding CC causes, consequences, and solutions (Boykoff 2008b; Beltrame et al. 2017). The literature further underscores a historical shift in mainstream media from questioning the very existence of CC to reporting disagreements over responsibility and burden sharing among nations. The current findings indicate that such conflict reporting not only sows doubt but also creates competing narratives in the media about which nations should bear the financial burden of climate consequences (e.g. developed versus developing countries). This “global blame game” fosters an indifferent mindset in which people consider CC remote and distant, thereby tending to defer responsibility to other social stakeholders such as scientists and government (Bond 2016).

A further issue raised by several participants is the inclusion of “over-academic” scientific information with technical jargon, which further contributes to the sense of remoteness in mainstream CC news. As Doyle noted, the dominant scientific themes on mainstream media often focus on polar bears, melting icebergs, and rising ocean levels and temperatures (Doyle 2016). Such scientific reporting provides little benefit in raising CC awareness among the Vietnamese public, making it even more challenging for audiences to link scientific findings to their local experiences. Moreover, the presentation of time-lagged CC impacts tends to be overshadowed by more immediate and sensational news, as U7 observed: “The scientific climate news is boring, unnecessary and I prefer to switch to entertainment programmes.”

A final shortcoming of CC news and information on mainstream media is the tendency to exaggerate and assign blame. Some participants in this research noted that Vietnamese mainstream media sometimes exaggerate CC impacts by adopting varying tones across different platforms, leading audiences to misunderstand the severity of CC impacts. This tendency suggests that the use of sensational and shocking news articles about CC, designed solely to maintain audience's interest, can engender scepticism and reduce the impetus for pro-environmental actions. This finding resonates with studies demonstrating that CC communication strategies relying on shock and disaster narratives typically fail to achieve the desired behavioural outcomes (O'Neill and Nicholson-Cole 2009; Arnold 2018). Rather than galvanising society to tackle the issue collectively, dramatic visual images and alarmist presentations of CC can increase emotional detachment, thereby discouraging effective action. Such remotely shocking images contribute to a perception of distance and inhibit the likelihood of meaningful behavioural change. When CC is portrayed as an impending apocalypse, for the majority of the population, it exists only as a figment of the imagination, hence further impeding efforts to change personal behaviours. Consequently, individuals, particularly those most vulnerable to CC, often feel a sense of hopelessness rather than motivation to engage in proactive measures to avert CC impacts. This sense of despair can lead to disengagement and a belief that the climate problem is too vast to be resolved by individual or collective action.

Notwithstanding these criticisms regarding shallowness, irrelevance, and exaggeration of CC news and information on mainstream media, there remains some appreciation among Vietnamese audiences for the role of this source in disseminating CC information. Most participants in this research confirmed that mainstream media, including television, newspapers, radio, and online information portals, continue to serve as their principal sources of CC information. This finding is consistent with earlier research on Vietnamese

mainstream media, which identified Vietnamese Television, Nhan Dan newspaper, and Tuoi Tre newspaper as the three primary outlets for CC news (Pham and Nash 2017). The volume of CC information available to Vietnamese audiences has increased since 2007, when the media began to cover the global CC debate during COP13 (Thuy et al. 2012). Since that time, the number of CC reports has risen substantially, particularly since the Ministry of Natural Resources and Environment started to release more CC information through the media (Pham and Nash 2017). This finding aligns with global research indicating that audiences in both developed and developing countries tend to learn about CC via traditional media outlets (Bell 1994; Whitmarsh and Capstick 2018). Moreover, there is a marked appreciation for the convenience offered by TV channels, broadcasting services, online mainstream newspapers, with many audiences valuing the way CC news is compiled, edited, and delivered in accessible formats. These responses echo findings from studies conducted in Europe, Australia, and the United States, where substantial portions of the population rely on television and print or online newspapers for updates on scientific and policy-related developments concerning CC (Brossard 2013a; Junsheng et al. 2019).

Furthermore, this research identifies a notable trust in mainstream media outlets. Consistent with scholarship that underscores the influence of professional norms and editorial filters in conventional journalism (Koteyko et al. 2013), the trust observed in this study is partly attributable to the “proved data” and rigorous fact-checking that mainstream journalists undertake. Importantly, this trust is associated with well-established media platforms, rather than with the unverified or sensationalist content that is sometimes encountered on social media. This finding diverges slightly from trends observed in Western contexts, where trust in the media has shown a sharper decline (Hanitzsch et al. 2018). A plausible explanation for this divergence in the Vietnamese context is the historical reliance

on state and party-run media, which may contribute to a more stable level of confidence in these outlets.

An extended point requires consideration is that although mainstream media are generally characterised by gatekeeping practices that aim to ensure qualified, credible, and objective news stories, these very practices consist of a series of editorial decisions that may inadvertently distort climate reality (Perga et al. 2023). While gatekeeping is intended to minimise personal bias in news reporting, scholars have long expressed concern about its potentially adverse effects on journalistic integrity (McQuail 2010). One key concern is that gatekeeping practices might lead to a deviation of the published messages from the original ones, owing to the structure of modern news organisations. In most cases, news items are subjected to extensive editorial examination prior to publication, and as a result, their meanings can be altered significantly from their original intent. In the case of CC news and information, while the gatekeeping process may help to ensure that news articles are of a higher quality and contain more accurate information, it can also present audiences with a skewed picture of CC. Such distortions may contribute to the misrepresentation of CC from the public and reduce its engagement with CC issues.

7.2.3.2. Superficial and bureaucratic CC information from the government

This section discusses the perceived impacts of government's CC communication on public engagement in Vietnam. It is important to note that the ultimate aims of government CC communication are to raise public awareness, facilitate understanding of policies and regulations, and galvanise societal demand for better policy responses (Chater 2018; Clar 2019). However, the findings of this research highlight several limitations of Vietnamese government's CC communication that impede its effectiveness in improving public engagement. Overall, government channels are criticised for its provision of shallow and overly generic CC information that is not directly applicable to daily lives. Government

CC communication is disconnected from individual's personal circumstances, lacking detailed analysis or practical advice. These factors not only negatively affect levels of interest and engagement in CC issues politically, but also provide no practical solutions that people can apply in their daily life.

From the findings, there are several reasons to explain for this shallowness and lack of direct relevant of CC information from Vietnamese government. Firstly, CC information is often integrated into other administrative documents and announcements on different issues, thus a clear and detailed instruction to practically cope with CC problems is difficult to achieve. This finding resonates with Doyle's research indicating that CC is overshadowed by more immediate issues in economy, healthcare and society, which require priorities from the governments (Doyle 2016). This situation has brought less attention to CC issues.

Secondly, CC communication by the government follows a bureaucratic, top-down approach. "Whatever changes mandated at the central level must be mirrored at the local level, with little room for independent actions," said one of my expert participants (S4). In principle, this could streamline climate messaging from the central government to provincial and local levels effectively. However, the findings in this study underscore that the "directive documents" circulated in Vietnam are perceived as repetitive, top-down reminders rather than interactive and detailed guidance. Centralised governance and issuance of climate policies hamper localised CC adaptation, as it eliminates local differences culturally and geographically. This contributes to the perceived sense of little relevance to the CC adaptation on the ground. This observation aligns with existing literature that criticises top-down communication approaches for failing to account for local contexts, thereby reducing their overall effectiveness in addressing the specific challenges faced by different communities. (Williams et al. 2020). For example, Giddens' arguments about the complexity of climate policy showed that imposing standard solutions across diverse ecological and cultural landscapes is difficult to

achieve the intended outcomes (Giddens 2015). For Vietnamese context, its long and varying geographical conditions, ranging from mountainous northern provinces to the flood-prone Mekong Delta, demand region-specific strategies that a uniform and top-down measure does not always accommodate.

The third reason is the lack of specialised knowledge among officials. Due to this, Vietnamese government officials prevalently use fixed, pre-composed documents and repetitive slogans when talking about CC in their speech and documents. This practice creates a sense of disconnection among the public as messages embedded in general environmental policies fail to highlight the distinct impacts of CC or offer clear and actionable measures. This approach not only fails to capture public interest but also reinforces scepticism regarding the government's commitment and expertise in addressing climate issues. From the finding, it can be seen that Vietnamese government's officials provide general CC information not only because of their knowledge deficit, but also because of the fear of jeopardizing political stances. For example, they are reluctant to express criticism towards industrial activities that contribute significantly to GHGs emission, posing serious damage to the environment and climate. As U6 said: "Government officers only seek information related to their interests". This self-interested communication might diminish the credibility of the government's CC communication and leads people to regard it as more of a political formality than a genuine effort to foster public engagement.

Further, trust issues arise when officials are perceived as more motivated by political interests than genuine climate solutions. Global research has shown public suspicion towards government's exploitation of environmental agendas for hidden objectives. For example, international scholarship indicated trust deficits in government-led CC communication for particular interests and purposes (Hibberd and Nguyen 2013a). Some individuals suspect political motives and climate policies will impose additional taxes and regulations without tangible

public benefits (Carvalho et al. 2017). The finding from this study notes similar sentiments, as most participants consider the Vietnamese government's climate discourse superficial and suspect that local officials merely relay "top-down propaganda". This could gradually result in lower levels of trust for government's CC communication and, consequently, reduces public engagement (Vraga 2017). This, however, needs to further explore before a conclusion can be made. In fact, a previous study found the opposite: a large number of Vietnamese people (85%) totally trust government officials as a good source for CC information, with local officers being trusted the most (Copsey et al. 2013).

Previously, I mentioned that Vietnamese rural participants expressed higher political CC engagement than urban participants by frequently attending local government-organised meetings to seek adaptation advice and political support. However, this suggests another issue of government's CC communication, which is an imbalance in how communication efforts are allocated. As the data suggest, government's CC communication tends to concentrate on rural regions (possibly due to direct climate vulnerabilities in agriculture), whereas urban areas see fewer meetings. This has caused an uneven approach to these meetings for urban residents, and partly reduce their engagement.

Despite the noted limitation and the underappreciated impacts in direct CC communication, the finding revealed that Vietnamese government is still entrusted with the irreplaceable role to collaborate with other sources such as scientists, NGOs or business to convey CC information. While its direct communication with the public is not yet effective, the government can act as an effective mediator between these sources and the general public. From the finding, the role of Vietnamese government in channelling CC information from other formal sources can be highlighted. Vietnamese residents, especially those in rural area, are generally more willing to accept CC information from other sources if it is endorsed by the government. Other research in Vietnam also finds the need for

the collaboration between government and non-governmental organizations in communicating CC. In their gatekeeping role, government officials have helped facilitate numerous CC communication programs and campaigns by international partners such as OXFAM, CARE, WWF, JICA, UNDP. For example, the Support Programme to Respond to CC, the National Target Program (2012-2015), or World Environment Day, International Day of Biodiversity, World Water Day, World Meteorological Day are communicated directly, or via websites and social media (IMHEN 2013; MONRE 2020). Internationally, some examples of public-private collaboration from the UK, the US and other nations are like the UK Government's cooperation with the Carbon Trust or the Energy Saving Trust to inform households about carbon reduction strategies, or the US Department of Agriculture's outreach programmes seeking public feedback on climate policies. These campaigns frequently use partnerships with NGOs, scientific institutions, and media outlets to expand their reach and credibility. In doing so, governments can influence the public's attitudes toward CC, encourage behaviour changes, and garner support for large-scale mitigation or adaptation policies (Haque and Jahid 2021).

7.2.3.3. Superficial and short-lived CC information from NGOs

NGOs have traditionally played a pivotal role in raising awareness of environmental and climate issues, mobilizing grassroots activism, and influencing policy. Research has found the role of NGOs as persuasive communicators, whereby their campaigns seek to shift public attitudes, encourage pro-environmental behaviours, and galvanize community support for climate-related policies (Hansen 2018; Comfort and Hester 2019). In Vietnam, there are more than 110 NGOs putting efforts to fight against CC. These organizations include both domestic and international ones such as VNGO&CC, CARE, WWF, CANSEA, SRD, etc. They have implemented CC campaigns such as Capacity

Building on CC for Civilization society, Sustainable livelihood in CC mitigation and adaptation in various provinces. These NGOs have formed a working group in Vietnam, named CC Working Group (CCWG), playing an important role in enhancing CC information sharing to the public. Their common purpose stationing in Vietnam is to develop, raise fund and execute CC programmes in adaptation and mitigation. Through these activities, NGOs communicate their CC information and improve public engagement with CC issues.

Ideally, these efforts produce long-term consciousness and sustained behavioural change. Yet, this study revealed a different picture of NGOs' CC communication in Vietnam: while NGOs do disseminate adaptive CC information, many of their initiatives are perceived as “superficial movements” and short-term or narrowly focused interventions. The gap between the ambitious goals of NGOs' campaigns and their actual influence on CC practices emerges in both rural and urban contexts, though it is articulated more robustly by Vietnamese rural residents who have direct exposure to these interventions.

A striking critique from the study's data is that many NGO campaigns in Vietnam appear to address only on-the-surface problems, leaving underlying issues untouched. For example, one rural participant (R11) lamented the lack of comprehensive grassroots-level communication. In some instances, NGOs organize short-term garbage collection drives or conduct training on plastic usage without integrating these actions into a broader educational strategy that addresses deeper consumption patterns and overall environmental awareness. This finding resonates with previous research suggesting that NGOs frequently tailor their strategies to quickly gain public legitimacy or showcase immediately visible achievements (Hansen 2018). In doing so, they may neglect the structural and behavioural roots of climate-unfriendly practices. Studies have indicated that NGOs often focus on small and event-driven projects, such as reforestation days, waste-collection campaigns, or brief public seminars, rather than committing to

sustained and long-term engagement. While these efforts can yield short-term improvements, they frequently fail to serve as the necessary catalysts for genuine, transformative change.

