Climate Finance

Handbook to

The Thai Parliament

The United Nations Development Programme (UNDP) collaborates with individuals and communities at all levels of society to assist nations in effectively responding to crises, driving and promoting sustainable growth, and ultimately improving the quality of life for all. With a presence in over 170 countries and border areas, the UNDP aims to provide a comprehensive understanding of global perspectives and local context insights in order to empower individuals and support nations in addressing a wide range of diverse challenges.

Author: Asst. Prof. Dr. Areeya Obidiegwu, Kasetsart University

Technical Support:

Technical support was provided by the United Nations Development Programme (UNDP) under the Governance of Climate Change Finance (GCCF), and a support project that facilitates the implementation of country-specific contributions to address climate change beyond the year 2020: The NDC Support Project: Delivering Sustainability through Climate Finance Actions in Thailand.

Financial Support:

The handbook was completed and published with the financial support of the Swedish International Development Cooperation Agency (Sida) under the Governance of Climate Change Project. The launch and translation of the handbook from Thai to English in 2024 has been supported by the UK's Foreign Commonwealth and Development Office under the Climate Finance Network Program.

Acknowledgements

The Thai Parliament has consistently played an active role in driving the country towards achieving the Sustainable Development Goals. It fulfills the mission through the core objectives and the mechanisms employed by various committees, primarily focusing on the development and improvement of the laws related to sustainable development. The Thai Parliament also prioritizes budget proposal considerations, monitoring and inspecting the administration of governmental affairs, and ensuring the effective utilization of the funds allocated to meet its objectives. In addition, the Thai Parliament works as the representative of the people by advocating for their interests. The Secretariat of the House of Representatives signed a Memorandum of Understanding (MOU) with the United Nations Development Programme (UNDP) on 17th August, 2020. This collaboration aims to strengthen awareness, knowledge-building, and capacity-building among parliamentary officials, equipping them to actively support the Members of Parliament's missions to implement the SDGs and achieve the 2030 Agenda for Sustainable Development.

Coping with climate change according to Sustainable Development Goal 13 is one of the issues that the Thai Parliament has highly prioritized because Thailand is one of the countries most affected by the global climate change. Thailand has set greenhouse gas reduction targets under the Nationally Determined Contributions (NDC), with the goal of reducing Greenhouse Gas (GHG) emissions. By 2030, there is a target to reduce greenhouse gas emissions by 20% compared to the business-as-usual (BAU) scenario. It is possible that this reduction could reach 25% depending on factors such as the quality of and adequate access to development, technology transfer, funding, and better and sufficient capacity-building support. At the COP 26 World Leaders Summit, General Prayut Chan-o-cha, the Prime Minister of Thailand, emphasized the country's commitment to addressing regional climate challenges comprehensively. He stated that “Thailand aims to achieve Carbon Neutrality by 2050 and Net Zero greenhouse gas emissions by or before 2065”. Achieving these ambitious targets requires collaboration and concerted effort from all sectors of society. It is imperative to drive collective action and work together towards sustainable solutions to combat climate change.

The Thai Parliament has adopted the Sufficiency Economy Philosophy of His Majesty King Bhumibol Adulyadej the Great as the guiding principle for sustainable environmental management within the Legislature. This philosophy emphasizes the importance of using resources in a moderate, reasonable, and prudent manner to ensure their long-term sustainability. The Thai Parliament is making great efforts toward becoming a Green Parliament. The focus of the effort lies in maintaining cleanliness, conserving energy, and preserving a healthy environment. Additionally, waste management is highly prioritized, ensuring that occupational health principles are strictly adhered to, and effective practices are consistently and rigorously implemented. In the international parliamentary arena, the Thai Parliament hosted the Asia Pacific Parliamentary Forum (APPF) held from Monday 26th to Thursday 29th October, 2022, that focuses on “The role of parliaments in accelerating sustainable development post COVID-19”. It is another important forum where parliaments from over 28 countries in Asia and the Pacific will come together to collectively reflect on the issues faced by the people of each country in the context of the challenges posed by the global pandemic that the world is currently facing.
This forum particularly emphasizes coping, adapting, and recovering from the crisis of climate change.

This Climate Finance Handbook to the Thai Parliament is designed to support the work of the members of the Thai Parliament in addressing climate change by providing a comprehensive understanding of the Climate Finance mechanisms available to combat climate change. It also serves as a practical guide for parliamentary staff in mobilizing and utilizing these mechanisms. The handbook aims to drive concrete climate action in Thailand through successful climate finance initiatives with the ultimate goal to assist the Thai Parliament in raising the level of climate action and ensuring that Thailand can effectively respond to climate-related crises domestically and internationally.

Mrs. Pornpiss Pecharoen
Secretary-General of the House of Representatives

Prologue

The world is currently facing a climate emergency, with climate change significantly impacting the economies, livelihoods, water resources, energy systems, transportation, agriculture, and ecosystems to an unprecedented extent.

According to the Germanwatch Global Climate Risk Index 2020 published by Germanwatch, Thailand ranks 8th among the countries most affected by extreme weather events between 1999 and 2018. The estimated cost of damage during this period exceeds 7.764 billion US dollars (234.6 billion baht). Moreover, prolonged droughts and unpredictable storms linked to climate change could result in damage in Thailand exceeding 300 to 420 million US dollars (9.8 to 13.9 billion baht). Additionally, major crops could experience yield losses of up to 15% by 2050. Although Thailand's contribution to global greenhouse gas emissions is less than 1%, the country still ranked in 2016 as the 20th highest global greenhouse gas emitter, according to the World Resources Institute's Climate Analysis Indicator Tool (CAIT).

The climate emergency was further exacerbated by the COVID-19 pandemic, leading to severe economic and social impacts that have deepened the inequalities between genders and socioeconomic groups. Vulnerable populations, including the poor, are disproportionately affected by both the climate change and COVID-19 crises. Addressing the challenges posed by the COVID-19 pandemic and the climate emergency requires a whole-of-society approach, including all sectors. It necessitates collective effort and solidarity to shift from the "business-as-usual" mindset and behavior to an inclusive approach that leaves no one behind.

The United Nations Development Programme (UNDP) is the United Nations (UN) agency that provides long-term support to countries in scaling up climate change solutions and fostering comprehensive climate action. The Nationally Determined Contribution (NDC) serves as a vital mechanism in assisting countries to fulfill the commitments encompassed in both the Paris Agreement and the United Nations Framework Convention on Climate Change (UNFCCC) comprehensively and inclusively. To support countries in enhancing their ambitious NDCs, the UNDP has launched the Climate Promise Initiative, assisting 120 countries worldwide, including Thailand, to improve their NDCs. This initiative is carried out in collaboration with Thailand's Office of Natural Resources and Environmental Policy and Planning (ONEP).

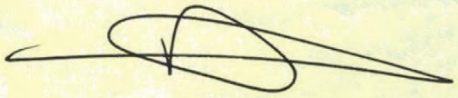
The UNDP is currently implementing projects to support country-led initiatives on climate change after 2020: the NDC Support which aims to strengthen the reform of climate finance in Thailand in order to achieve the NDC goals and promote the gender equality to support the national strategies of the Thai Government on climate change and sustainable development.

Concurrently, the UNDP actively supports parliaments, legislators, and citizen groups in aligning their commitment to implement the Sustainable Development Goals (SDGs) on the largest global scale by engaging with more than 60 nations, including Thailand, for collaborative effort.

From the awareness of the role and importance of parliament within the overall government's responsibility framework towards the citizens, including legislation, budget allocation, supervision of public spending, as well as supporting the acceleration of the operations and policy changes. The Climate Finance Handbook to the Thai Parliament was developed through close consultations with the parliamentary officials with an objective to support the work of the members of the House of Representatives, Senate, and the parliamentary officials involved in climate finance to become more efficient and effective.

This handbook, consists of three chapters. Chapter 1 provides an overview of the handbook's purpose, scope, and an explanation of the climate change context in Thailand. Chapter 2 examines the key concepts related to the climate change financing mechanisms. Chapter 3 clarifies the role of the Thai Parliament in relation to these mechanisms and covers various aspects such as lawmaking, governance, budgeting processes, and sectoral participation, drawing upon international experiences to provide practical insights for the Thai Parliament.

The UNDP firmly believes that this handbook will be instrumental in supporting the Thai Parliament's efforts to promote achievement of the Sustainable Development Goals by directly supporting climate action and leveraging its climate change agenda, which is of utmost importance.



Mr. Renaud Mayer
Representative of the United Nations Development Programme (UNDP) in Thailand

Table of Contents

Lists of Figures

Lists of Tables

13 Climate Change Coping Strategies

Prologue

1

1.1 Objectives and Scope of the Handbook

This manual is prepared to support the work of members of the House of Representatives and the Senate, as well as the officials of the Parliament who are involved in mechanisms related to climate finance, in order to integrate the aforementioned issues into each role of the Parliament. These roles include legal aspects, oversight, processes related to budgeting, and the involvement of various sectors to enhance the efficiency and effectiveness of Parliament's operations.

For the concerning roles related to the budgeting process, the objective of this Handbook is to enhance the capabilities of the Parliament members and relevant personnel in the consideration, screening, and review of the annual budget to address climate change issues, which includes the investments in mitigation that the government must achieve the set targets to respond to the country's sustainable development, and the investments in adaptation to short-and long-term impacts, considering the inequality of the dimensions of gender and vulnerable groups.

This section summarizes the physical and socio-economic impacts of climate change in Thailand from the reports of the agencies working on climate change, within the context related to the country's sustainable development approaches.

1.1 Definition of climate change-related terms

- **Climate change** refers to alterations in the climate resulting directly or indirectly from human activities that have impacted the composition of the atmosphere. These changes have modified the normal average weather pattern, including temperature, precipitation, and wind, as defined by the United Nations Framework Convention on Climate Change (UNFCCC).
- **Climate change adaptation** refers to adjustments made in natural or human systems in response to current or expected climate stimuli and their effect. These adjustments aim to mitigate the potential risks and damage associated, or take advantage of opportunities that arise from such stimuli or their effect. This definition aligns with the Intergovernmental Panel on Climate Change (IPCC).
- **Vulnerability** refers to the state of being susceptible to any adverse impact from climate change. It encompasses three key components: 1) **Sensitivity:** The degree to which a system or population is affected by climate stimuli; 2) **Exposure:** The degree of concentration of hazards or climate variability factors that a system or population is exposed to, and 3) **Adaptive Capacity:** The ability of systems, institutions, people, and other living beings to modify their behavior or way of life to reduce the potential for damage, take advantage of new opportunities, and respond to new challenges.
- **Resilience** refers to the potential of the social, economic, and environmental systems to cope with harmful events, trends, or disturbances. It is the ability of a system to respond or reorganize while maintaining its essential structure, identity, and function, while at the same time retaining the potential to adapt, learn, and transform.

Source: Office of Natural Resources and Environmental Policy and Planning, 2020

1.2 Context of Thailand

1.2.1 Greenhouse Gas Emissions in Thailand

According to Thailand's Third Biennial Update Report, the country emitted 354,357.61 thousand tons of carbon dioxide equivalent (tCO2e) in 2016 (Office of Natural Resources and Environmental Policy and Planning, 2020). After deducting the amount of greenhouse gasses that can be absorbed or sequestered (91,134.15 tCO2e), the net greenhouse gas emissions were 263,223.46 tCO2e. This represents an average annual increase of 2.27% in net emissions (Figure 1.1).

The energy sector is the largest source of greenhouse gas emissions, accounting for 71.65% in 2016. Since 2013, the agricultural sector has shown a downward trend in both the amount and proportion of greenhouse gas emissions. In 2016, it accounted for 14.72% of the emissions. The industrial processes and product use (IPPU) sector has shown an increasing trend in greenhouse gas emissions. However, its proportion compared to other sectors is relatively constant. In 2016, the IPPU sector accounted for 8.9% and 4.7% respectively of the emissions (Figure 1.2).