Another critical issue highlighted in the findings is the short-lived nature of many NGO-led campaigns. In Vietnam, numerous initiatives run only for a few weeks or months before the organizations move on, leaving communities without continued support or follow-up. This phenomenon is particularly pronounced in rural areas, where campaigns such as fishing or crop diversification programs may produce initial success but lack the long-term mentorship or iterative improvements needed for sustained impact. Although the precise rationale behind these short campaign timelines was not fully articulated by this research's participants, the literature suggests that restrictive grant conditions often require demonstrable and short-term outcomes. Such conditions leave little room for the prolonged capacity-building essential for effective climate adaptation (Comfort and Hester 2019). Consequently, NGOs may implement brief interventions, such as tree-planting days or pesticide reduction workshops, to satisfy donor requirements, even if these events do not translate into lasting behavioural shifts. Moreover, many NGOs face significant resource constraints compared to government agencies or mainstream media. Limited budgets, fewer institutional partners, and weaker in-person networks mean that NGO efforts in the field often remain episodic and shallow, undermining their potential to engender deep-seated change.

The short-lived and superficial character of these NGO-led CC communication efforts has several consequences for public engagement in Vietnam. First, it limits the capacity for fundamental behavioural change. Although some campaigns manage to address immediate problems (e.g., garbage collection), they fail to transform the underlying habits and practices necessary for long-term environment protection. In the realm of climate adaptation, repeated and

reinforced learning is critical. One-off training sessions or sporadic workshops by NGOs are insufficient; without consistent follow-up and ongoing mentorship, individuals tend to revert to familiar practices, and newly introduced eco-friendly methods fails to be established. Second, the temporary nature of these interventions can erode public trust in NGOs. When organizations appear, launch a campaign, and then vanish without sustained impacts, communities may become sceptical of future initiatives. Over time, this cyclical pattern of brief and isolated efforts can diminish the willingness of the public to engage with new projects, even those that offer genuinely meaningful strategies.

Similar to government's CC communication, this research also found the failure of climate-related NGOs in reaching Vietnamese urban residents. This indicates a further complication, which is the uneven allocation of NGO-driven climate communication across urban and rural area. This finding resonates with the literature suggesting that NGOs often concentrate their campaigns where environmental issues are most visible and communities are highly impacted, typically in rural areas facing with drought, salinity, or resource depletion (Comfort and Hester 2019). This research found that Vietnamese people in urban communities rarely encounter NGO-led programs. As a result, urban audiences receive minimal exposure to potentially beneficial adaptive ideas or solutions, leading to knowledge and behavioural gaps between them and rural ones. This imbalance parallels critiques of other stakeholder-driven CC communication, where rural populations receive more communication efforts due to direct vulnerabilities to CC, but urban areas remain overlooked regardless of their different climate-related issues such as air quality, tidal flooding, heatwave or green infrastructure. Without targeted programs for CC communication in urban areas, Vietnamese urban residents remain isolated from adaptive strategies, undermining the broader national effort to combat CC.

7.2.3.4. Profit-driven CC information from business

Much research has found that businesses occupy a unique position in the CC communication landscape. As both significant contributors to greenhouse gas emissions and potential agents of change, they are uniquely positioned to influence public perceptions and behaviour through their marketing and corporate social responsibility efforts (Stechemesser et al. 2024). However, the findings of this study reveal that in Vietnam, business-led CC communication is largely profit-driven. Rather than promoting genuine adaptive measures or long-term environmental responsibility, many business campaigns primarily serve to enhance their market competitiveness and secure financial returns.

This research's finding showed that Vietnamese businesses in the agricultural sector have increasingly employed profit-driven messaging and rhetoric to market and advertise their agrochemical products. They consistently refrain from communicating effective adaptive measures or acknowledging the full extent to which their products affect the environment, climate, livelihoods, and public health. Instead, these businesses claim that these products pose no harm to the environment and climate. This is closely associated with a business tactic, known as “greenwashing”, denoting to the fact that businesses exaggerate their environmental achievements while lacking the concrete actions needed to substantiate those claims. A common illustration involves labelling products as “natural” or “eco-friendly” without meeting stringent sustainability requirements (Lyon and Montgomery 2015). Further, Vietnamese businesses increasingly adopt CC rhetoric as a means to project a positive corporate image and differentiate themselves in competitive markets. The communication is less about substantive environmental protection and more about augmenting profit margins and gaining market share. This finding is supported by other research which also shows that certain businesses have employed communication strategies to highlight outcomes aligned with their strategic objectives, such as bolstering brand image,

drawing eco-conscious consumers, or gaining a competitive advantage (Delmas and Burbano 2011).

Another dimension revealed by the findings is the overt focus on securing investments and financial returns of Vietnamese agricultural businesses. Many business-led CC initiatives in Vietnam are designed to attract investment rather than to foster genuine climate adaptation. For example, some businesses offer loans to farmers under the guise of supporting adaptive agricultural practices. However, these financial supports are often accompanied by stringent conditions, in which businesses present farmers with limited repayment options (either immediate full repayment or debt rescheduling to coincide with the collection of livestock or fish stocks in the next season). This situation traps farmers in a vicious cycle of indebtedness, where the initial capital investment, intended to support CC adaptation, ends up exacerbating their financial vulnerability.

Furthermore, the finding also revealed that Vietnamese businesses are reluctant to invest in producing and promoting innovative CC solutions unless there is clear evidence of immediate profits or other financial incentives. They prefer to observe tangible achievements, such as a rapid increase in the yield of a particular crop or a short-term surge in sales, before committing additional funds. This risk-averse investment strategy prioritizes short-term gains over long-term sustainability, thereby discouraging the development of adaptive methods that might not yield immediate financial benefits. This finding echoes other research highlighting how corporate decision-makers often weigh the immediate cost-benefit trade-offs of green investments, leading to a reluctance to fund initiatives that are potentially innovative but might be financially risky, especially in sectors with considerable greenhouse gas emissions, such as energy, manufacturing and agriculture (Delmas and Burbano 2011).

The profit-driven nature of business' CC communication has several implications for public engagement in Vietnam. First, the emphasis on profit and market

competition tends to generate shallow communication that does little to alter public behaviour meaningfully. Instead of informing the business' stakeholders and consumers about effective CC mitigative and adaptive practices or business' underlying climate values and attitudes, businesses focus on branding their products with "green" labels (Carroll and Shabana 2010); Thomson et al., 2015). This message is often disconnected from the broader and more complex issues of sustainable agriculture and long-term climate stewardship. Such superficial messaging can leave the public with a fragmented understanding of CC and limit the overall willingness to adopt sustainable practices.

Second, the focus on short-term investment and immediate profit generation undermines the potential for long-term adaptive change. For example, when farmers receive financial support conditioned on short-term and profit-focused outcomes, they may be less inclined to adopt innovative practices that would yield long-term benefits but require sustained effort and resources. Further, the reliance on quick investment means that Vietnamese agricultural businesses are not ready for prolonged adaptive solutions. The recurring nature of risky investments, where Vietnamese farmers must repeatedly borrow money and then struggle to repay it, discourages a sustainable shift toward climate-resilient agricultural practices. Over time, such financial instability can lead to widespread disappointment among rural communities, reducing their overall engagement in CC initiatives.

And third, the profit-driven approach reinforces a narrow vision of CC communication of the Vietnamese agricultural businesses themselves, and in return, negatively affect the CC engagement of their stakeholders, including consumers, employees, and investors. Instead of presenting comprehensive strategies that emphasize their role and accountability in reducing emissions and mitigating climate risks (Hahn and Kühnen 2013), or informing and inspiring their stakeholders towards sustainable choices, the communication strategies by Vietnamese agricultural business often focus on isolated aspects of CC that serve

their financial interests. This selective CC communication for profits can also contribute to public scepticism and mistrust, as stakeholders may perceive that businesses are more interested in “greenwashing” than in implementing genuine environmental reforms. Studies suggest that greenwashing – the distribution of misleading information about climate-friendly initiatives for profit – erodes business credibility and public trust in their climate commitments, thereby fueling widespread scepticism (Cherry and Sneirson 2012; Lyon and Montgomery 2015). Such scepticism further reduces the likelihood of collective action and robust public engagement.

7.2.3.5. Limited efficiency of scientific sources of CC information

Scientific communication has long been considered as a cornerstone in CC engagement. Historically, scientists have been among the most credible sources of CC information, often viewed as “trusted messengers” capable of shifting public understanding and behaviour (Dilling and Moser 2004; Lowe et al. 2006). However, the findings of this study indicate that in Vietnam, despite the high credibility of scientists, the efficiency of their CC communication is constrained by limitations related to time, space, and cost. Moreover, the use of technical language and the idealized conditions under which experiments are conducted, along with an imbalanced allocation of scientific communication efforts between urban and rural areas, further hamper the effectiveness of scientific CC communication in promoting CC engagement from the Vietnamese public.

This research’s findings showed that scientific information often produces only short-term effectiveness. Adaptive strategies suggested by scientists, such as innovative cultivation methods or water management techniques, tend to work effectively only for a limited duration. In Vietnamese rural areas, certain scientific interventions, ranging from the use of root stimulants to specific water pumping methods, led to only temporary improvements in crop yields. As soon as climatic conditions changed, such as prolonged heat or unexpected shifts in rainfall, the

benefits of these scientific adaptive interventions are reduced. The episodic nature of these scientific interventions has diminished the adaptive capacity-building process of rural residents, causing them to revert to traditional methods. Without continuous reinforcement from scientists through recurring trainings or follow-up sessions, the one-off exposure to scientific information and solution fails to instil lasting behavioural change. As a result, scientific methods' capacity to drive long-term adaptation is severely diminished.

Another issue in the finding is the spatial limitation of scientific CC information. The findings reveal that various adaptive solutions recommended by scientists are applicable only in specific contexts and may not translate well across different localities. Many scientific initiatives for CC adaptation are designed with a one-size-fits-all mentality, failing to account for the diversity of local ecosystems. This is problematic in a country as geographically varied as Vietnam, where factors such as soil type, microclimate, and existing agricultural practices vary widely between locations in the Red River Delta, Central Coast, and Mekong Delta. Consequently, the effectiveness of adaptive practices is declined when they are applied in regions for which they were not originally intended. This observation is supported by previous research that emphasizes the need for localized solutions in climate adaptation strategies. With such localized approaches, the spatial applicability of scientific information will be enhanced, and its overall impact on sustainable practices is increased (Nalau et al. 2015; Marlon et al. 2019).

Cost is another significant constraint on the effectiveness of scientific sources of CC information. The findings indicate that many scientifically driven adaptive methods require substantial capital investment. For example, high-tech solutions for shrimp farming, though promising in theory, necessitate enormous capital expenditures that many rural farmers simply cannot afford. It inhibits the collective CC engagement within the community as not everyone has sufficient capital to adopt innovative technologies for their agriculture. This high cost not

only limits the widespread adoption of innovative technologies but also creates a cycle of financial vulnerability among rural communities. When farmers invest heavily in expensive scientific methods, their financial risk increases. This scenario often leads to debt accumulation and can discourage further experimentation with newly adaptive methods. In the context of Vietnam's developing economy, especially in rural areas, where capital is often scarce, costly investments in adaptive CC solutions can be particularly unsustainable.

A critical factor that can't be ignored lies in how scientists convey their knowledge and information to the public. The difficulty in informing and clarifying CC for general audiences is partly attributed to both what scientists communicate and how do they communicate. In addition to the time, space and cost limitation, the issue of using highly technical jargon further inhibits scientific CC information's applicability on the ground. Research has indicated that scientific findings frequently face criticism for its complexity and overreliance on technical jargon, making it challenging for the general public to comprehend and translate into practical steps (Nelkin 1991). This study has also found similar observation that Vietnamese scientists occasionally communicate with highly technical jargon. The scientific information is delivered without deliberate evaluation on how the audiences receive and respond to the information. For instance, some rural participants expressed frustration with the abstract nature of the scientific information provided, stating that while they appreciated the credibility of scientific sources, the lack of plain language and practical details rendered the information less useful for real-world application. This causes scientific information fails to translate into actionable solutions. This reflects what is often called the deficit approach to public CC understanding, employed by scientific elites (The information deficit model) (Suldozsky 2017). Under this model, scientists focus on transmitting knowledge rather than fostering meaningful dialogue, assuming a one-way flow of information and overlooking participatory engagement. In doing so, they communicate under the belief that they possess the

correct professional knowledge and authority necessary to educate and influence the public's understanding, attitudes, and behaviours regarding global CC. As a result, scientific outputs frequently remain jargon-heavy and fail to present information in an accessible manner for general audiences.

This issue is aggravated by a fact found in the finding that many scientific experiments for CC adaptation in Vietnam are conducted under controlled and ideal conditions that do not necessarily mirror the realities of local environment and climate. Vietnamese scientists sometimes overlook the contextual factors of local people, hence are unable to provide appropriate adaptive solutions. This finding echoes other research highlighting that scientific experiments and adaptive strategies do not resonate in the face of real-world variability (Nunn and McNamara 2019). Consequently, this leads to a situation where Vietnamese people are unlikely to personally connect to the CC issues, driving them gradually less enthusiastic in the legitimacy of scientific climate information. As a result, people are more likely to stray away from the implementation of pro-environmental actions based on scientific knowledge.

A further complication arises from the finding is that rural residents have higher level of engagement with scientific CC communication than urban ones. In addition to the lack of interest, the other contributor to this low engagement of urban residents is the imbalanced allocation of scientific CC communication efforts between urban and rural areas. My findings indicate that rural communities have attained more opportunities to attend meetings and workshops with scientists to receive contextually relevant advice in animal breeding, orchard planting, agricultural extension, and advance preparation for severe climate events. Scientific CC communication in urban and rural areas is different not only in the number of meetings, but also in how scientific CC information is conveyed. While people in rural areas enjoy more informally on-the-field workshops and lectures, where they can freely converse with scientists and absorb scientific CC

information easier, urban residents mostly attend the scientific meetings formally, where two-way conversation is rather restricted, making it harder for them to understand the provided information. This imbalance has significant implications for inclusive CC engagement strategies, as it suggests that urban populations may remain disengaged or misinformed about adaptive solutions, even though they not only face their own unique climate challenges, but also contribute greatly to GHGs emission. Other research has also indicated that when communication efforts are unevenly distributed, it undermines the overall national capacity to respond to CC challenges (Dorji et al. 2024)Howes, 2010; Pillay, 2017).

7.2.4. Lay expertise and its integration with scientific knowledge

Lay expertise has emerged as a significant informal source of CC information, particularly in contexts where traditional scientific, governmental, or media messages fail to resonate with people's lived experiences. While scientists, policymakers, and journalists have historically been regarded as the primary authorities on CC issues, an expanding body of research demonstrates that lay expertise, formed through experience, observation, intuition, and memory, plays a crucial role in shaping public understanding of CC and influencing adaptive behaviour (Nakashima et al. 2012; Dorji et al. 2024; Nicolaisen 2024). In line with these studies, this research reveals that lay expertise strongly influences how Vietnamese rural residents interpret and respond to climate phenomena such as unusual rainfall, droughts, and flooding. This finding resonates with a research conducted in Vietnamese rural areas indicates that 97% of respondents receive CC information from family and friends, 87% rely on neighbours, community leaders, and local organizations, and 80% receive from work colleagues as sources of CC information (Nguyen-Thi-Lan et al. 2021). Also according to this study, university students returning to their rural homes often share updated environmental knowledge with their parents, and community gatherings serve as important forums for exchanging climate, weather, and seasonal crop information.

Despite the active exchange, this study revealed that the total application of lay expertise, as a stand-alone source of knowledge for CC adaptation, often fails to produce favourable outcomes due to several limitations, including low credibility, limited efficiency, and inherent climate risks. First, the credibility of lay expertise is often questioned. Informal channels, such as word-of-mouth or community gatherings, where lay expertise typically transmitted, lacks rigorous verification. As previous research highlighted, lay CC information's quality and credibility poses an immense hurdle for certification as it mainly depends on intuitive observation, association, feeling and memory, rather than systematic empirical data. This means that people observe short-term weather fluctuations and assume long-term climate trends, even when scientific data suggests otherwise (Weber 2010; Maldonado et al. 2015; Dhar et al. 2023). There is a scepticism toward climate information shared by peers among Vietnamese rural residents, noting that such information is “unverified” and based on spontaneous cultivation practices. Information on CC shared among friends and family tended to be vague and oversimplified, focusing on noticeable weather irregularities rather than offering deeper understanding of climate patterns or actionable steps for adaptation. Individuals rely exclusively on personal observations or informal peer accounts, they develop an intuitive, but not necessarily accurate, understanding of CC, thereby undermining the information's credibility.

As my findings indicated, while rural residents actively exchange experiential insights, such as changes in local weather patterns or the efficacy of traditional cultivation methods, these practices often fail to evolve in response to the increasing variability of climate conditions. This is in line with other research on CC and agriculture, discussing how local agricultural knowledge, while useful, often falls short in addressing the systemic risks posed by CC (Nguyen et al. 2016; Praveen and Sharma 2019). It highlights that farmers' reliance on past weather patterns and traditional farming techniques can lead to maladaptation, as climate variability increases unpredictability. Several rural participants in this study noted

that methods which once assured successful harvests have become obsolete under the new climate regime; for example, longstanding practice of timing shrimp farming based on traditional monsoon patterns no longer works due to unpredictable climatic shifts.

Second, the efficiency of lay expertise in driving effective agricultural production under rapidly changing climate conditions is inherently limited. Lay expertise tends to be episodic and highly localized, depending on individual experience and observation. Although rural residents actively exchange insights, like changes in local weather patterns or the efficacy of traditional cultivation methods, such knowledge is often fragmented and may not offer comprehensive solutions for the complex challenges. As indicated by findings in this study, traditional practices that once ensured successful harvests are increasingly proving inadequate as climate variability intensifies. For instance, the longstanding practice of timing shrimp farming according to traditional monsoon patterns has become obsolete under unpredictable climatic shifts. This observation supports earlier research which contends that while lay expertise can offer immediate, context-specific knowledge, its capacity to drive long-term, systemic adaptation is inherently constrained by the rapid pace of CC (Nguyen et al. 2016; Ojala and Bengtsson 2018; Praveen and Sharma 2019).

Third, this research found that total reliance on lay expertise poses significant threat to climate and environment. A common practice in rural communities to respond to the destruction of on-season cultivation by severe CC impacts is that farmers rush into implementing off-season cultivation, driven by self-belief, experience or peer imitation. In the absence of scientific guidance, this reactive shift frequently leads to the aggressive use of agrochemicals aimed solely at achieving short-term financial gains. Such practices exacerbate environmental degradation, resulting in soil acidification, water contamination, and long-term reductions in agricultural productivity. This finding illustrates the prioritization of

immediate yield enhancement over sustainable practices from Vietnamese rural residents, thereby creating a vicious cycle of economic and environmental vulnerability. Similar findings have been reported in other contexts. For example, in Bangladesh, farmers' overreliance on informal knowledge often results in unsustainable agricultural development (Islam and Nursey-Bray 2017). They turn to overusing fertilizers and pesticides in an effort to boost yields, leading to long-term soil degradation and declining agricultural productivity. Furthermore, my findings demonstrate that the off-season cultivation based on personal experience and preference has undermined collective efforts for CC adaptation within a rural community in Vietnam, as people farm differently with different fertilizers and pesticides. Such practices both exacerbate environmental degradation, through soil acidification, water contamination, and biodiversity loss, and pose serious climate risks by contributing to increased GHGs and unsustainable farming cycles.

The limitations of lay expertise have showed that this informal CC information sources cannot alone sustain agricultural productivity and enhance its adaptation in rapidly changing climate conditions. An unexpected yet promising finding from this research is the effective integration of lay expertise with scientific knowledge which appears to foster sustainable climate adaptation in Vietnamese rural communities. Recent studies have underscored that co-production of knowledge between farmers and researchers can bridge the gap between traditional and modern climate adaptation strategies. The lay expertise can be strengthened when integrated effectively with formal scientific knowledge (Šūmane et al. 2018; Rust et al. 2022). This is not to belittle lay expertise; however, it calls for such expertise to be integrated within scientific frameworks to enhance adaptive capacity. Rather than viewing local knowledge as static and ineffective, the co-learning between farmers and scientists is considered an effective means to refine and contextualise CC adaptation strategies. In the Vietnamese context, such integrated knowledge is characterised by a sequential yet complementary process. Rural residents tend

to first adopt scientific insights that resonate with their local realities and then blend these with their own experiential knowledge to adjust cultivation practices. In many cases, scientists actively work with local communities to adapt research findings to practical applications, thereby developing innovative approaches that enhance the efficiency and resilience of traditional farming methods. In doing so, scientific knowledge is harnessed to amplify the strengths of lay expertise while mitigating its limitations. This method not only helps Vietnamese rural residents to take full advantage of their lay expertise, but also minimize the limitation of scientific knowledge-based methods if being executed from the outset, such as the high operating cost of scientific solutions.

The combination of lay and scientific knowledge has supported Vietnamese rural residents to better engage with CC. It creates more robust and contextually relevant practices, helping rural residents to address the limitations of episodic lay expertise in order to maintain, adapt and enhance their traditional cultivation to the capricious climate. It enables rural residents to move beyond short-term adaptations toward more proactive and resilient strategies, allowing them to reduce the dependence on aggressive use of fertilizers and pesticides, which in turn helps further reduce climate risks. Additionally, the integrated model offers a pragmatic solution to the high operating costs often associated with scientific-based interventions. By leveraging local knowledge as a foundation and integrating targeted scientific inputs, communities can achieve significant adaptive gains without incurring excessive costs. Last but not least, the combination of scientific and lay expertise promotes collective action. As in the case of “agricultural tourism” model, the success of combining both knowledge sources facilitate the model’s development. Socio-economically, it creates more jobs and income for other rural locals so that they can better engage in CC adaptation and mitigation. Further, when communities collaborate with researchers, the resulting knowledge co-production process fosters social cohesion and ensures that adaptation strategies are both contextually relevant and

scientifically sound. Such collaborative efforts not only enhance individual adaptive capacity but also contribute to broader environmental sustainability by reducing reliance on practices that exacerbate soil and water degradation.

7.3. The relationship between public CC engagement and information sources

While the previous sections discuss CC engagement and the role of information sources separately, the findings of this study suggest that these two dimensions are closely intertwined. First, people's social contexts, including their livelihood conditions, economic resources, and daily experiences with climate impacts, strongly shape not only their level of engagement, but also the types of information sources they rely on and the ways they interpret the information. At the same time, the barriers identified in this research influence the credibility, accessibility, and usefulness of different information channels.

This interaction lies in the difference between rural and urban residents. Rural residents, whose livelihoods depend heavily on climate-sensitive sectors such as agriculture and aquaculture, experience CC impacts more directly and frequently. This experiential proximity not only heightens their concern about climate issues but also shapes their information-seeking behaviour. Because climate impacts affect their daily work and income, most rural participants actively search for practical knowledge that can help them adapt cultivation practices, manage water resources, or respond to changing weather patterns. In this context, information sources that offer concrete and applicable guidance, such as local meetings, workshops with scientists, or discussions within agricultural cooperatives, are considered particularly valuable. Conversely, sources perceived as abstract or detached from local realities, such as global climate news in mainstream media or government's mass communication, are often regarded as less useful. This finding supports previous research suggesting that individuals are more likely to engage with climate information when it is closely aligned with their immediate

livelihood concerns and practical decision-making needs (Moser 2010; Weber 2016).

At the same time, several structural barriers identified in this study help explain why rural residents rely heavily on informal information sources. Limited access to financial resources and educational opportunities means that many rural residents cannot easily obtain or implement scientifically recommended adaptation strategies. Even when scientific information is available, the cost of adopting new technologies or practices may exceed rural residents' financial capacity. Under these circumstances, farmers often turn to more accessible, perceivable and affordable sources of information, particularly interpersonal communication within family, neighbour, and community networks. Lay expertise therefore becomes a critical mechanism through which climate-related information circulates in rural areas. This reliance on informal sources is not merely a cultural preference; it is also a response to structural constraints in formal communication systems. As official information sources often fail to provide timely, localized, and actionable guidance, rural communities fill the gap by sharing experiential knowledge among themselves. Similarly, infrastructural and institutional barriers also shape how people perceive and use information sources. For instance, the study finds that inadequate government support and fragmented policy implementation reduce public trust in government's climate communication. This research's finding shows that many participants perceive government's climate messages as bureaucratic, repetitive, or disconnected from local needs, they are less likely to rely on these sources for guidance. Instead, they seek alternative information channels that appear more responsive to their circumstances.

Barriers related to knowledge and misconceptions further illustrate the interaction between context and information sources. Misunderstandings about CC causes, such as confusion between CC and ozone depletion, reflect not only gaps in

scientific literacy but also limitations in the effectiveness of communication channels. The focuses on sensational disasters or abstract global phenomena without explaining underlying mechanisms of media coverage cause audiences struggling to connect these narratives to their everyday experiences. Likewise, the heavy reliance on technical language or controlled experimental conditions that differ from local realities of scientific communication results in information may appear irrelevant or impractical. In both cases, the barrier of limited understanding reinforces reliance on familiar sources, including personal observation and peer communication. Moreover, barriers such as perceived policy unfairness, uneven distribution of resources, and ineffective governance influence the way people perceive climate information from the sources they used to consider as credible. Some participants in the research, who express dissatisfaction with government policy implementation, often display scepticism toward official communication, even when the information itself may be scientifically valid.

The findings also demonstrate how socio-economic fragility could negatively affect the way people interact with CC information. Specifically, profit-oriented communication from agricultural companies often promotes chemical inputs or short-term productivity gains rather than sustainable adaptation strategies. For farmers, facing financial insecurity and unstable market conditions, such messages may appear attractive because they promise immediate economic benefits. The finding shows that rural people continue to use this information for quick benefit, even though knowing this dynamic can reinforce unsustainable practices harmful to the climate and environment, including excessive fertilizer and pesticide use. In this sense, economic vulnerability does not merely limit access to information; it shapes how information is prioritized.