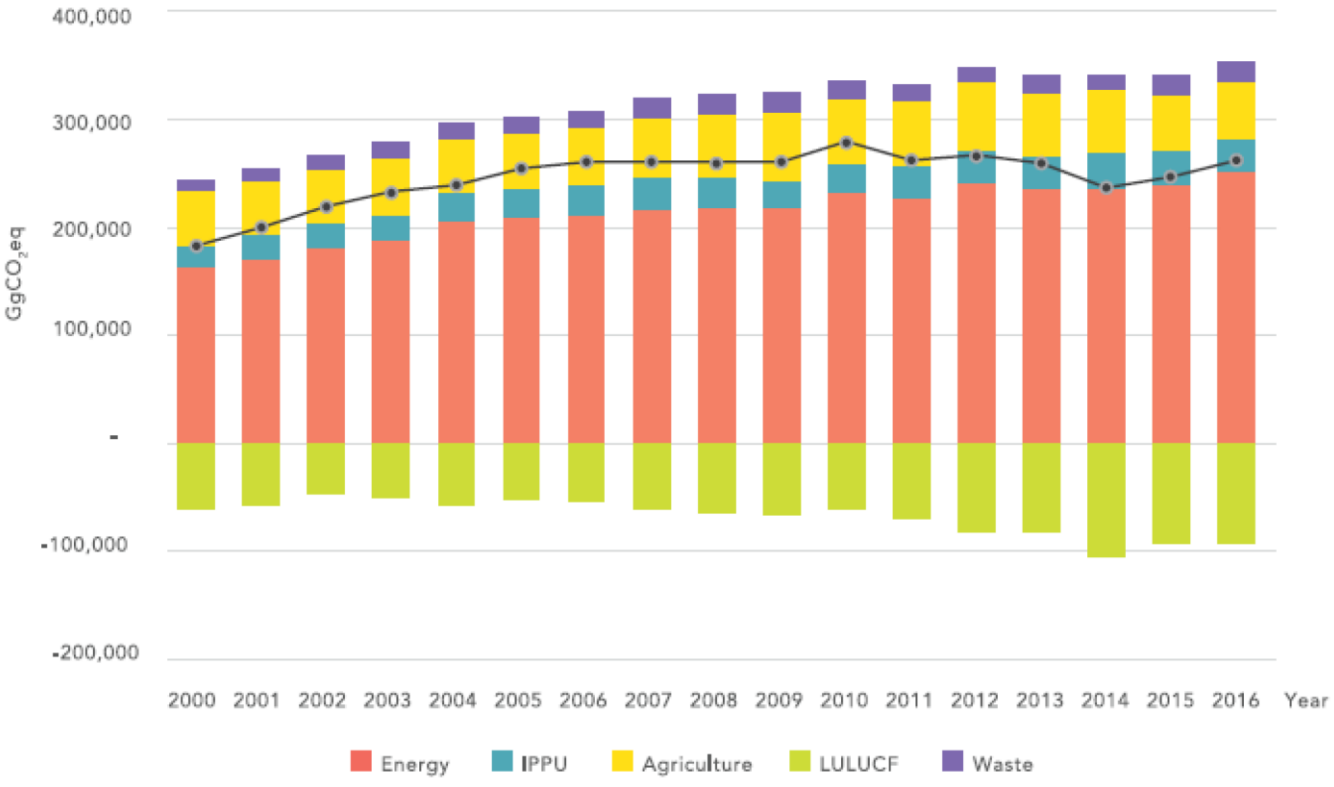


Figure 2-1: National GHG emissions/removals by sector 2000-2016

Figure 1.1: Greenhouse Gas Emissions by Sector (2000-2016)
Source: Office of Natural Resources and Environmental Policy and Planning, 2020

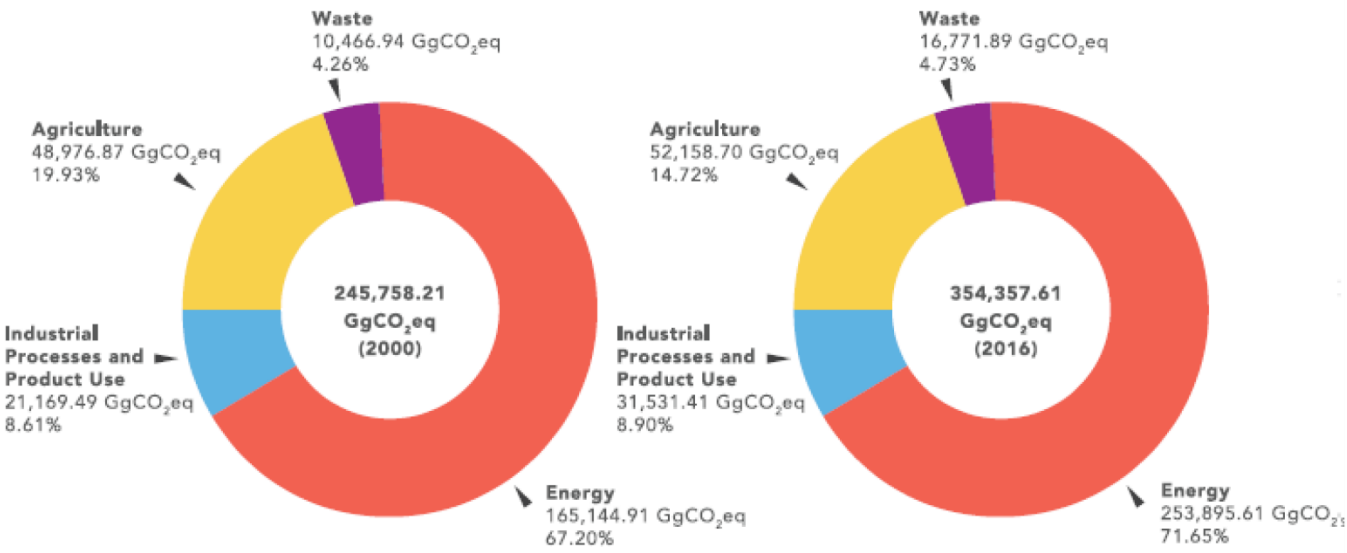


Figure 2-2 Total GHG emissions by sector (excluding LULUCF) 2000 and 2016

Figure 1.2: Amount and Proportion of Greenhouse Gas Emissions by Sector in 2000 and 2016
Source: Office of Natural Resources and Environmental Policy and Planning, 2020

1.2.2 Significant Physical Impacts

In 2021, Thailand was ranked 9th among the countries most vulnerable to the long-term impact of climate change. This was based on the assessment of data on the effect of severe weather events in the form of fatalities and economic damage during the period 2000-2019. This assessment utilized the Long-Term Climate Risk Index (CRI) (Eckstein et al., 2021) as the measure of exposure and vulnerability to extreme weather events or disasters, such as storms, floods, and heatwaves, but did not include slow-onset impacts, such as sea level rise, melting of glaciers, or rising ocean temperatures. The CRI can be used to raise awareness and prepare for any increasing intensity and frequency of extreme weather events and natural disasters caused by climate change.

Knowledge about the physical impact of climate change in Thailand comes from the "Synthesis and Review of Knowledge on Climate Change in Thailand: Second Assessment Report" (TARCC) prepared by the Thailand Research Fund and the Office of Natural Resources and Environmental Policy and Planning. The report projects the future impact of climate change in order to develop the National Adaptation Plan (NAP).

Changes in temperature and extreme temperature conditions.

Data on the average annual temperature in Thailand from the Meteorological Department's weather monitoring stations between 1970 to 2009 indicate a significant increase in Thailand's temperature. Over the past 40 years, the overall temperature has increased by approximately 1 degree Celsius (°C), and there is a trend for it to increase by another 1-2 degrees Celsius in 2050. According to a study by Limsakul (2020), if global temperatures increase by 1.5 degrees Celsius, which is expected to occur around the year 2040, Thailand's overall temperature is projected to increase by approximately 1.67 degrees Celsius. Furthermore, the Center for Climate Change and Renewable Energy Research at Ramkhamhaeng University predicts that under a high-emission scenario known as the Representative Concentration Pathway 8.5 (RCP8.5), Thailand's temperature is expected to rise continuously by approximately 2 degrees Celsius between 2024 to 2040 compared to the pre-industrial level.

The increase in temperature over the past 40 years has resulted in extreme changes in various temperature conditions in Thailand, with significant implications. These changes align with the evidence found in the Asia-Pacific region. The extreme temperature conditions exhibit characteristics consistent with the evidence, including various indices. These indices include the number of warm days and nights (Figure 1.3), the duration of warm periods, the number of days with maximum temperatures exceeding 35 degrees Celsius, the number of nights with minimum temperatures above 25 degrees Celsius, and the monthly maximum and daily minimum temperature indices. On the other hand, there is a significantly decreasing trend in extreme cold conditions, as indicated by the number of cold days and nights (Figure 1.3), the duration of cold periods, and the daily and annual temperature range indices. Additionally, Figure 1.3 illustrates the trend of increased risk of heat-related conditions, which also show some geographical variability.

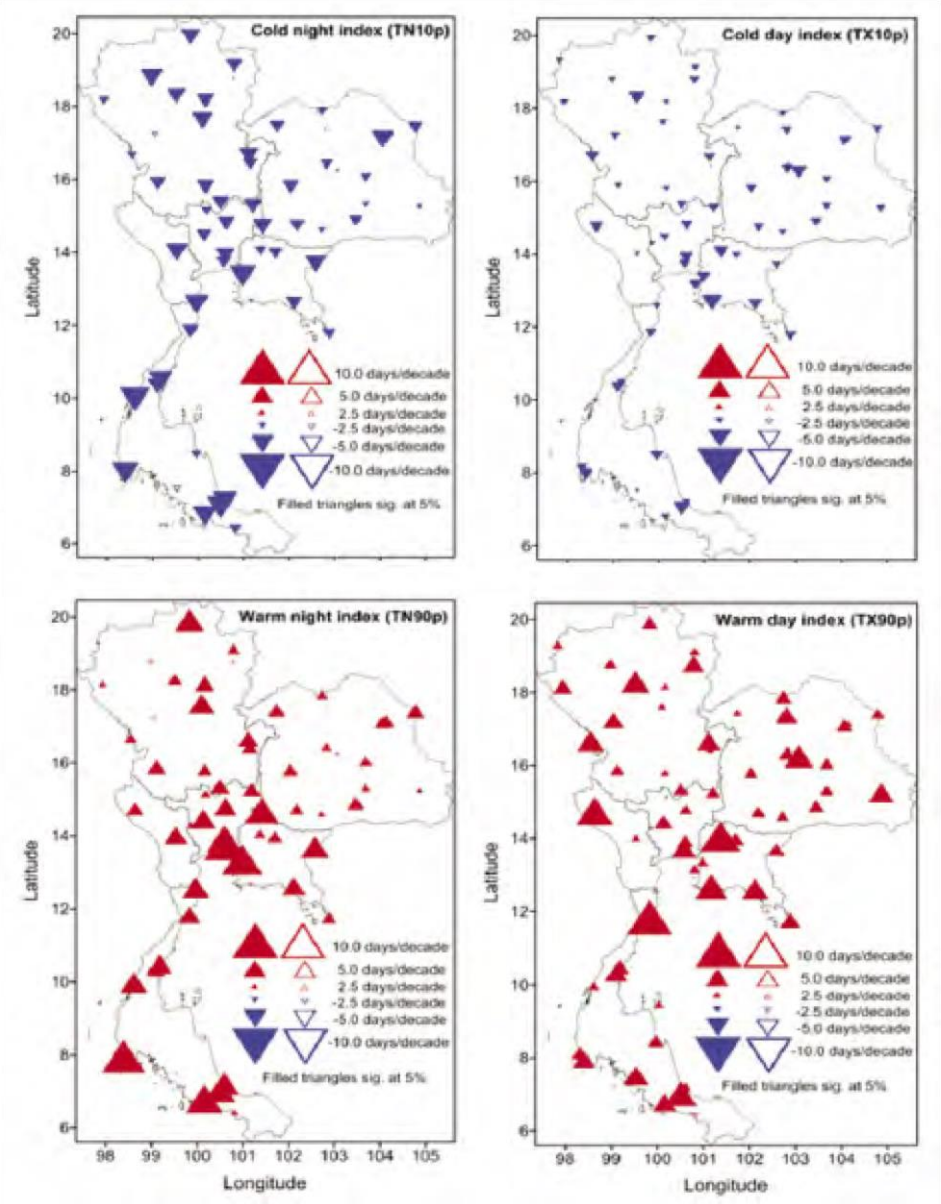


Figure 1.3: Trends in the Number of Cold and Warm Days and Nights, 1970-2009
Source: Thailand Research Fund, 2016

The result of the downscaled projections of future temperature changes in Thailand using three global climate models under three greenhouse gas emission scenarios (see Figure 1.2) indicates a significant increasing trend in average daily temperature, maximum temperature, and minimum temperature throughout the country in all models and future projections.

By 2100, the annual average value of the daily average temperature from all three models under the RCP8.5 scenario, representing the worst-case scenario of future greenhouse gas emissions, is projected to be higher than the average temperature during the period 1951-2011 by approximately 1.67, 3.98, and 4.82 degrees Celsius, depending on the model used. The HadGEM2-ES model shows the highest projected increase in the average temperature. Figure 1.4 illustrates the projected temperature change over time, indicating that the central and southern regions of the country are likely to experience a greater increase in average temperature compared to the other regions.

[1]The three models used in the study are: 1) GFDL-ESM2M, 2) MPI-ESM-LR, and 3) HadGEM2-ES.