On the other hand, the urban contexts reveal a different but equally important relationship between engagement barriers and information use. Many urban participants report limited engagement with climate information not because of

lack of access, but because climate risks are perceived as less immediate or less threatening to their livelihoods. Structural conditions such as stable employment, diversified economic opportunities, and access to modern infrastructure shield urban residents from the direct consequences of climate variability. As a result, climate information receives limited attention and competes with numerous other concerns, including work responsibilities, economic pressures, and everyday lifestyle priorities. In this context, barriers such as indifference, firmly established consumption habits, and the perception of CC as a distant problem weaken the appreciation of climate information from various sources. Even when urban residents encounter climate information through media or public campaigns, the absence of direct experiential connections often prevents them to translate this information into sustained engagement or behavioural change.

7.4. Chapter summary

This chapter aims at situating the research's findings into a wider literature of CC engagement and communication. A significant contribution of this study lies in its identification of rural-urban disparities in CC engagement. The findings show that rural residents demonstrate a deeper and more consistent engagement which aligns with a growing body of research emphasizing the role of experiential proximity in shaping climate perceptions and actions (Moser 2010; Spence et al. 2012; Myers et al. 2013). However, this study also contrasts with other research suggesting that urban populations – due to higher levels of education, media exposure, and access to resources – tend to exhibit stronger climate awareness and engagement (Wolf and Moser 2011). The finding proves otherwise by demonstrating that material exposure and livelihood availability don't equate with active CC engagement. Moreover, the identification of multiple individual and structural barriers further situates this study within a well-established body of literature on constraints to pro-environmental behaviour, such as financial limitations, lack of knowledge, and entrenched habits are confirmed as significant

impediments to climate action (Whitmarsh et al. 2011; Gifford and Chen 2017; Badole et al. 2024). However, this research extends existing scholarship by demonstrating how these barriers are intensified and reconfigured within the Vietnamese socio-political and economic context, such as the social-economic fragility of business making rural people refrain from engaging with CC.

Another significant contribution of this study lies in its analysis of the relationship between public engagement and information sources. The limitations identified in formal communication channels resonate strongly with international research. For example, the tendency of mainstream media to frame CC as episodic and event-driven rather than systemic has been widely critiqued (Boykoff 2008b; Arnold 2018; Said and Wölfl 2025). The critique of government communication as top-down and bureaucratic also aligns with broader literature that questions the effectiveness of centralized, non-participatory approaches to climate communication (Williams et al. 2020). In that context, the role of lay expertise identified in this study highlights their importance in shaping climate understanding and adaptation that previous research mentioned (McLean and Nakashima 2018; Maldonado et al. 2015). However, this study takes a further analysis by reinforcing the dual characteristics of lay expertise – its relevance and immediacy on the one hand, and its limitations in addressing complex, long-term climate challenges on the other. Importantly, the study advances the literature by suggesting the effectiveness of integrating lay and scientific knowledge. The Vietnamese case provides a particularly clear illustration of how such integration occurs in practice, through iterative processes of adaptation, experimentation, and community collaboration. This not only strengthens the applicability of scientific knowledge but also enhances the legitimacy and sustainability of lay expertise in climate adaptation.

Chapter 8. Conclusion

8.1. Overview of the study

This research aims at addressing the research gap in the field of CC communication and public engagement in Vietnam. First, it seeks to obtain a clear-cut understanding of how Vietnamese people engage with CC issues; in doing so it analyses public engagement in three dimensions: socio-economically, politically and morally. Second, it aims at examining how Vietnamese people receive, evaluate, and act upon CC information in their daily lives, especially in relation to how CC information from formal and informal sources affects Vietnamese public's CC engagement. In doing so, this research hopes to produce empirical findings that might bear implications for Global South countries, where more academic attention to CC communication and public engagement is badly needed.

The study employed a qualitative research design centered on in-depth interviews. A combination of purposive and snowball sampling was used to recruit a diverse group of participants from both urban and rural areas, as well as from specialized groups (e.g., climate experts, journalists). The data were analyzed using a blend of deductive and inductive thematic analysis, which enabled the systematic examination of predefined theoretical constructs while also remaining open to the emergence of new themes. The data is better analyzed and presented by comparing responses across different participant groups and supplementing interviews with field notes and contextual observations. This multifaceted methodological approach ensured both depth and breadth in understanding the dynamics of CC communication and public engagement in Vietnam.

The study poses two research questions. RQ1 – **“How do Vietnamese engage with CC issues?”** – includes two dimensions: “To what extent Vietnamese people engage with CC socio-economically, politically and morally?” (RQ1a) and “What

are the individual and structural barriers to CC engagement?” (RQ1b). In relation to these, the study shows that Vietnamese population engage disproportionately with CC issues, in the way they understand about CC causes and impacts, as well as their behavioral responses toward CC mitigation and adaptation. It depends on how directly they are in contact with CC impacts and how their livelihoods are affected by it. Vietnamese rural residents are more closely engaged with CC than their urban counterparts in socio-economic, political, and moral terms, largely because rural communities have a more immediate and direct experience of its impacts, experiencing irregular temperature and rainfall shifts, together with salinity intrusion, sea-level rise, and more intense El Niño episodes. These impacts have ravaged crops and eroded the livelihoods of countless farmers.

This direct contact prompts rural residents to adopt adaptive strategies both individually and collectively through local cooperatives and community networks. Individually, they embrace a set of eco-friendly practices, such as refraining from dumping litter into rivers or on land, organizing rubbish pick-ups, composting organic waste, cutting back on plastics, and storing water to safeguard their local environment and climate. Collectively, farmers strengthen resilience by forming community networks and cooperatives focused on CC adaptation. During regular gatherings, they share cultivation tips to improve yields and explore additional strategies for mitigating climate impacts.

Rural people also demonstrate stronger political engagement by actively seeking government support and calling for concrete policy interventions. They regularly participate in government-organized meetings to obtain updates on adaptation policies and to debate how these measures translate into everyday farming. During these sessions, participants voice strong support for additional material and financial assistance, ranging from protective infrastructure such as dikes and drainage systems to CC education and subsidies for alternative agricultural practices. Moreover, rural residents exhibit a heightened sense of moral

responsibility, focusing on environmental preservation for future generations and advocating for greater equity in global climate governance. They aim to pass the lessons learned from their farming practices to neighbors and younger generations, helping them replicate similar livelihood gains and strengthen their resilience to CC.

In contrast, urban residents typically show a more superficial understanding of CC, associating it mainly with discomfort from shifting weather patterns or minor disruptions in travel and daily routines. They are aware of solutions like energy-saving devices or plastic reduction but admit the lack of enthusiasm to undertake. Consequently, they tend to be less politically and morally involved. They exhibit very little concern about climate and environmental policies, and display minimal involvement in climate policy process, unless specific incentives or structural changes (e.g., policy support, easily accessible green products) are introduced.

Further, this study identified seven different individual and structural barriers that hinder effective CC engagement. At the individual level, the lack of resources, climate-unfriendly habits, indifferent attitude, and responsibility denial restrict the capacity of many Vietnamese people to adopt sustainable practices, thus discouraging both individual and collective efforts. At the structural level, limited political support and infrastructural shortcomings particularly impede sustainable adaptation in rural areas. In addition, fragile coordination among various stakeholders undermines market stability and collective resilience.

The second research question is **“What are the impacts of CC information sources on public CC engagement in Vietnam?”**, consisting of two sub-questions: “To what extent and in which way formal information sources affect CC engagement?” (RQ2a) and “To what extent and in which way informal information sources affect CC engagement?” (RQ2b). This findings show that overall, neither formal nor informal channels alone succeed in fostering sustained and meaningful engagement. It found the limited or even negative effects of CC

information from five formal sources – namely government, mainstream media, NGOs, businesses, and scientists – on public CC engagement. These formal sources are unable to bring about a meaningful CC engagement from the public due to several limitations, such as shallow and short-live content, irrelevant and exaggerated presentation, benefit-driven communication practices and information with limited efficiency in time, space and functioning cost. Such information fosters climate disengagement and confusion among the public, erodes trust, and fails to address the diverse requirements for long-term climate adaptation across Vietnam’s varied geographical regions. In contrast, the research finds that informal sources of lay expertise (i.e. CC knowledge and information gained from family, friends and neighbors, and/or from self-experiences in working and direct climate contact) are frequently and substantively used for CC adaptation, especially in rural areas. However, this informal source has certain limitations in application, whereby it lacks credibility, efficiency, and can cause harms to the climate and environment. In such precarious situation where no single information source can help facilitating CC engagement, the research underscores the success of integrating lay expertise with scientific knowledge. By uniting locally contextual insights and empirically validated knowledge, this collaboration bolsters adaptive capabilities. Such a cooperative framework not only increases the trustworthiness and practicality of climate information, but also galvanizes collective action, leading to stronger and more enduring adaptive measures.

8.2. Contributions

8.2.1. Theoretical contributions

This study utilizes the theoretical approach of public CC engagement and media structure to understand how Vietnamese public engage with CC issues and the sources they receive the information from. To date, it is the first one in Vietnam, examining critically and thoroughly the impact of CC information on public

engagement from the audience's views. It not only contributes to the understanding of this topic in this country, but also attempt to de-westernize the research approach. The study helps to extend the scope of the theory of public CC engagement. By applying it in a Global South country with highly climate-vulnerable, politically centralized, and socio-economically diverse settings, the study shows that local livelihood vulnerability becomes the primary driver of CC engagement, together with other factors such as top-down policy approach and market fragility. This could provide new theoretical insights that can be used and further explored in future research about public CC engagement in the developing world.

8.2.1.1. Enriching the knowledge of CC communication and public engagement in Vietnam

Past research models of public CC engagement have emphasized cognitive, affective, and behavioral dimensions of climate action. This study enriches these models by demonstrating the different level of engagement between urban and rural residents in socio-economic, political and moral terms. In Vietnam, direct exposure to climate impacts and local livelihood vulnerabilities fundamentally shapes how individuals perceive and respond to CC. In contrast to urban dwellers, whose engagement tends to be more generic and episodic, rural populations exhibit deeper, more integrated forms of engagement. They not only recognize the immediate and long-term threats posed by climate variability, such as erratic rainfall, salinity intrusion and rising sea levels, but also translate these experiences into proactive adaptation strategies. By documenting rural and urban disparities, the study contributes an understanding and recognition that local context is a critical determinant of public engagement with climate issues. This had not been adequately theorized and empirically examined in sufficient details, in Vietnam and in the general Global South context, before this study. As such, this research helps to fill the critical gap in theories of public CC engagement, using Vietnamese data to highlight the rural-urban divergence in CC engagement and

its causes. Further, it integrates Global South-specific structural constraints such as uneven infrastructure investment and limited market access into the model of climate engagement, considering these elements not as background, but as the core ones that can influence the public engagement with CC issues.

Further, this research is the first in Vietnam to comprehensively explore various barriers to public CC engagement. In addition to individual barriers which has been studied extensively by research around the world, this study highlights the role of structural factors (i.e. infrastructure deficits, shortcomings of political supports, and socio-economic fragility in business activities) in shaping CC engagement. The research demonstrates that even when Vietnamese individuals are aware of CC and its impacts, their capacity to act is often constrained by systemic barriers. These barriers can undermine the public's ability to engage meaningfully with CC issues. By integrating these insights, the study suggests that theoretical models of public engagement in Vietnam must move beyond individual attitudes and behaviors to also consider institutional and infrastructural conditions that facilitate or inhibit adaptation responses. This is critical especially for a politically centralized system in Vietnam, where the role of government in issuing climate policies to assist the public's adaptation is crucial. This finding can also be useful for research in other developing countries with similar socio-economic and political context to Vietnam.

Another contribution to knowledge of this research is its emphasis on the perceived impact of information sources on public engagement in Vietnam. This contribution is achievable because of the fact that scholars stationed in Vietnam have paid very little attention to this topic. Existing Vietnamese scholarship often critiques the general public's limited awareness of CC, yet rarely investigates the specific information sources that could address these knowledge gaps (Huong et al. 2020; Tung et al. 2024). Among the few studies focusing on distinct sources of climate information, most analyze the mainstream media's reporting, particularly

the narrative and framing techniques used by Vietnamese media, which tend to stress government policies while neglecting an in-depth exploration of how such messaging resonates with the public (Pham and Nash 2017; Pham et al. 2017; Trieu et al. 2022). As for information disseminated by governmental or non-governmental environmental organizations, past research in Vietnam offers only a cursory overview of their initiatives, with scant attention to their influence on public engagement (IMHEN 2013). This scarcity of research on this topic in Vietnam makes the finding of this research even more meaningful and critical. It has a potential contribution to consolidating the conceptual framework for future research on the impact of CC information on public engagement.

The findings indicate that while formal information sources are widely available, their effectiveness is often compromised by factors such as superficial content, irrelevance, benefit-driven communication practices and information with limited efficiency in time, space and functioning cost. Another issue is that the Vietnamese socio-cultural and political landscape presents unique challenges for CC communication that differ markedly from those in the Global North. These formal sources often operate in a top-down manner that may not adequately address the local nuances of climate impacts. By elaborating these contextual dynamics, the study challenges the assumption that increased media exposure or education necessarily leads to better climate engagement. Instead, it found that informal lay expertise in climate variability, rooted in personal experience, observation, and community exchanges, plays a stronger role in shaping local adaptive practices. However, reliance on lay expertise alone is not sufficient to engender sustainable adaptation. A key theoretical contribution of the research emerges, which is the integration of formal scientific knowledge and informal lay expertise. This hybrid model of knowledge co-production displayed the support and facilitation of scientifically validated information for lay expertise. This integration not only reinforces the feasibility of lay adaptive practices but also addresses the limitations of both approaches. In doing so, the research highlights

the potential for more resilient and context-specific adaptive strategies. This additional layer of analysis has enriched the thesis' overall findings.