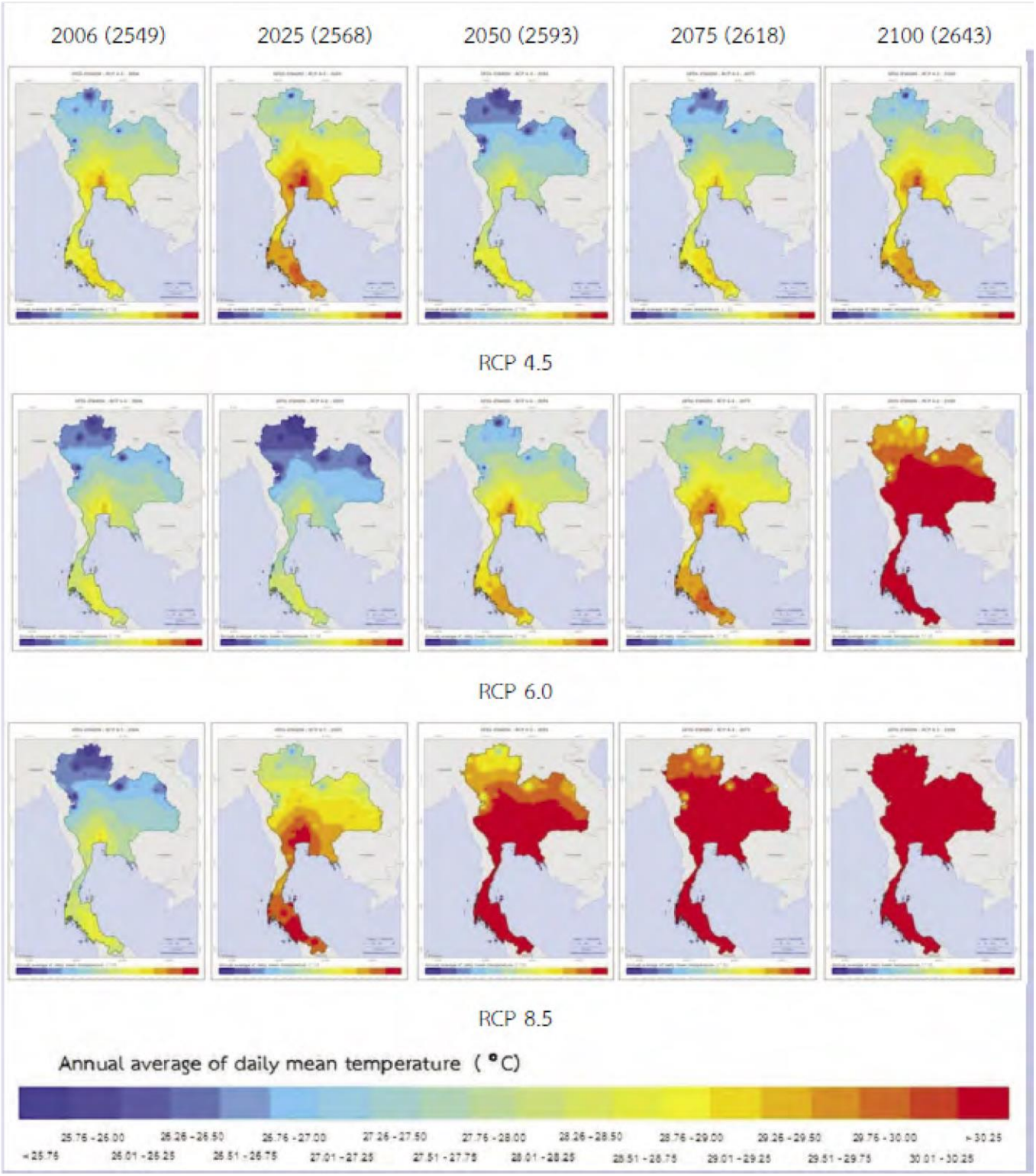


Figure 1.4: Projected Annual Mean of the Daily Mean Temperature for Thailand Under the HadGEM2-ES Global Climate Model
Source: Thailand Research Fund, 2016

1.2 Projection of the Representative Concentration Pathways (RCPs)

The RCPs (Representative Concentration Pathways) are projections of greenhouse gas concentrations in the atmosphere that are correlated with radiative forcing, which represents the energy imbalance in the Earth's atmosphere. The IPCC predicts these concentrations to occur by 2100. The numbers according to the RCP represent the radiative forcing value. For example, RCP 4.5 means that the radiative forcing from greenhouse gas emissions is projected to increase by 4.5 watts per square meter compared to the pre-industrial level, under the assumption of a greenhouse gas concentration of approximately 650 parts per million. The process of generating the RCP scenarios starts with estimating the concentration of greenhouse gasses in the atmosphere resulting from human activity. Then, the impact on climate change is assessed by using the Earth System Models to analyze the effect of increased greenhouse gas concentrations. Economic and societal developments, as well as measures to mitigate greenhouse gas emissions, are incorporated using Integrated Assessment Models to estimate the change in radiative forcing from radiative emissions by 2100 compared to 1750 in three different scenarios (see Figure 1.5).

1) RCP 2.6 sets a very low radiative forcing value of 3 watts per square meter, corresponding to a greenhouse gas concentration level of approximately 490 parts per million carbon dioxide equivalent. The peak annual greenhouse gas emissions are expected to occur between 2010 to 2020, and then decline by 2100 to achieve a radiative forcing value of 2.6 watts per square meter (corresponding to a greenhouse gas concentration of approximately 475 parts per million carbon dioxide equivalent).

2) RCP 4.5 and RCP 6.0 represent cases with constant radiative forcing values of 4.5 and 6.0 watts per square meter, respectively, corresponding to greenhouse gas concentration levels of approximately 650 and 850 parts per million carbon dioxide equivalent. The maximum level of greenhouse gas emissions are projected to occur starting in 2040 to 2080, and remain constant at these levels until 2100. These scenarios are considered intermediate-level projections.

3) RCP 8.5 represents a case with continuously increasing radiative forcing reaching 8.5 watts per square meter by 2100. This scenario corresponds to a greenhouse gas concentration level of approximately 1,370 parts per million carbon dioxide equivalent, representing the most severe and pessimistic projection. The greenhouse gas emissions in this scenario continue to increase steadily until 2100.

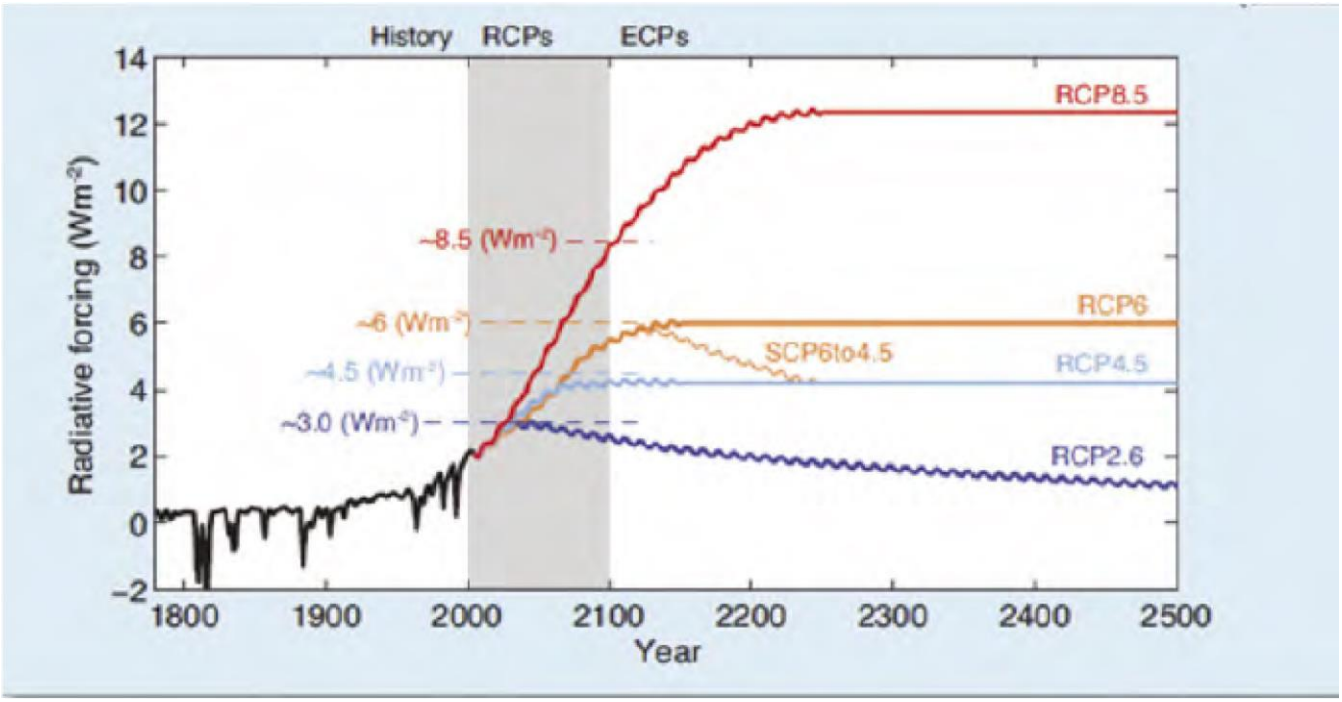


Figure 1.5: Projection of greenhouse gas emissions based on the Representative Concentration Pathways (RCPs)
Source: IPCC (2013)

Changes in Rainfall and Tropical Cyclones

Rainfall in Thailand exhibits high geographical variability. The cumulative annual rainfall from 1955 to 2014 increased in the northern, northeastern, and southern regions of the Gulf of Thailand, while it decreased in the eastern and southern regions. The total accumulated rainfall from November to April increased significantly at the rate of 10.8 millimeters per decade. When considering the intensity of rainfall, the number of heavy rainfall events has increased in frequency, but the duration of continuous rainfall has decreased in most parts of Thailand. This has led to an increased risk of flash flooding in some areas of the country.

The frequency of tropical cyclones impacting Thailand has shown a significantly decreasing trend that has directly impacted the rainfall and drought conditions in the country. However, despite the decline in the frequency of tropical cyclones, the number of intense tropical cyclones occurring every 10 years has been increasing since the 1970s. This indicates an increasing risk for Thailand in terms of extreme weather events, including heavy rainfall and flooding, alternating with prolonged drought conditions. This complex situation makes it more challenging and complicated for Thailand to adapt and prepare for both prolonged drought and sudden flooding events (Office of the Higher Education Commission, 2011; 2016).

Changes with flood and drought problems

Thailand has areas that are vulnerable and prone to natural disasters covering approximately 38,400 km^2, which account for 7.53% of the country's total area. Most of these areas are flat plains and experience recurrent flooding, and comprise 3,605 sub-districts, 552 districts, in 69 provinces. These areas are mostly irrigation land, covering nearly 15,200 km^2, which is approximately 40% of the overall flood-prone area.

The areas at risk of flooding outside of the major irrigation areas are mostly located in the northern and northeastern regions. The river basins most vulnerable to changes in rainfall patterns in recent years include the West Coast Gulf, Mae Klong, and the Pattani river basins. When considered by region, the central and western regions have the largest areas for flood risk, followed by the northern and northeastern regions. When examined at the provincial level, the top 10 provinces with areas vulnerable to flooding are Nakhon Sawan, Ayutthaya, Surat Thani, Suphan Buri, Phitsanulok, Phichit, Sukhothai, Roi Et, Nakhon Ratchasima, and Si Sa Ket.

The areas at risk of drought in Thailand cover approximately 197,920 km^2 equivalent to 38.59% of the country's total land area. This encompasses 5,577 sub-districts, 717 districts, in 66 provinces. Within this figure, around 26,400 km^2, or 13.3% of the drought-prone area, lies within the irrigation areas. The areas prone to drought outside the irrigation zones are mainly located in the northern and northeastern regions. When considering the risk of drought by region, the northern region has the highest level of drought risk, followed by the central, western, and northeastern regions respectively. The areas with the greatest risk of drought include;
Nakhon Sawan, Phetchabun, Nakhon Ratchasima, Phitsanulok, Kanchanaburi, Chiang Mai, Kamphaeng Phet, Sa Kaeo, Lampang, and Chaiyaphum.

Changes in sea level

Over the past 20 years, the average global sea level has risen by approximately 2.8 millimeters (measured by coastal monitoring stations) to 3.2 millimeters per year (from satellite data). When considering regional levels, as found that in some areas, the change may indicate a decreasing trend, while in other areas the sea level may be increasing depending on various physical factors.

The calculation of sea level changes is based on satellite data from the Andaman Sea, the South China Sea, and the seas around Indonesia that are closest to Thailand. It is found that the rate of sea level rise in these areas ranges between 3.6 and 6.6 millimeters per year. The sea level change study within Thailand has used data from the water level monitoring stations along the coastline. The data indicates significant fluctuations in sea level due to several factors. In particular, the upper Gulf of Thailand has recorded higher sea level changes compared to other areas, primarily due to groundwater extraction for domestic consumption, making the land subside. Additionally, after the occurrence of the tsunami, the study found that the land in Thailand and nearby areas has experienced some vertical movement. The uplift of the land has caused changes to the water level accordingly.

Changes in the resources and ecological systems

Climate change impacts nature negatively and ecosystems significantly. Rising temperatures affect plant growth and the migration of some animals to the cooler areas. The changes in seasons disrupt the life cycles of many animals, leading to migration or breeding pattern changes that affect the survival of both plants and animals and increase the risk of some species' extinction. However, it also reinforces the spread of diseases, including pests and insects. Besides the increase in temperature factor, the significant rise in the carbon dioxide level due to severe and more frequent natural disasters such as wildfires or storms, has further impacted the scale of forestry area degradation. In addition, rising sea levels result in increased erosion along coastal habitats, which are home to various marine animals. Warmer sea temperatures and increased carbon dioxide in the air, when combined with seawater, create more acidic oceans, causing coral bleaching. This, in turn, reduces the survival rate of the marine life that inhabits the coral reefs, ultimately escalating the risk of biodiversity loss.

1.2.3 Significant socio-economic impact

The economy of Thailand has been significantly impacted by climate change from the past to the present, and it is expected to have an even greater negative effect in the future. A study by Eckstein, Künzel & Schäfer (2021) indicates that over the past 20 years Thailand has experienced extreme weather events due to climate change more than 140 times. This has resulted in considerable economic damage amounting to 7,719 billion US dollars[2], making the most recent consecutive six years since 2016 that Thailand has been among the top 10 countries in the world most at risk from climate change.