8.2.1.2. De-westernizing the research approach on CC communication and public engagement

One of the primary contributions of this study is its effort to de-westernize the research approach to CC communication and public engagement. Much of the literature on this and related topics has focused on Western contexts (Nguyen 2024). Consequently, research in developing countries, where different socio-economic, political and climate contexts distinctly affect the way people engage with CC through CC information, is significantly lacking. By choosing and incorporating perspectives from Vietnam – a developing country acutely vulnerable to CC, this research broadens the theoretical framework for future research in Global South. De-westernizing the approach can bring substantial theoretical implications, prompting scholars to revisit and revise existing models of public engagement to account for diverse socio-cultural contexts. This includes re-examining concepts such as trust, efficacy, and motivation in CC communication in accordance with lay expertise with CC. This research's findings suggest that, different from Western context, adaptation capacity in Vietnam, particularly in the most CC-vulnerable areas, is less a function of formal information transfer and more a product of direct experiential learning, communal sharing of traditional practices, and integration with scientific knowledge.

8.2.2 Methodological contribution

This research has shown the effectiveness of qualitative in-depth interviews in the newly research approach in the field of CC communication and public engagement in Vietnam, which help to achieve more nuanced and detailed information from the interviewees' answers. As discussed, this research is the first in Vietnam examining the impact of CC information on public CC engagement from the audience's perspectives. The few studies about CC information sources

in Vietnam have used quantitative methodology solely to examine communication content patterns (Pham et al. 2017; Huong et al. 2020; Trieu et al. 2022; Tung et al. 2024). Only one study about the relationship between media use and CC awareness is found in the literature and this one employs a quantitative approach that fails to provide detailed investigation on how Vietnamese audiences perceive CC information sources (Pham and Nash 2017).

Thus, the qualitative in-depth interviews applied in this research were designed that allowed participants to express their lived experiences in their own terms. This contrasts with standardized survey instruments often developed in other quantitative research, which may fail to capture the subtleties of local engagement. The deductive component enabled the researcher to test existing theories on public CC engagement and communication, which predominantly developed in Western settings, within the Vietnamese context. At the same time, the inductive approach allowed for the emergence of new themes that are unique to Vietnam, such as the prominent integration of lay expertise and scientific knowledge in CC adaptation. This dual method not only validates established theoretical approach in a new setting, but also allows the research to capture a wide range of information and experiences. It provides a comprehensive picture of the phenomenon under study that would have been overlooked by a purely deductive approach. In doing so, the study is able to obtain sufficient information to answer the two research questions.

By adapting the qualitative method to reflect the socio-cultural and historical particularities, this research can serve as a source of success and failure lessons for future research into CC information sources and their impacts on public engagement in Vietnam. Further, the successful application of well-established qualitative methods in the Vietnamese context underscores their versatility and provides guidance for future researchers working in similar settings in Global South.

8.2.3. Practical implications

The research's findings on the impact of formal and informal information sources on Vietnamese's public CC engagement underline some implications for various stakeholders whose business involves helping Vietnamese people overcome challenges for better CC engagement.

8.2.3.1. Social and political implications

Various individual and structural barriers inhibiting an effective engagement have been found. To address these barriers, there are several implications for social and political interventions in Vietnamese context. To tackle individual barriers, targeted education campaigns can enhance public understanding of climate science and the impact of personal behaviours. For example, initiatives that highlight the carbon footprint of everyday activities, such as commuting or dietary choices, can empower individuals to make more informed decisions. These campaigns should prioritize accessibility, using clear and relatable messaging to bridge the gap between scientific knowledge and public perception. Dismantling these individual barriers requires multi-level collaboration, in which communities must see that alternatives are accessible, supported by policy, and reflective of local values. Without such socially coordinated actions, climate-unfriendly lifestyles are likely to persist, perpetuating both environmental degradation and the sense that individual efforts to mitigate CC are inconsequential. The recognition of CC as an aggregate outcome of numerous decisions from global industries to local farmers can create a sense of shared agency and responsibility, motivating individuals to act even if larger social entities fail to meet their commitment.

Addressing structural barriers necessitates systemic reforms that prioritize climate sustainability at all levels of society. Vietnamese governments must play a central role in driving these changes, implementing policies that incentivise

renewable energy adoption, invest in green infrastructure, and regulate high-emission industries so that they have minimal impacts on local life. For instance, in urban areas, subsidies for electric vehicles or solar panel installations can make these technologies more accessible to a broader demographic. Similarly, urban planning initiatives that prioritize public transportation and walkable communities can reduce reliance on fossil fuels while enhancing quality of life. For rural areas, the study highlights a critical need for more robust infrastructure such as better flood defences and waste management systems. For example, upgrading existing embankments and reinforcing dikes along riverbanks and coastal zones can reduce the frequency and severity of flood and salinity invasion. Policymakers should prioritize infrastructure investments that support long-term CC adaptation in vulnerable Vietnam rural areas. For instance, funding should be dedicated to accelerating the construction of adaptive infrastructure, together with designing training programs for district-level engineers and community technicians to sustain the infrastructure over the long term. While these are not communication issues, they have a strong influence on whether CC information channels can facilitate or hinder public engagement.

The findings also underscore the necessity for specific policy and bespoke support in different rural areas, as they have faced various levels of CC impacts. For example, in Ca Mau – the furthest South province of Vietnam, where CC hit the hardest, local people have asked the authority to issue an urgent investment for infrastructure building to protect farming production in the face of fast-rising sea level that has been taking the land of local people. National and provincial agencies can amplify rural communities' adaptive capacity by funding reliable irrigation systems, refining market linkages among key players for diversified crops, and offering accessible local resources for trading. These action plans not only help rural communities to adapt better to climate vulnerability but also allow other partners to harness informal local resources. By recognizing and proactively

responding to the intense climate pressures that rural populations face, Vietnamese policymakers can ensure that frontline communities receive the material, technical, and institutional backing needed to safeguard their livelihoods and strengthen overall climate resilience. This would ultimately instigate stronger, more positive public engagement with CC issues, including the drive to seek and act according to CC-related news and information.

8.2.3.2 Implications for formal CC information providers

In an effort to address the above-mentioned barriers, an engaging communication system is a crucial factor to inform the Vietnamese public about CC adaptation and mitigation. However, the limitations of CC information from formal sources identified in the research indicate that these providers should invest in improving the quality, efficiency and effectiveness of their CC communication.

For climate news practitioners, instead of sending information that is shallow, irrelevant and exaggerating, they should report on climate issues with news and information that are directly relevant to people's lives, especially simple and clear text with everyday examples, practical implications and, where appropriate, take-home summaries and messages. These elements have been proved to appeal to audience attention and consolidate their positive sentiments toward climate news. Moreover, news with a clear explanation, accurate scientific and technological information and in parallel with policy and economic solutions, also contributes to positive experience with climate news. With them, the audiences are able to acknowledge the meaning of CC in their life and know what to do with the provided information. More importantly, increasing exposure to relevant information helps them to maintain and secure their interests and eagerness to search for climate news. Therefore, journalists and reporters should present evidence which has a local connection to their day-to-day living and working activities such as energy usage reduction, alternative renewable and clean energies change, meat-free meal consumption, electric cars, public transportation using,

etc. Writing a piece of scientific CC article in a friendly, familiar and easy-to-understand style also helps the audiences know how to use scientific evidence of CC remediation in their daily lives. Without relevant climate information, audiences are clueless on how to apply scientific evidence of CC remediation into their daily lives. The conclusion of CC news, that leaves audiences with open interpretation, might cause audiences to dismiss previously stated information.

For government officials, the research shows that they are not highly appreciated in the provision of CC information. It means that there is an urgent need to shift from a one-size-fits-all, top-down approach towards more locally responsive and participatory communication strategies. It is essential that the government enhances the quality and specificity of the information provided, such as detailed and actionable guidance on how to adapt to changing climate conditions, particularly in relation to agricultural practices and alternative livelihoods for rural residents. The time lag inherent in the impacts of CC, combined with economic concerns and political skepticism from the public, suggests that government's CC communication cannot be seen in isolation. Rather, it must be integrated into a comprehensive policy framework that addresses the multifaceted issues of CC. For example, the government should integrate its CC communication with clear demonstrations of the economic benefits associated with green technologies and renewable energy development. By linking CC policies with tangible economic incentives and support measures, the government can help to mitigate skepticism and build a more favorable climate for public engagement.

Further highlighted in the finding is the vital role of government bodies and officials as mediators of CC information from other sources to the rural areas in Vietnamese context. This implies that the government should continue to work closely with external players such as NGOs and the scientific community, not only to support them to send CC information to the public, but also to co-produce CC

communication materials that are tailored to the local context. From the finding, several participants highlight the role of commune representatives who know each family and are familiar with local realities. This type of local gatekeeping or “trusted messenger” can enhance message credibility and cultural fit in the local areas. If the government invests more in training these local leaders on communicating climate policies and adaptation, they can effectively translate top-down directives into actionable plans for local communities. By doing so, the government can enhance public trust in government’s CC communication, improve the relevance and depth of its messages, and ultimately foster a more informed and engaged residents who are capable of supporting robust climate policies. This, in turn, will be essential for mobilizing collective action from the public to meet the pressing challenges posed by CC in Vietnam.

For NGOs, the implications of these findings in the Vietnamese context are multifaceted. First, NGOs must reassess their campaign designs to move beyond short-lived projects. This could involve securing multi-year funding to support sustained capacity-building and long-term mentorship. Second, NGOs should strive to integrate their efforts more deeply with local community structures and governmental programs. By collaborating closely with local authorities and trusted community leaders, NGOs can embed their interventions into existing networks, ensuring continuity beyond the life of an isolated campaign. Vietnam’s centralized governance, while attempting to keep NGO activities under control, offers potential advantages: if NGOs collaborate more strategically with local authorities, especially at commune or district levels, they could embed their short-term campaigns into ongoing state-led programs. This would create an environment where successful NGO methods last longer than a single funding cycle. Aligning NGO campaigns with government timelines, rather than operating in isolation, may ensure continuity. Third, there is a need for a more balanced allocation of communication efforts across urban and rural areas. Tailoring campaigns to address urban-specific CC challenges, such as promoting green

infrastructure, energy efficiency, and sustainable transportation, could bridge the current knowledge gap and foster a more inclusive approach to climate adaptation nationwide.

For business, the study reveals that business-led CC communication in Vietnam is perceived to be predominantly profit-driven and designed to enhance market competitiveness and secure investment. This often manifests in short-term interventions, such as branded agrochemical advertisements, risky investment schemes, and conditional loans, all of which do little to foster genuine long-term climate resilience. The shallow communication not only inhibits behavioral change among the public but also reinforces skepticism toward climate initiatives. To address these challenges, the findings suggests a need for greater integration and alignment between Vietnamese business-led CC communication and broader societal efforts. Businesses should focus on communicating societal climate risks and their contributions to climate solutions, emphasizing technological innovations and shared responsibility in addressing climate consequences. In addition to acknowledge corporate role in addressing CC, Vietnamese business can shift focus toward their capacity to develop and deploy innovative solutions in CC mitigation. Examples around the world has shown that modern corporate campaigns often portray businesses as champions of sustainability. Such campaigns underscore the promising role of business-led communication in educating consumers, inspiring sustainable practices, and driving societal engagement. For Vietnam, the findings underscore the need for policy and regulatory measures that promote greater transparency and encourage businesses to invest in sustainable and long-term adaptive solutions. Policies that encourage transparency in corporate sustainability claims, along with stricter regulations to deter greenwashing, could help ensure that business communications contribute to long-term public engagement rather than merely serving short-term profit motives.

For scientists, the findings show that despite high credibility, their CC communication has certain functional limitations in time, space and cost, in addition to theoretical/practical barriers and imbalanced flow. These limitations highlight several imperatives for improving scientific CC communication in Vietnam. To overcome time limitations, scientists should design communication strategies that include recurring trainings and long-term support systems rather than one-off events. This could involve setting up local demonstration sites where adaptation technologies are continuously monitored and improved upon. Addressing spatial limitations requires a move toward localized strategies. Scientists should collaborate with local communities to modify generic recommendations so that they are suitable for specific environmental and cultural contexts. Furthermore, the development of region-specific guidelines would help ensure that adaptive practices are relevant and effective. Given the high costs associated with many scientific solutions, apart from constantly updating the scientific methods in the direction of reducing cost, there is a need for policies that subsidize adaptive technologies for rural residents. Financial support from government can make cutting-edge technologies more accessible to rural farmers, enabling them to invest in sustainable practices without incurring debt. Moreover, scientists should strive to use plain language and practical examples to simplify their communication. Moving away from dense technical jargon toward more accessible terminology can help bridge the gap between scientific research and public understanding. Additionally, adopting bottom-up communication, whereby conclusions and actionable recommendations come before supporting scientific details, could enhance comprehension and uptake.