Additionally, the Swiss Re Institute (2021) has studied the impact of climate change on the Gross Domestic Product (GDP) data of 48 countries covering over 90% of the world's GDP. It is projected that Thailand's GDP will decrease proportionally by one of the largest proportions among the 48 countries assessed, ranging from 4.9% to 43.6% by 2048 in the case that the temperature rises by 2°C to 3.2°C respectively. If Thailand does not have any additional adaptation measures to mitigate the impact, and as Thailand ranks relatively low at 39 out of 48 countries assessed in terms of its coping ability, the Thai economy is expected to be most significantly affected in the tourism and agricultural sectors. Moreover, the impact on forestry resources, coastal areas, and water resources also has negative implications for interconnected businesses and industries. The significant repercussions include the following.

[2] When considering the Purchasing Power Parity (PPP) of the region.

Impact on the Tourism Sector

Climate change affects tourism directly and indirectly because suitable weather conditions play a significant role in supporting touristic activities. Direct impact may result from flooding, drought, extreme cold weather, or extreme heat, leading to a decreasing trend in touristic activities. Additionally, the coral bleaching phenomena may damage the infrastructure, leading to interruptions in the tourism business. Some indirect impact on tourism may arise from environmental and ecosystem changes, as tourism relies on natural resources and cultural heritage as tourist attractions.

Impact on the Industrial Sector

Changes in weather patterns, particularly extreme weather events, such as flooding and droughts, can have a significant impact on manufacturing activity due to damage to production processes and infrastructure. Additionally, water scarcity due to droughts may also affect industrial production (The Office of Natural Resources and Environmental Policy and Planning, 2018).

Impact on the Agricultural Sector

Climate change tends to affect agriculture directly, both in terms of plant and animal physiology, as well as changes in agricultural land use. Wisanu Atthawaranit et al. (2021) pointed out that the agricultural sector in Thailand is highly vulnerable to climate change. With approximately 12.62 million workers, it accounts for 34.1% of the total labor force (National Statistical Office, 2020). The agricultural sector contributes only 8.6% to the country's Gross Domestic Product (GDP) (National Economic and Social Development Council, 2021), indicating that most farmers have a lower economic status compared to workers in other sectors of the economy. Furthermore, most farmers are small-scale operations with limited land ownership, limited education, and only 26% having access to irrigation systems. Additionally, they face a higher rate of aging population, and higher than in other sectors of the economy due to the gradual exit of farmers and laborers from the agricultural sector.

Research by Attavanich (2017) examined the impact of climate change on the agricultural sector and found that climate change is expected to cause accumulated damage between 2011-2045 estimated at a high value of 0.61-2.85 trillion baht, with an average of 17,912-83,826 billion baht per year, depending on the severity level of climate change. The areas outside the irrigation zones are expected to experience more damage due to being larger areas and suffering more severe effects [3]. When considered by province, the top 10 provinces expected to suffer the highest level of damage include Surat Thani, Nakhon Si Thammarat, Chumphon, Songkhla, Nakhon Ratchasima, Trang, Chanthaburi, Rayong, Krabi, and Prachuap Khiri Khan, respectively.

[3] The predicted damage to agricultural areas outside the irrigation zones is estimated at a value of 0.38-2.16 trillion baht, with an average of 11,245-63,420 billion baht per year. Meanwhile, areas within the irrigation zones may expect damage valued at 0.23-0.69 trillion baht, with an average of 6,667-20,405 billion baht per year.

The impacts of climate change on the country's major economic crops, such as rice, sugarcane, cassava, and rubber, are projected to result in significant production declines according to current research. Without adaptation measures implemented by farmers, a study by Pipitpukdee & Attavanich (2021) has estimated the production trends using the RCP4.5 and RCP8.5 scenarios, which simulate the potential accumulation of greenhouse gasses in the atmosphere, leading to changes in temperature and rainfall patterns. The study projected a decrease in rice production by approximately 10.18-13.33% in both the rain fed and irrigated areas, and a decrease in sugarcane production of approximately 24.94-34.93%, and a decrease in cassava production (a drought-resistant crop) of approximately 14.74-21.26% (Pipitpukdee et al., 2020a; 2020b). Similarly, rubber production is expected to decline by approximately 5.30-2.86% (Attavanich, 2019). The reduction in agricultural crop yields will have an adverse effect on farmers, resulting in decreased income. It will also impact the agro-industrial and downstream sectors that require these crops as raw materials, as they will face fluctuating production costs and uncertain raw material availability. Additionally, the decline in agricultural export income will affect Thailand's main agricultural economy, as the country is currently a leading global exporter. This could have implications for global food security, with predictions indicating a potential 7% decrease in rice exports, 3% decrease in sugar exports, and 13% decrease in palm oil exports, which are important food sources globally.

Considering the impact of climate change on the country's main agricultural products, the research indicates that rice, sugarcane, cassava, and rubber production are expected to decrease significantly. Without adaptation for farmers, a study by Pipitpukdee & Attavanich (2021) has estimated the production trends using the RCP4.5 and RCP 8.5 scenarios, creating the possible simulation scenarios of greenhouse gas accumulation in the atmosphere affecting temperature and rainfall patterns. In both cases, rice production, both paddy and off-season, is projected to decrease by approximately 10.18-13.33%. Sugarcane factory output is expected to decrease by 24.94-34.93%, while drought-resistant cassava production is predicted to decrease by 14.74-21.26% (Pipitpukdee et al., 2020a; 2020b). Additionally, rubber production is forecast to decline by 5.30-2.86% (Attavanich, 2019). The reduction in agricultural crop yields will impact farmers negatively by reducing income and affecting manufacturers in the midstream and downstream sectors that use these agricultural products as raw materials. The manufacturers will experience fluctuations in production costs and uncertain raw material quantities. Moreover, it is anticipated that export revenues from Thailand's main agricultural products will decrease as Thailand is one of the top global exporters, which will affect global food security. It is forecast that exports to the global market of rice, sugar, and cassava flour that are essential global food sources will decrease by 7%, 3%, and 13%, respectively.

Impact on health

Climate change affects people’s health directly and indirectly, and in Thailand is a tropical country that suffers a negative impact from various climate change phenomena (Figure 1.6). These include illnesses or fatalities due to heat stress in the long-term, leading to risks of cataracts, pterygium, skin cancer, and sunburn. Air pollution resulting from dry and arid conditions increases the frequency and severity of forest fires, raising levels of particulate matter in the atmosphere and smoke haze that cause irritation and inflammation of the skin and eyes. Respiratory diseases and emerging infectious diseases, such as acute respiratory distress syndrome and avian influenza will also increase. Furthermore, climate change promotes the proliferation and accelerated breeding by mosquitoes, leading to more severe incidences of vector-borne diseases, particularly dengue fever and chikungunya, which have re-emerged in 2008-2009 in various southern areas after their disappearance since 1970 (Department of Health, 2010). Contagious diseases from other animals, such as leptospirosis and trypanosomiasis transmitted by flies, may also tend to occur more frequently.

The most significant health impacts also arise from extreme weather conditions such as storms, floods, and droughts, leading to various illnesses, injuries, and fatalities. Moreover, they may affect mental health due to stress from property and life losses of family members. There is also the risk of an outbreak of disease due to poor sanitation, such as gastrointestinal infections and other digestive disorders caused by contaminated water and foods.

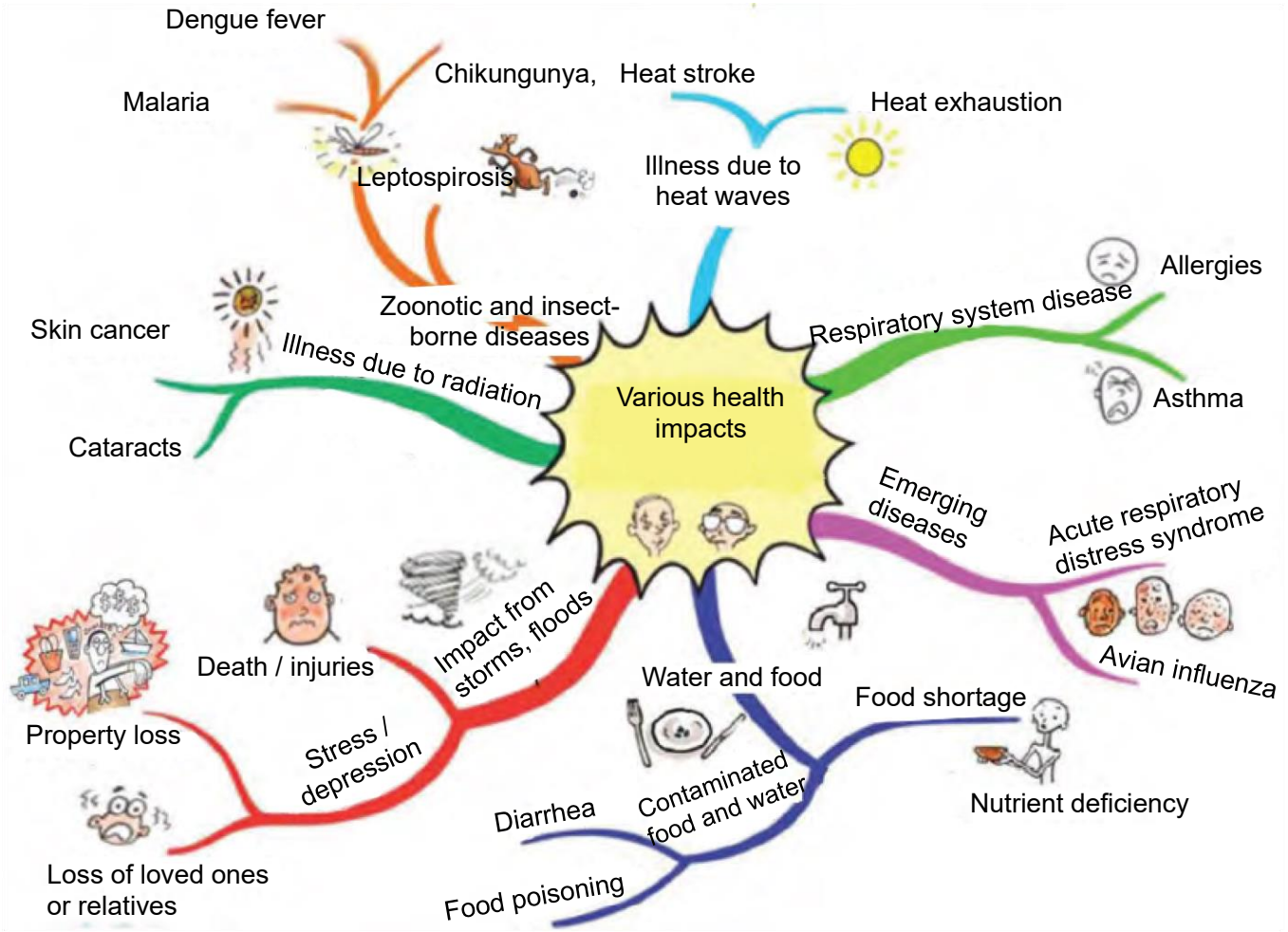


Figure 1.6: Health Effects of Climate Change
Source: Department of Health (2010)

It can be seen that the impacts of climate change may affect the quality of human life in various dimensions, including the direct impacts noticeable immediately regarding health, life, and property due to extreme weather conditions and natural disasters. Additionally, there are indirect and long-term impacts through the changes and degradation of water resources and various ecological systems that affect several economic activities, especially those relying highly on natural resources, such as agriculture and tourism (as shown in Figure 1.7).