This research has revealed the successful integration of scientific knowledge and lay expertise in CC adaptation and mitigation, enabling communities to design adaptive solutions that are both practically feasible and scientifically validated. The data has shown several examples of rural participants in Ca Mau and Soc Trang, who combine what they learn from scientists and their own knowledge to

sustain and develop their cultivation. Some examples are like the three-level fruit and seafood cultivation, or multi-orchard farming, rice-shrimp farming. There are several implications from this finding, showing that there should be continuous engagement between the two knowledge sources, by developing long-term programs that reinforce integrated adaptive practices over time and organizing regular training sessions and follow-up workshops to ensure the continuous updates and application of both lay and scientific knowledge. Finally, it is essential to address the urban-rural imbalance in scientific communication. Urban audiences, despite their exposure to diverse media sources, often lack direct engagement with scientists. Scientific communication strategies can be organized in a more informal way with information on climate adaptation strategies relevant to urban settings so that they can absorb the scientific knowledge easier. Further, adjusting communication efforts in urban areas, such as public lectures or partnerships with local community organizations, could improve urban public engagement; hence ensuring that all segments of society have access to reliable and actionable CC information.

8.3. Limitations

8.3.1. Theoretical limitations

Despite its significant contributions to understanding CC communication and public engagement in Vietnam, this study is not without theoretical limitations. One prominent limitation arises from the reliance on existing theoretical models, primarily developed in Western contexts, to interpret CC engagement in Vietnam. Although the study deliberately seeks to de-westernize the research approach by incorporating local perspectives and exploring the mutual relationship between lay expertise and scientific knowledge, the foundational frameworks still tend to prioritize cognitive, affective, and behavioral dimensions as delineated in the West (or Global North). These models may not fully capture the intricate socio-cultural, political, and economic nuances that shape CC engagement in a developing

country like Vietnam. This theoretical bias risks oversimplifying or even misrepresenting the diverse forms of engagement, might be inadequate to fully capture the complexity and context-specific dynamics of public engagement in a developing country, particularly the deep and experiential learning processes observed among rural populations.

Further, the study's theoretical approach, although enriched by multidimensional analysis (socio-economic, political, and moral), still does not fully account for the dynamic interplay between personal experience and socio-political context. For example, while the integration of lay and scientific knowledge emerged as a key theme, the study could not definitively elaborate pathways linking this integration to long-term behavioral change. Future research might develop more comprehensive theoretical models that prove the long-term application of this integration in combination with factors such as cultural norms and economic constraints.

The study attempts to distinguish the impact of various formal CC information sources on public engagement. Yet in the Vietnamese context, the boundaries between government, media, NGOs, and business communications are often blurred, and the government exerts influences over the CC communication efforts of other formal channels, both in terms of what kind of information is delivered and how it is delivered to the public. These factors may somewhat limit the theoretical contribution of this study, as the effects of individual sources cannot be easily isolated from each other. While the study provides valuable insights into the different influences of formal sources, the versatile influence of government sources suggest that further refinement of theoretical constructs is needed.

8.3.2 Methodological limitations

The methodological limitations of this research primarily stem from its qualitative design and the contextual specificity of its sample. First, while qualitative in-depth interviews enable rich, nuanced insights into Vietnamese public engagement with

CC and the impact of information sources, the relatively small sample size (47 participants) limits the generalizability of the findings. The insights gathered, although deeply contextualized, cannot be assumed to represent the broader Vietnamese population or other Global South contexts without caution. This challenge is common in qualitative research, where depth is prioritized over breadth, but it nonetheless restricts the study's external validity. In the context of this study, the issue of external validity is of critical importance, as many of the adaptive behaviors and information exchanges found among our Vietnamese communities are highly sporadic and context-dependent, thus lacking explanatory power for places where climate impacts rapidly evolve and require immediate and flexible responses.

Second, the reliance on purposive and snowball sampling, while effective in capturing diverse perspectives from both rural and urban areas, introduces potential selection bias. Participants were selected based on their relevance to the research questions and were often referred by initial contacts. Consequently, the sample may overrepresent individuals who are already more engaged or vocal about CC issues, particularly in rural settings where lay expertise is more pronounced. This selection process might inadvertently exclude less-engaged or harder-to-reach participants.

Another limitation is the potential for the researcher's subjectivity, which is inherent in qualitative research. Although the study employed both deductive and inductive thematic analysis to balance pre-existing theories with emergent insights, the interpretation of data is inevitably influenced by the researcher's perspectives. Efforts were made to enhance credibility through respondent validation; however, subjective interpretation remains a challenge. The repetitive process of coding and theme development may have led to selective emphasis on certain themes over others, possibly overlooking contradictory or less prominent viewpoints.

Logistical challenges also contributed to methodological limitations. Fieldwork was conducted during periods of COVID-19 lockdown, which extended the research timeline and increased costs. The necessity of face-to-face interviews, chosen to capture the emotional and experiential nuances of CC impacts, meant that travel restrictions and safety concerns potentially limited the frequency or diversity of interactions with participants.

8.4. Suggestions for future research

Future research in CC communication and public engagement should aim to deepen and broaden our understanding of the multi-layered dynamics that shape how different communities interact with climate information. One promising avenue is to conduct comparative studies across additional regions within Vietnam and other Global South countries. Such research could examine whether the rural–urban disparities observed in this study persist in regions with varying levels of economic development, cultural practices, and exposure to climate impacts. A comparative analysis would help to identify region-specific drivers and barriers to effective CC engagement and could contribute to the development of a more contextually sensitive framework for CC communication.

Another important area for further research is the integration of formal and informal information sources. Future work could focus on designing and testing intervention models that actively promote the co-production of knowledge in Vietnam. For instance, mixed-method research could investigate intensively and extensively on the combination of scientific knowledge with lay expertise influencing both individual and collective adaptation strategies over time. Such research can also evaluate the sustainability and long-term economic and climate outcomes of these integrated approaches.

Given the rapid evolution of communication technologies and social media, another promising direction is to explore the digital transformation of CC communication in Vietnam. Researchers should investigate how emerging digital

media platforms might affect public CC engagement in Vietnam and how those platforms help to bridge the gap between formal and top–down messages with the local and experiential knowledge within climate-affected communities. In particular, studies could analyse the role of online networks and citizen journalism in disseminating context-specific CC information and fostering peer-to-peer communication.

Furthermore, longitudinal and observational research can be adopted to capture the dynamic nature of both climate impacts and public engagement. A longitudinal study would allow researchers to track how shifts in climate patterns influence the local adaptation strategies and the ways in which people respond to various communication efforts over time. Such studies could also reveal whether the integration of lay expertise with scientific knowledge results in sustained behavioural change and improved resilience over long period of time. This temporal perspective is critical, as CC is a long-term challenge that requires adaptive strategies capable of evolving alongside climate variability.

Also, there is a need to examine the policy implications of the identified individual and structural barriers in Vietnamese context. Future research could focus on the effectiveness of Vietnamese governmental policies and influence in mitigating these barriers, assess how these policies interact with local cultural and economic contexts, and investigate how much macro-level interactions influence micro-individual engagement with climate change, including their CC information reception and action.

The opportunities to obtain a more nuanced understanding of how CC communication influences public engagement in Vietnam and similar contexts is endless. This will help policymakers, media practitioners, scientists, NGOs, business and community leaders – in Vietnam and other parts of the Global South – to develop communication strategies that inform and empower communities to build resilience in the face of an increasingly unpredictable climate.

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APPENDICES

Appendix 1. Questions used for in-depth interviews

Appendix 2. Notes from the interview field trips

Appendix 3. Codebook extracted from NVIVO

Appendix 4. Coding examples

Appendix 5. Participant information sheets

Appendix 6. Participant agreement sheets

Appendix 7. Ethics approval form

Appendix 1. Questions used for in-depth interviews

English version

Part 1: Climate change engagement

1. To what extent you concern about CC? and why?
2. To what extent you pay attention to CC?
3. To your knowledge, what is CC? and What are its impacts on human life?
4. What impacts does CC have to Vietnam generally and your daily life particularly?
5. To your knowledge, what are CC causes (naturally and anthropologically)?
6. To your knowledge, what are personal responsibilities in causing CC? Please state some examples.
7. To your knowledge, how necessary it is for Vietnam to deal with CC?
8. To your knowledge, what can we do to remediate the CC impacts? And what challenges do you meet when doing these activities?
9. Do you think Vietnam has actively engage in CC remediation activities? Why?
10. What are your personal actions to cope with CC?

Part 2: CC information and communication

11. In what ways CC should be communicated to improve awareness and encourage Vietnamese people to deal with CC?
12. CC information comes from different sources, including media, scientists, governments, NGOs, friends and family. Which source do you receive CC information from the most?
13. In your opinion, what is the role of Vietnamese media in providing CC information? What should they communicate to instigate your attraction and attention?
- 13a. How conflicting CC information between countries on Vietnamese media affect your belief and awareness on CC?

13b. Does CC information such as North Pole's melting icebergs and Amazon rainforest wildfire affect your local actions and awareness toward CC? Why?

14. In your opinion, what is the role of CC communication from governments in providing CC information for lay people? What should they communicate to instigate your attraction and attention?

14a. CC information from government often contains both CC pro- and anti-environment policies. How these information affect your CC awareness and actions? Why?

15. In your opinion, what is the role of CC communication from scientists in providing CC information for lay people? What should they communicate to instigate your attraction and attention?

15a. CC information from scientists often contains abstract and technical jargons. Do these information help you to understand CC better and change your behaviors? Why?

16. In your opinion, what is the role of CC communication from NGOs in providing CC information for lay people? What should they communicate to instigate your attraction and attention?

16a. NGOs often use its CC communication to introduce CC projects and actions with community and people. How these information affect your actions and awareness toward CC? Why?

16b. Also, NGOs cultivate their CC communication to attract financial support and investment for their CC campaigns. How these activities affect your actions and awareness toward CC? Why?

17. What is the role of CC information of people around you such as family, friends, colleague in your CC actions and awareness?

18. Among the mentioned-above CC information sources, which of them are the most effective and influential to the CC actions and awareness of Vietnamese people?

Vietnamese version:

Phần 1:

1. Anh/chị quan tâm đến BĐKH như thế nào? Và vì sao?
2. A/c theo dõi thông tin BĐKH sát sao đến mức nào?
3. Theo sự hiểu biết của anh/chị, BĐKH là gì? Và nó có tác động thế nào với đời sống con người?
4. A/c có nhận thấy biểu hiện hoặc ví dụ nào về tác động của BĐKH đến Việt Nam nói chung và cuộc sống của a/c nói riêng? Nó có liên quan như thế nào?
5. Theo a/c, nguyên nhân dẫn đến BĐKH là gì (về mặt tự nhiên và con người)?
6. Theo a/c, vai trò mỗi cá nhân trong việc gây ra hiện tượng BĐKH như thế nào? Xin kể rõ một số ví dụ.
7. Theo a/c, giải quyết BĐKH mang tính cấp thiết như thế nào đối với Việt Nam?
8. Theo a/c, chúng ta cần làm gì để giảm thiểu tác động BĐKH? Và để thực hiện các giải pháp đó thì gặp những trở ngại gì?
9. Theo anh/chị, Việt Nam đã tham gia tích cực vào việc giảm thiểu tác động BĐKH chưa? Vì sao?
10. Bản thân a/c đã làm gì để ứng phó với BĐKH?

Phần 2:

11. Theo a/c, thông tin BĐKH cần được truyền đạt thế nào để hiệu quả trong việc nâng cao nhận thức, cũng như vận động người Việt tham gia giải quyết BĐKH?
12. Thông tin BĐKH đến từ nhiều nguồn khác nhau, bao gồm báo chí, bạn bè người thân, giới khoa học, các cơ quan chính quyền, các tổ chức phi Chính phủ. A/c chủ yếu dựa vào những nguồn thông tin nào trong số đó?
13. Theo a/c, báo chí Việt Nam có vai trò thế nào trong việc đáp ứng nhu cầu thông tin BĐKH của cá nhân a/c? Và họ cần làm gì thêm để thu hút sự chú ý và hành động của a/c?

13a. Khi đọc những thông tin BĐKH quốc tế mang tính xung đột lợi ích giữa các quốc gia trên báo chí Việt Nam, điều này có tác động thế nào đến nhận thức và niềm tin của a/c về BĐKH?

13b. Những thông tin sự kiện thảm họa do BĐKH gây ra trên thế giới như băng tan ở Bắc Cực, cháy rừng Amazon có thay đổi nhận thức và hành động của a/c ở địa phương không? Tại sao?

14. Theo a/c, truyền thông BĐKH của cơ quan chính quyền có vai trò thế nào trong việc đáp ứng nhu cầu thông tin BĐKH của cá nhân a/c? Và họ cần làm gì thêm để thu hút sự chú ý và hành động của a/c?

14a. Truyền thông BĐKH của cơ quan chính quyền thường đề cập tới những chính sách liên quan đến môi trường và khí hậu, những thông tin này có tác động đến nhận thức và hành vi của a/c với BĐKH như thế nào?

15. Theo a/c, truyền thông BĐKH của giới khoa học có vai trò thế nào trong việc đáp ứng nhu cầu thông tin BĐKH của cá nhân a/c? Và họ cần làm gì thêm để thu hút sự chú ý và hành động của a/c?

15a. Thông tin BĐKH từ các nhà khoa học thường mang tính trừu tượng với các thuật ngữ chuyên ngành, điều này có giúp a/c nhận thức rõ hơn về BĐKH và thay đổi hành vi của mình không?

16. Theo a/c, truyền thông BĐKH của các tổ chức phi Chính phủ có vai trò thế nào trong việc đáp ứng nhu cầu thông tin BĐKH của cá nhân a/c? Và họ cần làm gì thêm để thu hút sự chú ý và hành động của a/c?

16a. Các tổ chức phi Chính phủ thường sử dụng truyền thông để giới thiệu về các dự án, hoạt động ứng phó BĐKH với cộng đồng và dân chúng, những thông tin như vậy có tác động thế nào đến nhận thức của a/c với BĐKH?

16b. Ngoài ra, các tổ chức phi Chính phủ cũng sử dụng truyền thông để kêu gọi và thu hút sự ủng hộ tài trợ từ bên ngoài cho những chiến dịch BĐKH của họ, điều này có ảnh hưởng đến niềm tin của a/c vào các tổ chức này không? Tại sao?

17. Theo a/c, thông tin BĐKH từ những người xung quanh có vai trò thế nào đối với nhu cầu thông tin BĐKH của cá nhân a/c?

18. Trong tất cả nguồn thông tin vừa nói tới, theo a/c nguồn nào có hiệu quả nhất trong việc ảnh hưởng tới nhận thức và hành động về BDKH của người Việt? Vì sao?

Appendix 2. Notes from the interview field trips

Two groups of information reception

Group 1 – Active information seekers

- Proactively engage with CC information.
- Readily share local data and resources.
- Heavily influenced by village “opinion leaders” (e.g., the abbot at the pagoda).
- Receive updates via agricultural-extension officers, commune information officers, Zalo groups, and village meetings.
- Scientific institutes introduce “nature-based” cultivation models through extension services, on-farm demonstrations, and hands-on workshops held on the field.
- Local authorities run extension classes, distribute leaflets, and host public meetings.
- Peer-to-peer communication within the community is vibrant. Farmers freely exchange effective adaptation techniques.
- NGOs and businesses pilot innovative projects that help residents cope with CC.

Group 2 – Low information exposure.

- Access little or fragmented information and may feel overwhelmed when too much is delivered at once, leading to selective filtering.
- Scientists often fail to situate findings in a local context or to communicate effectively with lay audiences.
- Scientists admit they used to “talk only among themselves,” leaving farmers baffled. They rarely cooperate with local media teams who translate technical messages into local dialects.
- Current outreach remains superficial; provincial and ministerial campaigns are often “movement-style” and short-lived.
- Residents need concrete, life-relevant information rather than abstract slogans.

Urban Residents

Urban dwellers receive CC messages from many sources but rarely alter daily routines, mainly because livelihoods seem less directly threatened. They know intense heatwaves, flash floods, land subsidence, and tidal surges across the Mekong Delta, but rarely experience first-hand.

Perceived impacts – Flooded streets damage vehicles and disrupt traffic; extreme heat affects health.

Self-reflection – Many recognise personal contributions to emissions (gas stoves, air conditioners, motorbikes) and try to adopt greener practices: saving electricity, reducing plastic, planting trees, and launching workplace “green office” initiatives, but feel difficult to perform.

Information landscape – Mass media is dominant. Scientific workshops invite experts, yet content is too technical and lacks vivid, month-by-month examples. Official documents are generic, and repetitive broadcasts prompt channel-switching. Leaflets often go unread. Residents prefer concise, compelling visuals or expert commentary on VTV1.

Communication gaps – Government’s CC communication are text-heavy and abstract. People need specific, practical guidance and case studies that link climate impacts to personal cost-benefit calculations. Direct household outreach is rare, so behaviour change remains limited.

Rural Communities

Awareness and impacts – Farmers understand that sea-level rise and salinity intrusion threaten rice and fisheries. They recognise erratic rainfall and attribute poor fruit yields to excessive rain. They link El Niño abroad with local climate anomalies but feel detached from distant causes.

Perceived drivers – Littering, open burning, resource extraction, and fossil-fuel use.

Adaptation actions – Shifting from traditional crops to agri-tourism; collecting plastic and waste oil for recycling; modelling environmentally friendly behaviour for neighbours.

Participation – Engaging in “Reduce Plastic Bags” campaigns, water-storage initiatives, and climate-adaptation workshops.

Information channels – Cooperative societies invite experts. Residents attend village forums with journalists and scientists. Climate education is delivered “from the bottom up,” starting with simple habits like waste sorting.

- Researchers increasingly collaborate with journalists so their results are conveyed in clear, relatable language.
- Radio loudspeakers and community PA systems still broadcast climate-related news.

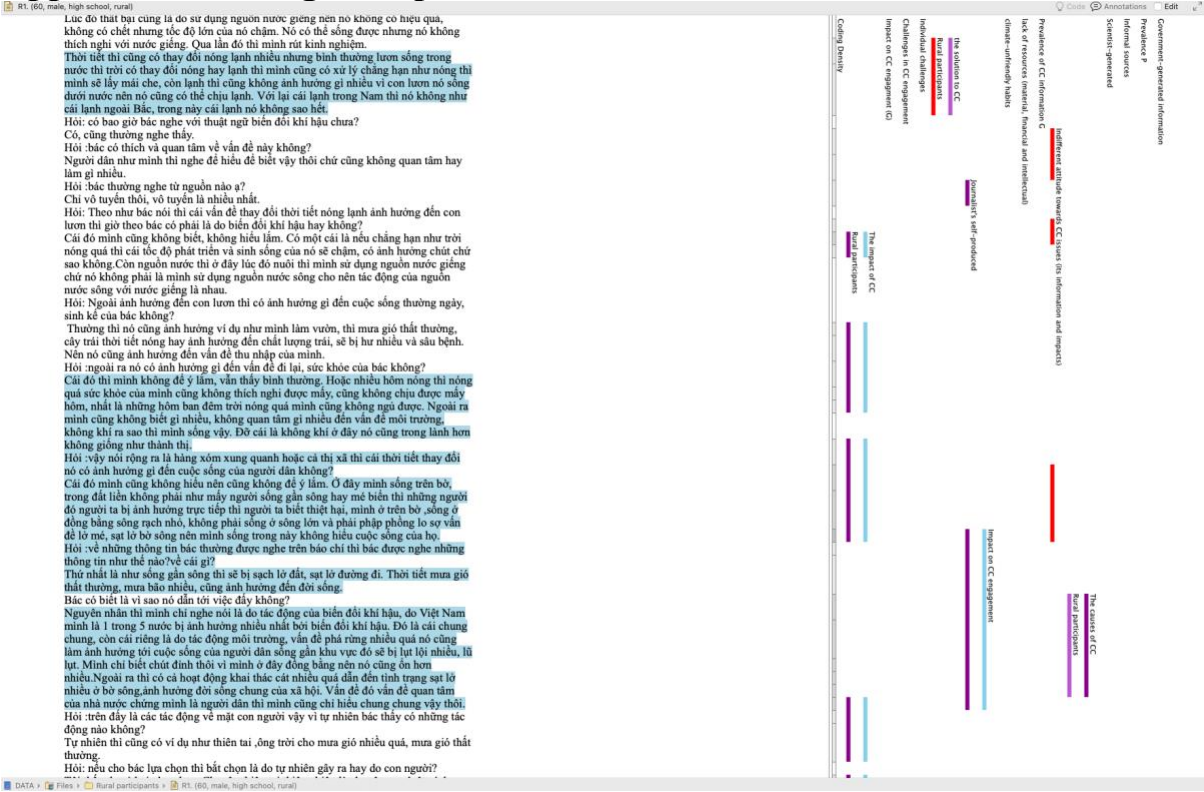
Local people in rural areas possess a sound awareness of CC. They rely heavily on indigenous knowledge – monitoring tides, observing vegetation, and reading the sky – to adapt their livelihoods. Because comprehensive information and official adaptation guidance from government and scientific sources remain limited, communities depend primarily on experiential knowledge. This enables them to react quickly to shifting weather patterns, but it leaves long-term livelihood strategies uncertain. These farmers once cultivated rice, but harsher weather and climate-change-driven salinity intrusion have prompted them to switch to shrimp monoculture or integrated rice–shrimp systems. All three now rely chiefly on experiential and indigenous knowledge

They consider scientific recommendations remote from local realities, prohibitively expensive, and unsettling. Fear of failure reinforces their reluctance to adopt “scientific” approaches. Some farmers initially heeded scientific advice when setting up their new operations, but soon reverted to their own experience. They explained that fully following scientific prescriptions would be too costly, yield limited gains, and prove ill-suited to their specific circumstances.

Appendix 3. Codebook extracted from NVIVO

Name	Files	References
▼ CC information sources	0	0
▼ Formal sources	0	0
▼ Gov bodies	0	0
Impact on CC engagement (G)	27	76
Prevalence of CC information G	31	73
Type of information G	24	66
▼ Media	0	0
Government-generated information	2	5
> Journalist's self-produced	29	111
Scientist-generated	8	16
NGOs and businesses	12	22
> Scientists	18	44
▼ Informal sources	38	248
combination of lay knowledge and scientist's knowledge	20	105
> Impact on engagement	29	111
Prevalence P	13	20
Type of information P	7	7
▼ Public CC engagement	0	0
▼ Challenges in CC engagement	34	96
> Individual challenges	20	41
Organizational challenges	22	55
> The causes of CC	25	47
> The impact of CC	37	100
> the solution to CC	21	42

Appendix 4. Coding examples



An example of coding density

Appendix 5. Participant information sheets



Participant Information Sheet

The title of the research project

Public engagement with climate change messages in Vietnam: mainstream versus social media

Invitation to take part

My name is Duong Quoc Bao, PhD student at Media and Communication Faculty at Bournemouth University, United Kingdom. I am also a lecturer at International Relation Faculty at Academy of Journalism and Communication, Hanoi, Vietnam. I am composing this invitation to invite you to take part in my research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the project?

The research is trying to find how the use of mainstream (radio, television, newspaper, online newspapers) and social media (blogs, Twitters, Facebook, YouTube, etc.) related to Vietnamese public engagement in climate change issues. From this, the researcher can understand in what ways climate change information could be effectively presented on the media to help the lay public to engage more in climate change issues. Finally, compelling climate programs could be executed.

Why have I been chosen?

You will be selected from population data of local governmental agencies on population management. This research chooses the most affected areas by climate change in Vietnam that is why as a citizen living in this area you are selected as a participant of the research. There are a total of 6 focus groups (6

persons per group) divided equally in three age groups in one urban and rural area. The inclusion/exclusion criteria are:

- Ages (18-30, 31-45, 46+)
- Location (Rural and urban area)
- Jobs (No environmental officers, scientists, activists and journalists)

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a participant agreement form. You can withdraw from participation during the focus groups at any time and without giving a reason. If you decide to withdraw, I will usually remove any data collected about you from the study. Once the data collection activities have finished you may still be able to withdraw your data, up to the point where the data is analysed and incorporated into the research findings or outputs. At this point, your data will usually become anonymous, so your identity cannot be determined. It may not be possible to identify your data within the anonymous dataset. Withdrawing your data at this point may also adversely affect the validity and integrity of the research.

What would taking part involve?

You will only have to attend a one hour interviewing session for one time. Travel fee will be available for all participants, around £1 (equivalent to 30,000 VND). Interview questions intend to seek for information in the public use of mainstream and social media, their engagement in climate change. Interview questions are open-ended questions so to achieve information from all participants. The focus groups attempt to promote active discussion among participants, therefore, you are encouraged to discuss, debate, and exchange ideas about the research topic. You are invited to provide as many as opinions and ideas as you wish. For the smoothness of the interview sessions as well as safety for other participants, you should not use alcoholic beverage and stimulant before and during the interview sessions.

What are the advantages and possible disadvantages or risks of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will provide detailed information on how

people use the media and what people have done and haven't done to climate change issues. Based on the information, government, NGOs or other environmental organizations can launch effective communication campaigns on climate change to facilitate pro-environmental actions from general society, and thus contributing to greener and cleaner environment for future generation.

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

This research pays its attention to the relationship between media use and public engagement in climate change in Vietnam. Thus, the expected information to extract from you is those on the use of mainstream and social media for climate change information (that is to say what sources you receive climate change information from, how often do you receive the information from these sources, how do you evaluate information on these sources) and your engagement in climate change issues.

Will I be recorded, and how will the recorded media be used?

The focus group sessions will be audio recorded. However, the audio recordings of your activities made during this research will be carefully managed and be used only for analysis and the transcription of the recording(s) for research findings. The recording will be permanently deleted after the research finish. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings.

How will my information be kept?

All the information I collect about you during the course of the research will be kept strictly in accordance with current data protection legislation. Bournemouth University (BU) is a Data Controller of your information which means that she is responsible for looking after your information and using it appropriately. BU's Research Participant Privacy Notice sets out more information about how she fulfils her responsibilities as a data controller and about your rights as an individual under the data protection legislation. I ask you to read this [Notice](#) so that you can fully understand the basis on which Bournemouth University will process your information.

Publication

You will not be able to be identified in any external reports or publications about the research without your specific consent. Otherwise your information will only be included in these materials in an anonymous form, i.e. you will not be identifiable.

Security and access controls

BU will hold the information I collect about you on H drive - a BU password protected secure network where held electronically. Personal data on the hard copy of participant agreement forms will be stored in a lockable cabinet in a secure place, Bournemouth University.

Except where it has been anonymised, your personal information will be accessed and used only by appropriate, authorised individuals and when this is necessary for the purposes of the research or another purpose identified in the Privacy Notice. This may include giving access to BU staff or others responsible for monitoring and/or audit of the study, who need to ensure that the research is complying with applicable regulations.

Sharing and further use of your personal information

The information collected about you may be used in an anonymous form to support other research projects in the future and access to it in this form will not be restricted. It will not be possible for you to be identified from this data.

Retention of your data

All personal data collected for the purposes of this study will be deleted permanently from the date of publication of the research or presentation of the results to the University. Although published research outputs are anonymised, I need to retain underlying data collected for the study in a non-anonymised form for a certain period to enable the research to be audited and/or to enable the research findings to be verified.