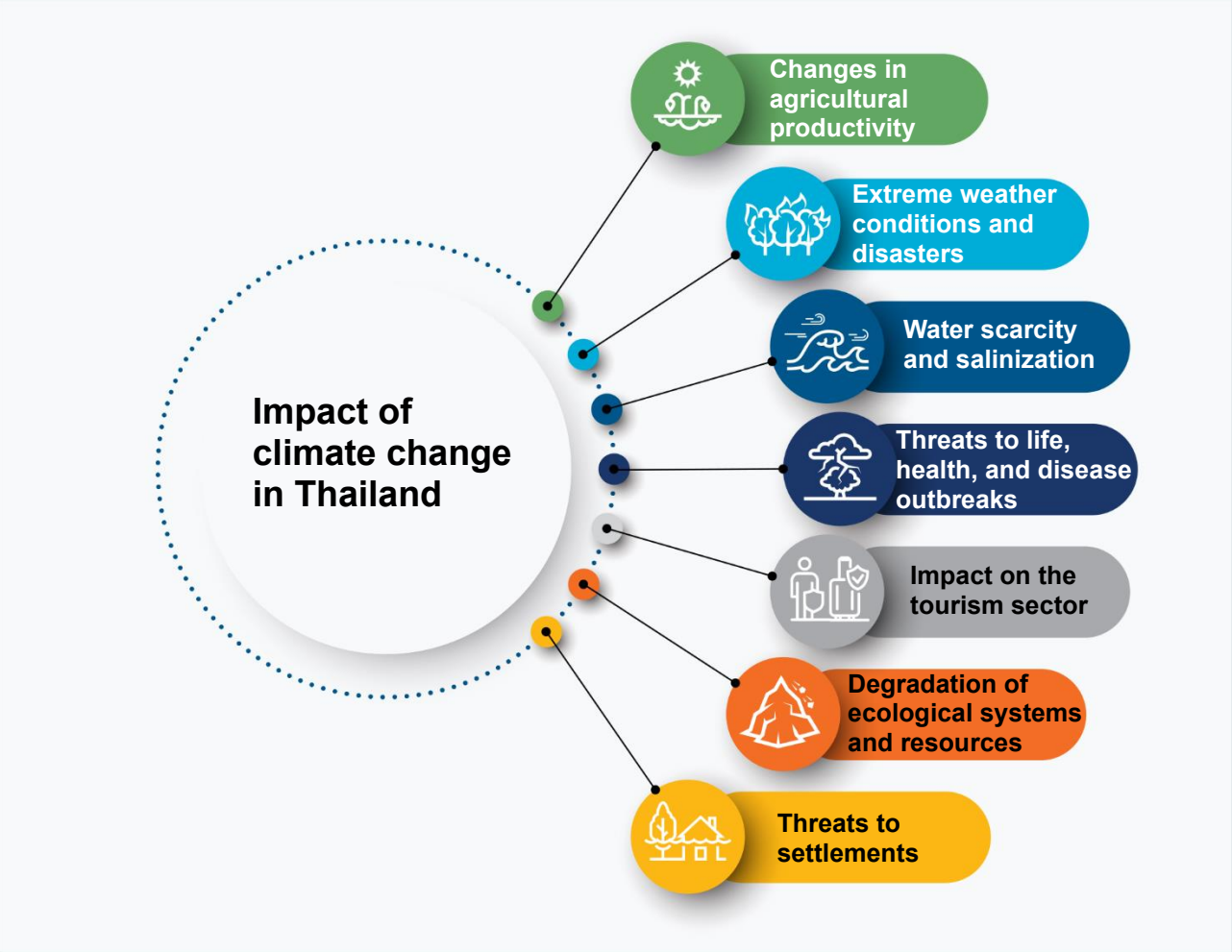


Figure 1.7: Impact of Climate Change in Thailand
Source: Author

1.2.4 Variation in impact across social dimensions and vulnerable groups

The impact of climate change affects different groups of people unequally due to geographical factors whereby the physical impact vary, and also due to differences in people's vulnerability and capacity to manage such impact. In Thailand, **livelihoods through agriculture and poverty are significant factors contributing to vulnerability due to the impact of climate change**, leading to impact disparities or damage, especially regarding issues due to natural disasters such as floods and droughts.

An example of the disparities regarding the impact of climate change can be seen from the economic losses due to the massive flooding in 2011. The household survey data from the National Statistical Office on flood-affected households indicated that households headed by women experienced higher proportions of income loss from the flooding compared to households headed by men, reflecting the greater economic vulnerability among female-headed households. When considering different educational levels among the population, households with higher education degrees suffered greater income and property losses from the flooding compared to those with lower education levels, which could be due to their greater potential to earn daily income and higher assets' values. However, households with lower levels of education had a higher proportion of income loss, indicating a greater vulnerability to the impact. When dividing the population into groups by occupation, it was found that households with occupations in the formal sector[4] suffered greater income losses from the flooding compared to those in the informal sector, but the overall proportion of income loss was lower. Additionally, households with occupations in the informal sector had higher property values and a greater proportion of property losses from the flooding compared to those in the formal sector, indicating greater vulnerability to the flooding impact among households with a higher occupational status. Regarding the poverty dimension, it was found that impoverished households had lower average income losses in both the agricultural and non-agricultural sectors, as well as lower property value losses compared to non-poor households. However, when considering the proportion of the impact on income, impoverished households had a significantly higher proportion of the impact from the flooding compared to non-low-income households, ranging from 12 to 17% of annual income.

The disparities regarding the impact of flooding are also evident in the health area, especially among the elderly population in Bangkok. The proportion of elderly people injured by flooding was higher than in other age groups, and the proportion of elderly people who become ill from the flooding was also higher than in other age groups in every region. Similarly, there was a higher proportion of elderly people who died from the flooding compared to other age groups. The proportion of those affected in terms of health who were informal workers was higher than those in formal employment. Regarding the dimension of poverty and the impact on health, it was found that the proportion of poor individuals affected by health issues was higher in Bangkok and the central region, while the trend was the opposite in other regions, where the proportion of poor individuals affected by health issues was not higher than that of non-poor individuals.

[4]The four occupations in the public sector include civil servants, government employees, state enterprise employees, and monthly employees or private sector workers.

1.3 List of Basic Data Sources Regarding Climate Change in Thailand

In addition to the aforementioned impact data, there are important basic data sources about climate change in Thailand, as shown in Table 1.1.

Table 1.1 Important Basic Data on Climate Change in Thailand

Reports	Sources
Summary Report of the IPCC Fifth Assessment Report for Policymakers	Office of Climate Change Management, Office of Policy and Natural Resources and the Environment
Reports on the Synthesis and Compilation of Thailand's Climate Change Knowledge, 1st and 2nd Editions, 2016	The Center for Coordination and Development of Global Warming and Climate Change Research
Thailand's National Communication Report (1-3 Issues)	The Office of Natural Resources and Environmental Policy and Planning
Thailand's National Adaptation Plan, 2015-2050	The Office of Natural Resources and Environmental Policy and Planning
Thailand's National Adaptation Plan	The Office of Policy and Natural Resources and Environment
Thailand Climate Change Network: http://www.tccnclimate.com/	The Office of Natural Resources and Environmental Policy and Planning and Environmental Research and Training Center
Thailand's Climate Change Adaptation Information Center of Thailand (T-PLAT): http://t-plat.deqp.go.th/	The Office of Natural Resources and Environmental Policy and Planning (ONEP) as a policy unit in collaboration with the Environmental Research and Training Center (ERTC), Department of Environmental Quality Promotion (DEQP)

Source: Author

1.4 Climate Change Management and Solutions

The Thai Government has recognized the necessity of engaging with the global community in efforts to address climate change issues by committing to international frameworks under the United Nations Framework Convention on Climate Change (UNFCCC) since 1994.

In 2002, Thailand has ratified the Kyoto Protocol and has consistently participated in global discussions and negotiations aimed at addressing climate change issues. One particularly significant event is the Conference of the Parties (COP), where national leaders convene to monitor and evaluate progress in climate change management. The COP 21 in Paris marked a notable milestone, where the participating countries, including Thailand, adopted the Paris Agreement in 2015. A key aspect of this agreement is the Nationally Determined Contributions (NDCs), whereby each country commits to reducing greenhouse gas emissions. Thailand has set a target to reduce greenhouse gas emissions by a minimum of 20% by 2030, and a higher target of 25%[5] subject to access to technology, finance, and capacity-building support through the UNFCCC network. Furthermore, at COP 26, Thailand announced its commitment to achieve carbon neutrality by reducing net carbon dioxide emissions to zero by 2050, and reaching net-zero greenhouse gas emissions by 2065.

1.4.1 Policies and Plans for Climate Change

This section discusses the policies, development plans, laws, and the key agencies and organizations involved in the activities related to Thailand's climate change that encompass the mitigation and adaptation efforts as detailed below:

1) The National Adaptation Plan for Climate Change 2015-2050

The National Adaptation Plan for Climate Change 2015-2050 serves as the long-term framework for the governmental agencies and various stakeholders to address climate change issues. It provides the policy framework for these agencies to develop detailed action plans, including the mechanisms and tools to effectively address climate change issues. Additionally, it serves as a tangible framework for the budget allocation plan to address climate change issues.

[5] When compared to business as usual (BAU) operations without greenhouse gas reduction measures, which predict the level of greenhouse gas emissions based on baseline data from 2005, Thailand's BAU 2030 is estimated to be approximately the equivalent of 555 million tons of carbon dioxide.

The vision presented in the National Adaptation Plan for Climate Change is for Thailand to be resilient to climate change and to grow with low carbon emissions in a sustainable development framework, with three main missions:

1) Building resilience to climate change in national development by promoting integration of the strategies and measures to adapt to climate change in all sectors and at all levels.
2) Reducing the country's greenhouse gas emission rate, and creating the mechanism for sustainable low-carbon emission growth.
3) Strengthening the capacity and awareness of the development sector, as well as developing the knowledge and technology infrastructure to support and enhance the readiness status for implementing adaptive measures and sustainable low-carbon development.

The targets set in the Master Plan include short-term, medium-term, long-term, and continuous goals that must be evaluated and monitored regularly.

The long-term adaptation goals comprise 16 goals focusing on the adaptation by farmers to enhance their capabilities regarding water management, water retention, and disaster risk management. The adaptation goals also emphasize reducing the health impact on children and disease outbreaks, as well as the aims to mitigate the environmental impact.

The long-term goals for reducing greenhouse gas emissions comprise 8 goals that focus on reducing electricity consumption by at least 25% compared to the business as usual (BAU) operations before 2030. They also aim to reduce greenhouse gas emissions from land transportation and support public transportation systems, investment in low-carbon industrial sectors, improve waste management efficiency, and manage or alter agricultural production methods to be more efficient by reducing chemical usage and reducing crop burning practices in agricultural areas.

2) Thailand’s Nationally Determined Contribution Roadmap Regarding Mitigation 2021 - 2030

The Office of Natural Resources and Environmental Policy and Planning, Ministry of Natural Resources and Environment, has implemented mechanisms and action plans to achieve Thailand's greenhouse gas reduction targets as outlined in the Intended Nationally Determined Contribution (INDC) proposal after 2020 A working group has been established to develop the country's greenhouse gas reduction plan to consider and draft the roadmap for the country's greenhouse gas reduction target. This target is to reduce greenhouse gas emissions by 20-25% from the baseline scenario level compared to the projected emission levels in the future without any mitigation measures (Business as usual: BAU). For Thailand, the BAU set 2005 as the starting point, because Thailand had not implemented any greenhouse gas reduction measures before that year.

Projected Greenhouse Gas Emissions in Thailand (BAU Scenario).

The amount of greenhouse gas emissions released by Thailand in 2005, which is the first year used to calculate the BAU, were 279,129 thousand tons of carbon dioxide equivalent. The projection of the carbon dioxide emissions for Thailand was considered based on factors related to economic and social development, including the growth rate of Gross Domestic Product (GDP) (average of 3.94%), and the population growth rate (average of 0.03% per year). The projected amount of greenhouse gas emissions expected to be released by 2030 are 554,649 thousand tons of carbon dioxide equivalent, or an average annual increase rate of 2.8%, as shown in Figure 1.8.

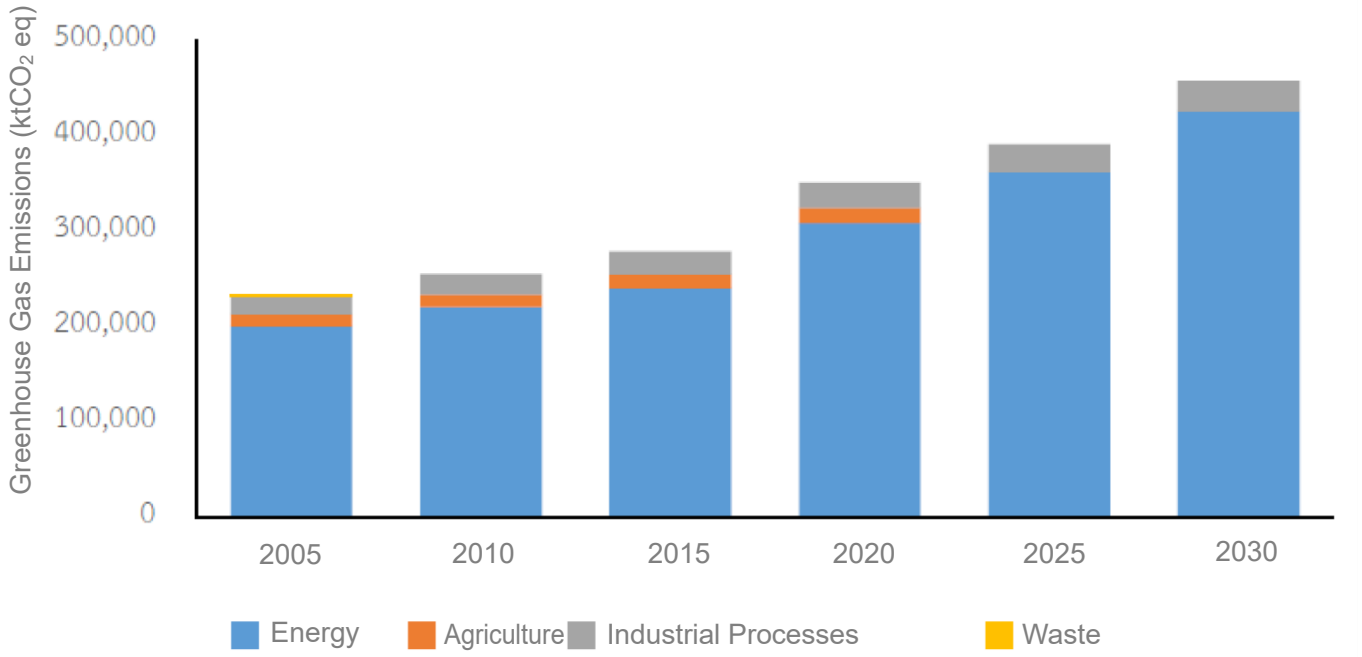


Figure 1.8: Projected Greenhouse Gas Emissions in Thailand (BAU Scenario)
Source: Office of Natural Resources and Environmental Policy and Planning (2017).