Contact for further information

If you have any questions or would like further information, please contact to the project's researcher Duong Quoc Bao, PhD student in Bournemouth University, email: gduong@bournemouth.ac.uk.

In case of complaints

Any concerns about the study should be emailed directly to researchgovernance@bournemouth.ac.uk.

Finally

If you decide to take part, you will be given a copy of the information sheet and a signed participant agreement form to keep.

Thank you for considering taking part in this research project.

Appendix 6. Participant agreement sheets



Participant Agreement Form

Full title of project: Public engagement with climate change messages in Vietnam: mainstream versus social media

Name, position and contact details of researcher: Duong Quoc Bao, PhD student at Media and Communication Faculty, Bournemouth University. Email: qduong@bournemouth.ac.uk

PART A

In this Form we ask you to confirm whether you agree to take part in the Project. We may ask you to agree to some specific additional uses of your identifiable information for which we need your consent.

You should only agree to take part in the Project if you understand what this will mean for you. If you complete the rest of this Form, you will be confirming to us that:

- You have read and understood the Project Participant Information Sheet and have been given access the BU Research Participant [Privacy Notice](https://www1.bournemouth.ac.uk/about/governance/access-information/data-protection-privacy) which sets out how we collect and use personal information
(<https://www1.bournemouth.ac.uk/about/governance/access-information/data-protection-privacy>)
- You have had the opportunity to ask questions;
- You understand that:
 - ☐ Taking part in the research will include being recorded (audio) on the basis that these audio recordings will be deleted once transcribed
 - ☐ Your participation is voluntary. You can stop participating in research activities at any time without giving a reason, and you are free to decline to answer any particular question(s).
 - ☐ If you withdraw from participating in the Project, you may not always be able to withdraw all of your data from further use within the Project, particularly once we have anonymised your data and we can no longer identify you.
 - ☐ Data you provide may be included in an anonymised form within a dataset to be archived at BU's Online Research Data Repository.
 - ☐ Data you provide may be used in an anonymised form by the research team to support other research projects in the future, including future publications, reports or presentations.

<i>Consent to take part in the Project</i>	<i>Yes</i>	<i>No</i>
I agree to take part in the Project on the basis set out above	☐	☐

PART B Signature

Name of Participant

Date

Signature

Name of Researcher

Date

Signature

This Form should be signed and dated by all parties after the participant receives a copy of the participant information sheet and any other written information provided to the participants. A copy of the signed and dated participant agreement form should be kept with the project's main documents which must be kept in a secure location.

Appendix 7. Ethics approval form

About Your Checklist

Reference Id	17185
Status	Approved
Date Approved	15/01/2019 08:37:17
Date Submitted	01/01/2019 21:54:20

Researcher Details

Name	Quoc Bao Duong
Faculty	Faculty of Media & Communication
Status	Postgraduate Research (MRes, MPhil, PhD, DProf, EngD, EdD)
Course	Postgraduate Research - Media
Have you received external funding to support this research project?	No

Project Details

Title	Public engagement with climate change messages in Vietnam: mainstream versus social media
Start Date of Project	02/05/2017
End Date of Project	02/05/2021
Proposed Start Date of Data Collection	30/01/2018
Original Supervisor	An Nguyen
Approver	Research Ethics Panel

Summary - no more than 500 words (including detail on background methodology, sample, outcomes, etc.)

The study's focus on analyzing the relationship between the public climate change engagement (i.e. perceptions, attitudes, and behaviors) and their use and involvement in climate change messages on traditional and social media. The research utilizes focus groups and survey questionnaire for data collection. For the first part of data collection, the researcher will conduct a series of six focus groups (6 persons per group) in Can Tho City as it is one of the most vulnerable provinces to climate change in Mekong Delta River area and experiences environmental phenomena that are believed to be exacerbated by climate change. The interviewees will be selected and categorized by age groups (18-30, 31-45, and 46 plus). Each age group will be assigned two focus groups sessions in one urban and rural area, respectively. The second part of the data collection is the quantitative survey questionnaires among a representative sample of the population from three sampled cities across the countries, which are Quang Ninh, Da Nang and Can Tho. These cities will be purposively selected according to climate change and sea level rise data from the Vietnam Institute of Meteorology, Hydrology and Climate change. The survey questionnaire will be sent out for 600 respondents residing in six urban and rural areas divided equally for

Climate change. The survey questionnaire will be sent out for 600 respondents residing in six urban and rural areas divided equally for three cities. The reason for this is to avoid unbalance sampling between rural and urban areas. The researcher intends to seek collaboration with relevant local government agencies and NGOs (e.g., Mekong Delta Environment Forum, Vietnamese Forum for Environmental Journalists) in the collection of the focus group and survey data. The expected research outputs include the use and acknowledgement of climate change information on mainstream and social media (that is to say, which media platforms, channels and sources do the lay public receive climate change information from, how frequency do they achieve the information from these sources and channels, their perceived importance of each sources and channels). Secondly, it endeavors to analyse the public evaluation on climate change information from these sources and channels. And third, it investigates public engagement in climate change in terms of

politics, socio-economy, moral-ethics and individual.

Human Participants

Participants

Describe the number of participants and specify any inclusion/exclusion criteria to used

- Focus groups: 36 participants constitute six focus groups (6 persons/ a group) in one urban and rural area in a city- Survey questionnaires: 600 participants will be sampled in six urban and rural areas divided equally into three cities.- Stratifying criteria are ages groups (18-30, 31-45, and 46 plus), locations (rural and urban areas) and professions. Environmental activists, scientists, and journalists are excluded from the survey.

Are your participants considered vulnerable?

No

Is a Disclosure and Barring Service (DBS) check Required?

No

Recruitment

Please describe how participants will be identified, approached and recruited. Include details of any relationship between researcher(s) and participant(s), e.g. teacher-student

Focus groups: Participants for each age group will be identified through population data from local government. A governmental officer will accompany me to meet the participants at their doors. Recruitment methods are via phones. Survey questionnaire: Population data from local government will be used to randomly select participants. The questionnaire will be delivered to participants in a face-to-face context with the presence of the government officer. Recruitment methods are via phones.

Data Collection Activity

Will the research involve the completion of a questionnaire/survey? If yes, don't forget to attach a copy of the questionnaire/survey or sample of questions.	Yes
How do you intend to distribute the questionnaire?	
face to face	
Will the research involve interviews and/or focus groups? If yes, don't forget to attach a copy of the interview/focus group questions or sample of questions.	Yes
Will the research involve the collection of audio materials?	Yes
Will the audio recordings be used solely for the purposes of producing an anonymised transcript/summary and then deleted and will not be used in any outputs or made publicly available?	Yes
Will your research involve the collection of photographic materials which will identify a participant?	No
Will your research involve the collection of video materials?	No
Will the study involve discussions of sensitive topics (e.g. sexual activity, drug use, criminal activity)?	No

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Will any drugs, placebos or other substances (e.g. food substances, vitamins) be administered to the participants?	No
Will the study involve invasive, intrusive or potential harmful procedures of any kind?	No
Could your research induce psychological stress or anxiety, cause harm or have negative consequences for the participants or researchers (beyond the risks encountered in normal life)?	No
Will your research involve prolonged or repetitive testing?	No

Consent

Describe the process that you will be using to obtain valid consent. If consent is not to be obtained explain why	
Potential participants will initially be approached for consent at their door. All agreed participants will then be provided with a participant information sheet to read and a consent form to sign before any interview is taken.	
If participants are minors or for other reasons are not competent to consent, describe the proposed alternative source of consent	
Not applicable	
Will it be necessary for participants to take part in your study without their knowledge and consent?	No

Participant Withdrawal

Describe how the participants will be informed of their right to withdraw from the study	Focus group: Participants can withdraw until their data is analyzed, anonymized, incorporated into the research findings, and published. In case of halfway withdraw, I can still include what they said up to the point leaving as it is hard to edit out their voices while dialoguing with others. Survey questionnaire: Respondents can withdraw at any time until the dataset analysis. Once the analysis starts it would be difficult, if not possible, to remove their data from the rest of the dataset.
Explain what will be done with the participants' data if they withdraw	If participants decide to withdraw their data at the point of during or after the data collection activities are finished, their data will be removed from the study and cannot be retained for any purpose or purposes. Their data is refrained from using for future research.

Participant Compensation

Will participants receive Financial compensation (or course credits) for their participation?	Yes
Please provide details	
For focus group: Travel expense will be available for all participants.	
Will financial or other inducements (other than reasonable expenses) be offered to participants?	Yes
Please provide details	
Focus group: Each participant also receives a gift worth £1 (equivalent to VND 30,000) as a compensation of their time and effort. Survey questionnaire: Each respondent of a questionnaire will receive 1£ in cash for their help.	
If participants choose to withdraw, how will you deal with compensation?	
All of the compensation will be given at the data collection days. If they choose to withdraw their data later, no action will be taken to recover the initial payment as they would have spent their time on the research activities.	

Personal Data

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Will identifiable personal information be collected, i.e. data which identifies or could enable identification of the research participant?	Yes
Please give details of the types of information to be collected, e.g. personal characteristics, education, work role, opinions or experiences	
The types of information are names, ages, gender, education, location, and occupations.	
Will the personal data collected include any special category data, or any information about actual or alleged criminal activity or criminal convictions which are not already in the public domain?	No
Have you considered and addressed the need for 'data minimisation' in your use of personal data for the study?	Yes

Have you considered and addressed the need for 'data minimisation' in your use of personal data for the study?	Yes
Please give brief details of how you will address the need for data minimisation	
The research focuses only on the lay public's engagement in climate change issues in relation to their uses of media. Therefore, it only recruits a necessary number of participants which are 36 for focus groups and 600 for the survey. There is no sensitive information, except for name, age, gender, education, location (urban and rural areas) and occupation (no environmental scientists, activists, journalists).	
Will the data be anonymised at some stage during the study?	Yes

Storage, Access and Disposal of Personal Data

During the study, what personal data will be stored and where?	Participants' personal data on names, ages, locations, and occupations will be stored electronically in staff H drive secured by BU and logged in with staff credentials. Personal data on the hard copy of participant agreement forms will be stored in a lockable cabinet in TAG 20, Tolpuddle Annex 2, Talbot Campus, Bournemouth University. Once the study has completed, the anonymized data will be electronically stored on the BORDaR. There is no personal data in survey questionnaires.
How long will the data be stored?	The personal data in the H drive and in hard copy forms will be deleted from the date of research publication or from the result presentation to the University. Only anonymized data will be stored on the Bournemouth Online Research Data Repository.
During the study, who will have access to the data?	People who can access to the personal data are the project's researcher and members of his supervisory team.
After the study has finished, what personal data will be stored and where?	After the conclusion of the study, participants' personal data on names, ages, locations, and occupations in the H drive and in hard copy forms will be deleted permanently.
After the study has finished, how long will personal data be stored?	After the conclusion of the study, participants' personal data on names, ages, locations, and occupations in the H drive and in hard copy forms will be deleted permanently.
After the study has finished, who will have access to the personal data?	After the study has finished, all personal data in the H drive and in hard copy forms will be permanently deleted. No one will have the access to personal data by then.
Will any identifiable participant data be transferred outside of the European Economic Area (EEA)?	No
How and When will the data be deleted/destroyed?	All of the identifiable personal data in the H drive and in hard copy forms will be deleted and disposed of permanently after the finalization of study.
Will any data be stored on the BU's Data Repository "BORDaR"?	Yes

Risk Assessment

Have you undertaken an appropriate Risk Assessment?	Yes

Research Data

Additional Details	
Please describe the data, its source and how you are permitted to use it	The research data covers the public use of mainstream and social media for climate change messages, news, and information, together with data from the public engagement in climate change issues. Those data is originating from interviews and survey questionnaire on lay people. All of the anonymous analyzed data can be used for future conferences and publications.

Research Outside the UK

Additional Details	
What country will your research take place in?	Vietnam
Does the country in which you are conducting research require that you obtain internal ethical approval (other than BU ethical approval)?	No

Attached documents
Sample questions.docx - attached on 03/12/2018 16:25:47
confirmation of gatekeepers.pdf - attached on 03/12/2018 16:25:51
Revised - Participant Agreement Form focus group.docx - attached on 27/12/2018 14:36:26
Revised - Participant Agreement Form survey questionnaire.docx - attached on 27/12/2018 14:36:34
Revised - Participant Information Sheet for Focus groups.docx - attached on 27/12/2018 14:36:41
Revised - Participant Information Sheet Template for Questionnaires.docx - attached on 27/12/2018 14:36:48
Track changed - Participant Agreement Form focus group.docx - attached on 27/12/2018 14:36:52
Track changed - Participant Agreement Form survey questionnaire.docx - attached on 27/12/2018 14:36:58
Track changed - Participant Information Sheet for Focus groups.docx - attached on 27/12/2018 14:37:04
Track changed - Participant Information Sheet Template for Questionnaires.docx - attached on 27/12/2018 14:37:09
Vietnamese - Participant Agreement Form focus group.docx - attached on 27/12/2018 14:37:14
Vietnamese - Participant Agreement Form survey questionnaire.docx - attached on 27/12/2018 14:37:18
Vietnamese - Participant Information Sheet Template focus group.docx - attached on 27/12/2018 14:37:23
Vietnamese - Participant Information Sheet Template for Questionnaires.docx - attached on 27/12/2018 14:37:28