The forecast of greenhouse gas emissions in the BAU scenario by sector is shown in Table 1.2. **The energy sector produces the highest greenhouse gas emissions**, comprising energy use in households, commercial buildings, and government buildings, as well as energy use by industrial production and transportation. In 2005, the amount of greenhouse gas emissions was 200,392 thousand tons of carbon dioxide equivalent, accounting for 71.8% of the country's total greenhouse gas emissions. This is projected to increase to 425,649 thousand tons of carbon dioxide equivalent, or 76.7%, by 2030, with an average annual increase rate of 3.1%. The agricultural sector follows by accounting for 4.6% of the total greenhouse gas emissions in 2005 with an average annual increase rate of 2%. In 2030, the agricultural sector is projected to account for 13.8% of the total greenhouse gas emissions. The industrial processes and product use sector ranks third in terms of greenhouse gas emissions with an average annual rate of increase of 2%, accounting for 7% and 5.8% of the total greenhouse gas emissions in 2005 and 2030, respectively, followed by the waste sector, which has an average annual increase rate of 1.8%, accounting for 4.6% and 3.6% of the total greenhouse gas emissions in 2005 and 2030, respectively.

Table 1.2: Thailand's Projected Greenhouse Gas Emissions under the BAU Scenario.

Sectors	Greenhouse Gas Emissions ($ktCO_2eq$)					
	2005	2010	2015	2020	2025	2030
Energy Sector	200,392	200,856	240,332	308,587	362,107	425,649
Waste Sector	12,878	13,001	14,489	16,135	17,986	20,010
Industrial Processes and Product Use Sector	19,565	21,408	23,737	26,304	29,148	32,360
Agricultural Sector	46,294	52,316	57,554	63,316	60,656	76,630
Total	279,129	307,579	336,112	414,342	478,879	554,649

Source: Office of Natural Resources and Environmental Policy and Planning (2017)

Key Measures for Reducing Greenhouse Gasses

The greenhouse gas reduction roadmap has proposed guidelines for reducing the country's greenhouse gas emissions by designating the energy and transportation sectors, industrial processes and product use, and waste management as the main sectors for reducing greenhouse gas emissions. This is because these agencies are ready and capable of implementing measures to reduce greenhouse gasses. By 2030, a total of 115.6 million tons of carbon dioxide equivalent emissions should be achieved, which is higher than the target of 111 million tons of carbon dioxide equivalent, or a 20% reduction from the baseline scenario. The energy and transportation sector has the potential to reduce greenhouse gas emissions by 113 million tons of carbon dioxide equivalent by 2030, as shown in Table 1.3. However, the greenhouse gas reduction roadmap has not yet included the agricultural forestry, and land use sectors.

Table 1.3: Thailand's Greenhouse Gas Reduction Potential by Sector

Sectors	Greenhouse Gas Reduction (Mt-CO_2 eq)
	2030
Energy and transportation sectors	113.00
Waste management sector	2.00
Industrial processes and product use sector	0.60
Total greenhouse gas emissions reduction potential	115.60

Source: Office of Natural Resources and Environmental Policy and Planning (2017)

The measures supporting the reduction of greenhouse gas emissions consist of 9 measures in the energy and transportation sectors, 4 measures in the waste management sector, and 2 measures[6] in the industrial processes and product use sectors. The energy sector is considered the best potential sector for greenhouse gas reduction. The Ministry of Energy has utilized the Energy Efficiency Plan (EEP), the Alternative Energy Development Plan (AEDP), and the Power Development Plan (PDP) to develop the country's greenhouse gas reduction action plan until 2030. The primary measures used for greenhouse gas reduction in the energy and transportation sectors are highlighted in Table 1.4, with the focus on improving energy efficiency in production, transportation, and electricity generation combined with development of alternative energy sources and bioenergy for industrial, transportation, and electricity generation, as well as energy use in households and commercial buildings.

Table 1.4: Key Measures for Greenhouse Gas Reduction in the Energy and Transportation Sectors

Sectors	Target Groups	Key Relevant Agencies
Electricity generation		
Measures to improve energy efficiency in the electricity generation	Electricity generators	EGAT
Measures for electricity generation from renewable energy	Electricity generators	DEDE, EGAT, PEA, MEA
Energy consumption by the industrial sector		
Measures to improve energy efficiency in the industrial sector	Private operators	DEDE
Measures for renewable energy consumption by the industrial sector	Private operators	DEDE

Note: EGAT - Electricity Generating Authority of Thailand; DEDE - Department of Alternative Energy Development and Efficiency; PEA - Provincial Electricity Authority; MEA - Metropolitan Electricity Authority; OEPP - Office of Energy Policy and Planning; TISI - Thai Industrial Standards Institute; OTP - Office of Transport and Traffic Policy and Planning; SRT - State Railway of Thailand.
Source: The author has presented a concise summary of information from the roadmap for reducing greenhouse gas emissions in Thailand covering the period from 2021 to 2030.

[6] In 2020, the operational plan for sector-specific greenhouse gas (GHG) reduction was reviewed and updated. Revised targets were set for each sector: energy (117.66 MtCO2eq), transportation (35.42 MtCO2eq), industrial processes and product use (2.25 MtCO2eq), and waste (1.53 MtCO2eq).

Table 1.4: Key Measures for Greenhouse Gas Reduction in Energy and Transportation Sectors (Cont.)

Sectors	Target Groups	Relevant Key Agencies
Transportation		
Measures to improve energy efficiency in the transportation sector	Service Providers/Commuters, Transport Systems, Land, Water, and Air Transportation / General Public	OEPP, TISI, OTP, SRT
Measures for biofuel use by vehicles	Producers / Motorists	DEDE
Energy consumption by households		
Measures to improve energy efficiency in households	Households	DEDE, EGAT
Measures for renewable energy consumption by households	Households	DEDE, EGAT

Note: EGAT - Electricity Generating Authority of Thailand; DEDE - Department of Alternative Energy Development and Efficiency; PEA - Provincial Electricity Authority; MEA - Metropolitan Electricity Authority; OEPP - Office of Energy Policy and Planning; TISI - Thai Industrial Standards Institute; OTP - Office of Transport and Traffic Policy and Planning; SRT - State Railway of Thailand
Source: The author has presented a concise summary of information from the roadmap for reducing greenhouse gas emissions in Thailand covering the period from 2021 to 2030.

In addition to the policies mentioned above, in the long-term, it will be necessary to reduce greenhouse gas emissions through the decarbonization process, which aims to assist governments and organizations to transition both the economy and society to achieve Carbon Neutrality or net zero carbon emissions by the second half of the century. Like other countries in the world, measures should be taken to reduce greenhouse gas emissions from fossil fuel use. There should be a timeframe for these measures, and goals to maintain the global temperature increase below 2 degrees Celsius, compared to pre-industrial levels by 2050, known as Deep Decarbonization Pathways. Several measures should be implemented, particularly in the power generation sector, which continues to focus on increasing the share of renewable energy, such as solar and wind power, and ultimately phasing out fossil fuel-based electricity generation. Measures in the industrial sector should come from new technologies, such as hydrogen or carbon capture technology, and the utilization and storage of carbon (CCUS). In the transportation sector, the focus should be on increasing the proportion of electric vehicles instead of vehicles using fossil fuels.

However, implementing measures according to the Deep Decarbonization Pathways 2050 immediately may have unavoidable and negative impacts on the Thai economy and society (Rajbhandari, Limmeechokchai & Masui 2019). Therefore, the Ministry of Natural Resources and Environment has developed a (draft) long-term strategy for Thailand's low-carbon development, using a general equilibrium model to predict the long-term economic impacts, including new investments in the country's infrastructure, by transitioning its energy production structure to support the Deep Decarbonization Pathways while maintaining the temperature increase below 2°C and not exceeding 1.5°C. In the case of maintaining the temperature increase below 2°C, the GDP loss would be 2.6% by 2030 and 18.0% by 2050, with Thailand achieving net-zero greenhouse gas emissions by 2090. Meanwhile, in the case of maintaining the temperature increase below 1.5°C, the GDP loss would be 9.2% by 2030 and as high as 66.5% by 2050 (Table 1.5). This is due to the necessity for more intensive economic structural changes and substantial investments.

Table 1.5: Economic and Structural Implications of Thailand's Long-Term Low-Greenhouse Gas Emissions Development Strategy

Year	GDP loss that would occur for maintaining the temperature increase to below:	
	2 ℃	1.5 ℃
2030	-2.61	-9.22
2040	-6.60	-6.04
2050	-18.01	-66.47

Source: Office of Natural Resources and Environmental Policy and Planning (2021), cited in Karnikar Thampanichawong et al. (2021).

National Strategies For Greenhouse Gas Reduction.

In addition to setting goals for reducing greenhouse gas emissions by sector, outlining the measures to achieve those goals, the Government has proposed driving operations more efficiently by using tools and mechanisms to reduce greenhouse gas emissions. Key financial mechanisms include: 1) Allocating additional budgets from existing plans (top-up) that are sufficient to allow the agencies responsible for greenhouse gas reduction to allocate strategically for climate change adaptation. 2) Requesting financial support funds from capital resources under the UNFCCC, or the support funds from other foreign sources. 3) Increasing the role of environmental funds to support greenhouse gas reduction projects in the form of grants and loans.

Furthermore, the Government should develop incentives to encourage greenhouse gas reduction efforts, including: 1) Providing benefits to entrepreneurs to promote private sector involvement in investing in greenhouse gas reduction, such as tax benefits or reducing/exempting Customs duties for machinery used in greenhouse gas reduction processes that reduce operational costs. 2) Using economic tools to create incentives for behavioral change, such as imposing pollution taxes or levying fees on products with high pollution levels. 3) Utilizing regulatory and social control tools, such as banning environmentally harmful products, raising awareness about reduce plastic and foam usage, and supporting alternative biodegradable packaging options.

3) The Draft Climate Change Act

The problems and necessities in legislating climate change are to establish a comprehensive and complete greenhouse gas database for the country, ensuring the public receives accurate and beneficial information about the Government’s policy-making. It is essential to have mechanisms to monitor the state’s agencies' adherence to the greenhouse gas reduction plans, enabling the country to achieve the stated greenhouse gas reduction targets. Additionally, there is the need for long-term climate change forecasting systems and analyses of the impact on the various sectors in order to establish an effective public alert system for effective adaptation.

The structure of the draft bill consists of 8 sections, comprising 56 articles that encompass the key provisions regarding the National Climate Change Policy Committee, the supporting Master Plan for climate change, greenhouse gas data, greenhouse gas reduction, adaptation to climate change, and measures to promote climate change-related activities. It shall specify the rights of individuals and communities concerning climate change, including the right to receive information about the impact of climate change and the preparations for adaptation, the right to provide input and opinions to address climate change issues, and the right to receive promotion of activities related to climate change.

Regarding the duties of the governmental agencies, they are divided into four aspects: 1) Forecasting and assessing the risks and impacts of climate change, including disclosing information, issuing warnings to the public, and implementing measures to prevent and mitigate these impacts. 2) Setting greenhouse gas reduction targets and implementing the measures to achieve them. 3) Supporting research and technology development for greenhouse gas reduction and adaptation to climate change. 4) Formulating the policies related to the economy, society, and the environment, by considering the prevention and mitigation of the impact of climate change. Additionally, there must be preparation of the annual budget allocations for the governmental agencies responsible for implementing the supporting Master Plan for greenhouse gas reduction and adaptation efforts, and ensuring that the budget plan aligns with the workload.

4) The Climate Change Adaptation Plan.

The vision of the climate change adaptation plan **is "Thailand is resilient and capable of adapting to the impacts of climate change towards sustainable development."** To achieve this vision, the adaptation plan specifies three key missions: 1) Integrating the guidelines and measures for adaptation that support climate change across all sectors and levels. 2) Enhancing the capacity and awareness of development stakeholders at all levels. 3) Developing databases, research, knowledge, and technology to support the adaptation to climate change. The adaptation plan sets the implementation timeframe between 2018 and 2037, and outlines the guidelines and measures for adaptation in six main areas: 1) Water management, 2) Agriculture and food security, 3) Tourism, 4) Public health, 5) Natural resource management, and 6) Human settlement and security.

Table 1.6: Goals and Indicators for Climate Change Adaptation by Sector

Sectors	Objectives	Indicators
Water management	Enhance the nation's water security while mitigating casualties and property losses and minimizing the impact of water-related disasters.	1 Water Security Index 2 Assessment of the casualties and property losses from water-related disasters
Agriculture and food security	Ensuring the sustained efficiency of production and safeguarding of food security under the risks and impacts of climate change.	1 Proportion of the damage value to gross agricultural produce affected by climatic factors. 2 Capacity of the agricultural sector to achieve self-reliance during climate-related natural disasters.
Tourism	Reinforce the tourism industry's sustainability through strategic development and climate change risk mitigation.	1 Percentage of tourist attractions affecting visitors' confidence level regarding safety and quality of the attractions in relation to protection from natural disasters. 2 The tourism industry's monetary losses resulting from natural disasters influenced by climatic circumstances.
Public health	Accessible public healthcare systems are essential in order to adeptly manage the risks and mitigate the adverse health effects of climate change.	1 Climate change-induced morbidity and mortality rates among individuals 2 Economic losses resulting from adverse health-related impacts of climate change
Natural resource management	Implement sustainable practices for the management of natural resources and biodiversity in order to adapt to the impact of climate change effectively.	1 Natural habitat coverage ratio, encompassing forested areas and rehabilitated coastal ecosystems, in relation to the total land area of the country. 2 The number of climate change-endangered or climate-threatened species within the biodiversity spectrum.
Settlements and people's security	Ensure that the citizens, communities, and cities are ready and equipped to adapt to the risks and impacts of climate change in a manner suitable for the context of the area.	1 The number of deaths, disappearances, and direct impact on the population from natural disasters related to climate per 100,000 people compared to the average baseline over the past 5 years. 2 The total number of integrated urban plans addressing the adaptation to climate change.

1.4.2 The Institutional Mechanism for Climate Change Management

The institutional mechanism shall function to regulate the overall operation to ensure coordination of climate change adaptation efforts among the various agencies and sectors in alignment with the Master Plan, strategies, and relevant policies. It consists of the National Climate Change Policy Committee, responsible for setting the direction of climate change policy and regulating the related work overall. Additionally, there are supporting agencies driving financial and treasury operations and supporting academic data, as detailed below.

Institutional Mechanism for Policy and Planning

1. The National Climate Change Policy Committee.

The National Climate Change Policy Committee was established in 2007 according to the regulation of the Office of the Prime Minister regarding climate change operations. Its mission includes formulating the policies, guidelines, and the mechanisms related to climate change operations in order to achieve the goals for climate change as per the agreements Thailand has participated in. This includes supporting and regulating the alignment of key agency operations with the country's climate change plans and policies. The Committee’s structure comprises the Prime Minister as the Chairperson, with members including the Permanent Secretaries of 15 ministries, the Governor of Bangkok, the Secretary-General of the National Economic and Social Development Council, the Director-General of the Budget Bureau, legal experts, economists, environmentalists, scientists, technologists, energy experts, and other relevant experts. Additionally, qualified representatives from the private sector are included, as detailed in Table 1.7.

Table 1.7: Composition of Thailand's National Committee on Climate Change Policy

National Climate Change Policy Committee	Positions
The Chairperson of the Committee	The Prime Minister
The Deputy-Chairperson No. 1	The Minister of Natural Resources and Environment
The Deputy-Chairperson No. 2	The Minister of Foreign Affairs
The Position-based Committee Members	The Permanent Secretary of the Ministries as follows; 1. The Office of the Prime Minister 2. The Ministry of Finance 3. The Ministry of Foreign Affairs 4. The Ministry of Tourism and Sports 5. The Ministry of Transport 6. The Ministry of Digital Economy and Society 7. The Ministry of Energy 8. The Ministry of Commerce 9. The Ministry of Interior 10. The Ministry of Labor 11. The Ministry of Education 12. The Ministry of Public Health 13. The Ministry of Industry 14. The Ministry of Agriculture and Cooperatives Agriculture 15. The Ministry of Higher Education, Science, Research and Innovation The Permanent Secretary of Bangkok The Secretary-General of the National Economic and Social Development Council (NESDC) The Director of the Budget Bureau
The Experts' Committee	The experts in law, economics, environment, science and technology, energy, or other relevant fields related to climate change such as natural resources, adaptation to climate change, greenhouse gas reduction, international relations (5-9 individuals).
The Experts' Committee from the Private Sector	1 Expert from the Private Sector
The Committee and General-secretary	The Permanent Secretary of the Ministry of Natural Resources and Environment
The Director and Deputy General-secretary	The Secretary-General of the Office of Natural Resources and Environmental Policy, and the Planning Director of the Greenhouse Gas Management Organization
Five subcommittees	The Climate Change Policy Integration and Planning Subcommittee
	The International Climate Change Negotiation Strategy and Cooperation Subcommittee
	The Climate Change Academic and Database Subcommittee
	The Climate Change Public Relations and Climate Empowerment Subcommittee
	The Climate Change Legal Subcommittee

Source: Adapted from the Office of Natural Resources and Environmental Policy and Planning (2020)

Under the Climate Change Policy Committee, there are five sub-committees responsible for the following tasks:

1) **The Climate Change Policy Integration and Planning Subcommittee** is responsible for compiling supporting data to develop the policies, strategies, and plans for greenhouse gas emissions' reduction and adaptation to climate change. It shall formulate recommendations on the legal and financial mechanisms, including advocating integration of climate change issues into budget allocations.

2) **The International Climate Change Negotiation Strategy and Cooperation Subcommittee** is respnsible for preparing recommendations regarding the country's stance in negotiations on international multilateral agreements on climate change. It shall collect information and knowledge related to climate change negotiations, propose action plans concerning foreign affairs, and engage with representatives of other countries in negotiations.

3) **The Climate Change Academic and Database Subcommittee** is responsible for providing input on the preparation of reports for the country under the framework of the United Nations Framework Convention on Climate Change. It shall support the development of greenhouse gas inventories, provide recommendations for developing the databases and knowledge related to climate change, particularly in terms of reducing greenhouse gas emissions, adaptation, and the measurement, reporting, and verification (MRV) systems.

4) **The Climate Change Public Relations and Climate Empowerment Subcommittee** is responsible for disseminating information related to the causes, impacts, and solutions to climate change issues under the Paris Agreement. It shall aim to promote the country's greenhouse gas reduction targets and sustainable development goals. Additionally, it shall promote and support activities related to training, awareness-building, and enhancing the nation's capabilities concerning climate change across all sectors.

5) **The Climate Change Legal Subcommittee** is responsible for proposing ideas for the development, improvement, or amendment of laws related to climate change. It shall draft the legislation, regulations, and decrees related to climate change issues, provide legal opinions, and enforce the laws related to climate change.

2. The Climate Change Management Coordination Unit

The Climate Change Management Coordination Unit was established in 2014[7], as part of the restructuring of governmental agencies under the Office of Natural Resources and Environmental Policy and Planning, aiming to enhance the efficiency of the country's work on climate change. The unit has authority in 6 areas:

1) Providing recommendations for policy, strategies, and action plans regarding climate change prevention and mitigation across the country, including greenhouse gas emissions' reduction, and research and development related to climate change.

2) Offering guidelines, criteria, and mechanisms for national and international-level climate change management, as well as strategies and approaches for negotiating conventions and protocols with other countries related to climate change, and ensuring alignment with the country's economic, social, and national interests.

3) Provide recommendations for measures to enhance cooperation and coordination between the Government and private sectors about implementing activities related to the management of the country's climate change response.

4) Monitor and coordinate with the Government and private sectors about implementing activities related to the management of the country's climate change response.

5) Perform duties as the Secretariat of the National Climate Change Policy Committee.

6) Collaborate or support the work of other relevant agencies or as assigned.

3. National Greenhouse Gas Inventory Agency

The Agency is responsible for calculating, estimating, and reporting the amount of greenhouse gasses emitted by each sector under the greenhouse gas inventory guidelines of the IPCC (2006). The Office of Natural Resources and Environmental Policy and Planning shall collect and report on the economic activity data in collaboration with the primary units in five sectors:

1) Energy: the Department of Energy Policy and Planning and the Department of Transport Policy and Planning is responsible for collecting data on fuel consumption and electricity usage from the relevant units under the Ministry of Energy and the Ministry of Transport, respectively.

2) Industrial processes and product use[8]: the Department of Industrial Works is responsible for collecting data on production, import and export of products in various industries from the agencies under the Ministry of Industry and related organizations.

---

[7] Formerly known as the Climate Change Management Coordination Unit.
[8] quantities of greenhouse gasses produced from chemical reactions in manufacturing processes, the use of certain products, and the utilization of carbon fossil fuel in non-energy forms.

3) Agriculture: The Department of Agricultural Economics is responsible for collecting data on greenhouse gas emissions from livestock farming, rice cultivation, agricultural land, and crop residue burning from various agricultural agencies under the Ministry of Agriculture and Cooperatives.

4) Land Use and Forestry Changes: The Department of National Parks, Wildlife, and Plant Conservation is responsible for collecting data on land use, land-use changes, and the quantity of timber products produced by the agencies under the Ministry of Natural Resources and Environment and related agencies.

5) Waste: The Department of Pollution Control is responsible for collecting data on waste origins, waste composition rates, wastewater volumes, as well as greenhouse gas emission coefficients about waste management activities from the relevant units under the Ministry of Natural Resources and Environment and other related agencies.

Each primary unit in each sector reports greenhouse gas emission data according to the guidelines set by the Department of Pollution Control. Subsequently, the Department of Pollution Control verifies the data for entry into the Thailand greenhouse gas emission Inventory System. The recorded data is then sent to 5 committees by sector to review the methods, estimates, control data quality, and to verify the completeness and accuracy of the greenhouse gas emission data in each sector. The greenhouse gas emission inventory data is then sent to the Committee on Climate Change Policy and Technical Databases for verification before obtaining approval from the National Climate Change Policy Committee for submission to the UNFCCC.

The Institutional Finance and Fiscal Mechanism

1. Working Group for Climate Change-related Fiscal Framework Development

The institutional mechanisms in finance and treasury for the Climate Change Management include the Climate Fiscal Framework (CFF) serve as the guidelines for collecting financial and treasury data from various projects addressing climate change issues. The working group consists of the Department of Natural Resources and Environment Policy and Planning, the National Economic and Social Development Council, the Budget Bureau, and the Public Debt Management Office, with support from the United Nations Development Programme (UNDP). Additionally, the working group receives academic support for the Climate Public Expenditure and Institutional Review (CPEIR) conducted by the UNDP. The CPEIR study serves as a vital tool for operations under the Climate Fiscal Framework, detailed in Section 2.3.

2. The Greenhouse Gas Management Organization (Public Organization)

The Greenhouse Gas Management Organization (GHG-MO) was established in 2007 under the Cabinet resolution to ensure efficient management of projects aimed at reducing greenhouse gas emissions under the Clean Development Mechanism (CDM). It serves as the focal point for coordinating cooperation between the public sector, private sector, and international organizations. The GHG-MO operates under the Royal Decree on the establishment of the Greenhouse Gas Management Organization (Public Organization) 2007, under the supervision of the Ministry of Natural Resources and Environment. Its main objectives include analyzing, screening, and providing opinions on project certification for greenhouse gas emission reduction projects under the Clean Development Mechanism. Additionally, it monitors and evaluates certified projects, promotes project development and market trading of certified greenhouse gas emissions. It serves as the central hub for information on the operational status of greenhouse gas projects, compiles databases of certified projects and traded greenhouse gas emissions, and promotes capacity building. It also provides advice to the Government and private sector organizations on the status of greenhouse gas management.

3. Working Group on Sustainable Finance

The Working Group on Sustainable Finance comprises 5 organizations, namely the Ministry of Finance, the Bank of Thailand, the Securities and Exchange Commission, the Office of Insurance Commission, and the Stock Exchange of Thailand. They have published guidelines on **Sustainable Finance Initiatives for Thailand** that define the direction and framework for the financial sector's operations in Thailand as a central intermediary in capital mobilization and economic resource allocation, raising awareness of its role in driving sustainable economic growth, and considering any negative impacts on the environment and society as a whole. The 3 main objectives include:

Developing advancement for the role of the financial sector, both currently and in the future, to support achievement of the sustainable economic development models for Thailand and ASEAN through prioritizing continuous pursuit of the Sustainable Development Goals (SDGs), and transitioning to a low-carbon economy as outlined in the Nationally Determined Contributions (NDCs).

Supporting development and implementation of the measures, policies, and initiatives related to sustainable finance by the financial sector.

Inspiring financial sector organizations, stakeholders, and society as a whole to integrate environmental, climatic, social, and governance factors into financial decision-making processes to promote sustainable economic development.

4. Establishing the framework and objectives to drive sustainable transformation of Thailand's financial sector by December 2025.

Establishing Key Strategic Initiatives (KSI) for development of the sustainable finance approach that includes 5 items:

1) Defining and categorizing sustainable economic projects or activities, and establishing a common standard (Taxonomy) to serve as the reference for policymakers to align sustainable financial support policies, as well as for financial business operators to develop products and services that address the sustainability goals.

2) Disclosing environmental, social, and governance (ESG) data that meets international standards, which is crucial for financial tracking, analysis, and decision-making. It also helps in designing products and policies that meet the business sector's needs, as well as efficiently distinguishing investment types and measuring the asset risks related to ESG issues, thereby enhancing transparency regarding business governance and oversight.

3) Creating incentive measures to stimulate the market and investment in sustainable financial products, promoting investors and fundraisers to see opportunities in generating high returns with low risks.

4) Establishing the environment that enables financial sector players to benefit from sustainable financial instruments, while adjusting the regulations to reduce the burdens for launching new products and services.

5) Building high-quality human resources in the financial sector with knowledge and expertise in promoting sustainable finance practices that achieve tangible results.

Institutional Mechanisms for Academic and Data-related Affairs.

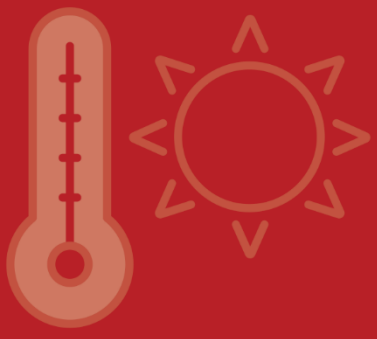
1. The Thailand Research Fund's Coordinating Center for Global Warming and Climate Change Research

The Thailand Research Fund's Research and Development and Coordination Center for Global Warming and Climate Change (THAI-GLOB) is supported by the Office of the National Science and Technology Development Agency (NSTDA). Its main mission is to create and support research projects that focus on global warming and climate change. This includes monitoring and coordinating internal and external project activities to ensure that research projects achieve the planned objectives and yield practical benefits.

2. Southeast Asia START Regional Center (SEA-START).

This is a regional research center established through a large international network titled the Global Change System for Analysis, Research, and Training (START)[9] by the National Research Council of Thailand, and Chulalongkorn University. The activities of the START Regional Center cover the entire Southeast Asia region, focusing on research of future climate education in various countries in the region, including the impact and vulnerabilities to climate change.

[9] This network is a collaboration of several organizations, including the International Geosphere-Biosphere Programme (IGBP), the International Human Dimension Programme (IHDP), and the World Climate Research Programme (WCRP). START units conduct various research and training activities, particularly related to climate change.



Climate Finance

2

2.1 The Role and Importance of Financial Mechanism for Climate Finance

Climate finance is the investment or expenditure aimed at carrying out activities or projects to address climate change issues, including projects with objectives to reduce greenhouse gas emissions or strengthen resilience to negative impacts due to climate change. Funding sources for these activities may come from the public or private sector either domestically or internationally. The various plans and policies developed to address climate change issues cannot be tangibly and effectively implemented without sufficient investment or budget for such planned activities.

In the area of international climate finance mechanisms, the UNFCCC employs the principle of common but differentiated responsibilities and respective capabilities according to the countries involved in greenhouse gas reduction. This principle signifies that the developed countries, which have historically and cumulatively emitted greenhouse gasses due to industrial development, should bear a higher responsibility for reducing emissions. Additionally, they should provide assistance to the developing countries with lower developmental levels and help their climate change adaptation efforts. Under the UNFCCC, financial mechanisms were established through the creation of the Global Environment Facility (GEF) in 1994 and the Green Climate Fund (GCF) in 2011, which are multilateral funds allocated to finance projects worldwide. Furthermore, there are special funds for climate change, such as the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF), with both funds being managed by the GEF.

2.2 Developing the Climate Change Financing Framework (CCFF)

Development of the CCFF aims to promote systematic operations concerning climate change by integrating the policy frameworks and plans into the country's budgeting process to ensure efficiency, effectiveness, and transparency for allocation and utilization of the public sector’s funds. The CCFF will help to establish the roadmap for the country to integrate climate change into the Public Financial Management (PFM) by identifying gaps in various dimensions, including legal, institutional mechanisms, and the finance and fiscal management systems in the public sector. The CCFF emphasizes involvement of the relevant governmental agencies in the climate finance mechanism by prioritizing PFM reform details under the CCFF roadmap leading to effective implementation.

In the Asia-Pacific region, several countries have developed CCFFs with support from the UNDP; for example the Federal Democratic Republic of Nepal and the Islamic Republic of Pakistan.

Each country's CCFF varies in detail due to differences in the policies, priority sequences, national structures, governmental budget utilization and allocation, or the various related climate change activities. Currently, Thailand, through collaboration between the NRCT and the UNDP under the NDC Support Project : Delivering Sustainability Through Climate Finance Action in Thailand (NDC Support Project), is in the process of developing its CCFF, which was originally expected to be completed by 2022.

2.3 Climate Fiscal Framework

To significantly reduce greenhouse gas emissions as outlined in the NDC targets, including mitigating the impact of natural disasters that are expected to intensify due to climate change, the Government and the various sectors must make substantial investments to fund the cost of large-scale infrastructure investment. Therefore, it is imperative to understand and estimate the investment needed and the approach to secure the necessary funding to meet these targets, and to consider the balance between investment in greenhouse gas reduction action and adaptation. Alternatively, there should be establishment of the Climate Fiscal Framework at the national level to provide guidance on utilization of the funds from foreign sources or other sectors, including the country's budget, to address most effectively the challenges due to climate change. Consequently, the Climate Fiscal Framework should include details about the following issues:

1) Allocate funds for climate change equally across all sectors.

2) Estimate the financial needs and identify the units or sectors responsible for implementation.

3) Identify the Treasury departments responsible for sourcing funds domestically and internationally, as well as the fiscal instruments to be used.

4) Establish ethical guidelines for managing climate change funds within the framework of the country's financial policy.

2.4 The Climate Finance in Thailand

The working group responsible for the fiscal framework, which conducted the Thailand Climate Public Expenditure and Institutional Review (CPEIR), was supported by the UNDP and the Capacity Development for Development Effectiveness Forum (CDDE). This review marks a significant initial step in understanding and developing the climate finance in Thailand. The CPEIR study aims to review the fiscal management processes and expenditure related to activities concerning climate change. It categorizes public expenditure into various groups relevant to climate change. This section reviews and summarizes the key findings, as well as provides recommendations on financial and fiscal/treasury matters to administer climate change action, as follows:

2.4.1 Implementation of the financial and fiscal policies

The Thai Government shall allocate expenditure and investment towards climate change initiatives through budgetary channels and off-budget mechanisms, such as revolving funds, foreign loans, and foreign support funds, or multilateral funds aimed at supporting activities related to climate change.

- The relevant laws pertaining to the financial and fiscal policies include the Budgetary Procedures Act of 1969, the Public Debt Management Act of 2005, the Budget Structure and Operation of Policy Under the Sustainable Fiscal Framework, and the complete designation of the work responsibilities for each ministry as the effective conditions for climate change finance, particularly during natural disasters.
- Expenditures outside the budget in the form of revolving funds currently have the potential to serve as funding sources for climate change activities, including energy conservation funds, environmental funds, and the National Greenhouse Gas Management Organization (Public Organization). **However, revolving funds are still subject to legal limitations governing fund management, which may not facilitate operational activities.** In the area of climate change, areas not prescribed by fund laws are also under the supervision of certain ministries, which hinder efficient collaboration between funds.
- **Due to prolonged budget deficits, the Government lacks sufficient financial flexibility to increase revenue from loans to support climate change policies.** Alternative fiscal measures or reliance on funding from foreign sources for climate change may need to be considered to generate adequate income.
- **The private sector plays a crucial role in mobilizing funds to reduce greenhouse gas emissions, particularly in the energy sector**. Apart from increasing revenue for emission reduction activities, this approach also yields co-benefits by reducing business costs, demonstrating an effective mechanism for climate change management that facilitates easier access to foreign funding sources.

Fiscal Measures

The instruments the Government may consider to mobilize funds to address climate change include:

1) Taxes: Taxation is an efficient way to incentivize activities aimed at reducing greenhouse gas emissions, and has lower administrative costs compared to other regulatory instruments, including the Fuel Tax, which is a special sales tax collected based on energy efficiency standards. For example, imposing lower rates on vehicle excise tax or import duties for electric vehicles (EVs) that emit lower greenhouse gas rates than vehicles using fossil fuels, in order to encourage consumers to use low-carbon emission products, providing import duty exemptions for the machinery and equipments imported for the greenhouse gas emissions, granting corporate income tax exemptions to entities for the investment under greenhouse gas emissions, granting corporate income tax exemptions to entities supporting funds for farmers or cooperatives that engage in environmentally friendly activities to boost incentives for businesses to drive grassroots economic growth.

2) Subsidies are measures that affect incentives similar to taxes, such as subsidizing clean energy procurement by increasing the purchase price (adder) from renewable energy.

3) A regulatory fiscal mechanism is a measure that supports other fiscal measures that tend to be low in effectiveness or in cases where fiscal incentives do not pass through to consumers. For instance, in cases where imposing mandatory regulations incurred cost burdens on households or businesses, or when the production attempt to circumvent the fiscal measures. Examples of supervision mechanisms include setting quotas, standards, prohibiting the use or production of certain products, and mandatory insurance purchases.

2.4.2 Expenditure Budget for Climate Change in Thailand

The CPEIR study reviewed land expenditure budgets for the fiscal years 2009-2011 to identify the groups of budget items related to all four dimensions of climate change: greenhouse gas reduction, adaptation, capacity building, and technology transfer for climate change. Each dimension was categorized according to its relationship or relevance to climate change, as follows:

Table 2.1 Criteria for Assessing Budget Relevance to Climate Change in CPEIR

Relevance	Criteria for Assessment
High	The objectives are clear that the outcomes will help improve targeted climate adaptation, lead to greenhouse gas emissions reduction, technology transfer, and/or capacity building related to climate change.
Moderate	The secondary objectives are related to initiating climate resilience or leading to greenhouse gas emissions reduction, or projects that involve multiple activities that are difficult to clearly delineate but at least support the promotion of climate resilience or the reduction of greenhouse gas emissions.
Low	Activities that demonstrate the indirect benefits in terms of reducing greenhouse gas emissions or adaptation efforts.
Very Low	Activities that are only indirectly or theoretically associated with climate resilience and, in some cases, may lead to increased carbon dioxide emissions.

Source: Working Group on Climate Fiscal Framework (2012)

From the analysis of budget allocations following the CPEIR guidelines, it was found that during the fiscal years 2009-2011, Thailand allocated 0.5% of GDP and 2.7% of the total national budget for climate change. The majority of the budget was expenditure related to enhancing resilience to climate change impacts or adaptation, accounting for almost 70% of the total climate change budget. For greenhouse gas reduction, it received approximately 20% of the remaining budget, with the remaining budget allocated for capacity building and technology transfer, accordingly (see Figure 2.1).

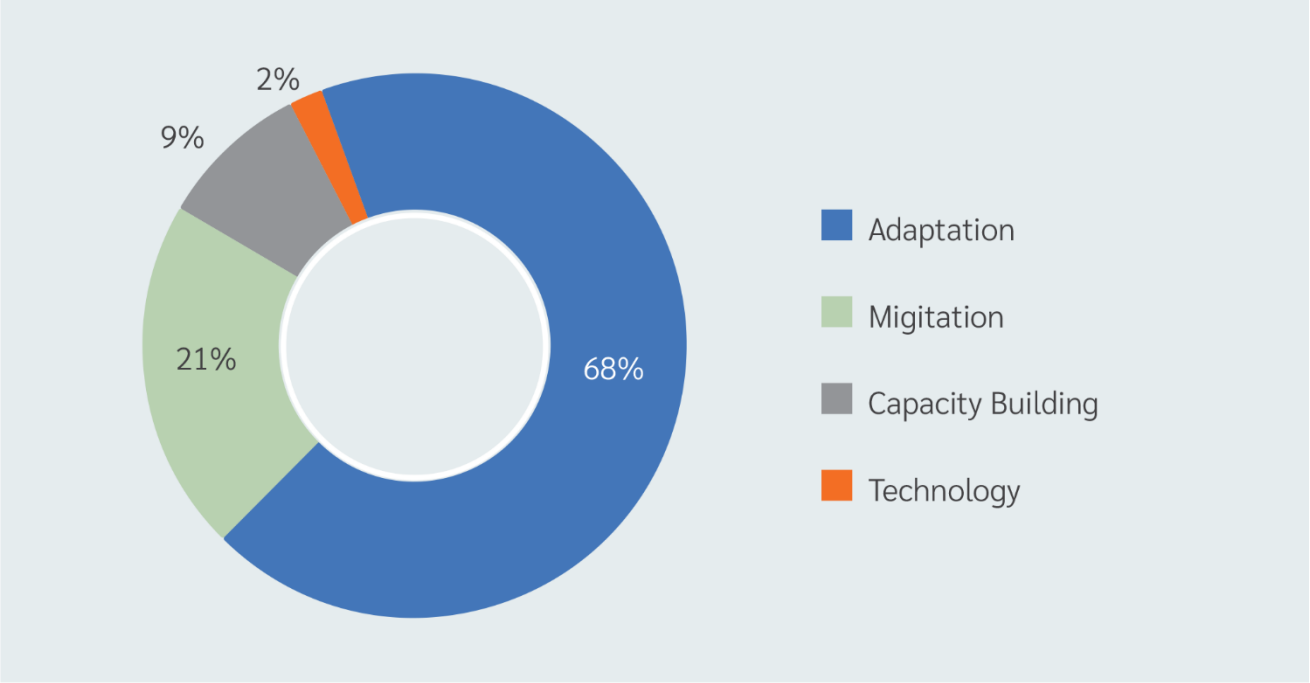


Figure 2.1 Proportion breakdown by budget type for climate change, fiscal years 2009-2011.
Source: Working Group on Climate Fiscal Framework (2012)

If the budget is divided based on its relevance to climate change, it will be found that approximately 1 in 5 of the budget items are related to highly relevant climate change assessment criteria. The majority of the budget, about 60%, is moderately related. There are 137 government agencies involved in climate-related activities. However, more than 3 out of 4 of the budget are concentrated in only 10 agencies. The two main ministries allocated budget for climate change are the Ministry of Agriculture and Cooperatives, and the Ministry of Natural Resources and Environment, with a combined budget allocation of 83.4% of the total budget for climate change. When considering the sub-agencies, the Department of Irrigation and the Department of National Parks, Wildlife, and Plant Conservation together receive nearly half of the budget for climate change. However, in terms of missions, the budget is concentrated under the framework of water resource management operations (fair and equitable water distribution in all sectors and increased water storage and irrigation areas), which accounts for more than 1 in 3 of the total climate change budget.

When examining the primary mission of climate change adaptation that received budget priority, it is found that nearly 70% of the budget from the Ministry of Agriculture and Cooperatives is allocated to land and construction expenses for water allocation and increasing water storage and irrigation areas.

Personnel expenses follow this allocation. This aligns with the budget for developing water storage facilities, increasing water volumes, and ecologically sustainable water resource development under the Ministry of Natural Resources and Environment, where the majority of expenses (61.5%) are also related to land and construction, followed by personnel expenses.

In terms of expenses for reducing greenhouse gasses, the highest expenditure is for the mission of managing forest resources effectively in conservation forest areas and restoring biodiversity to ensure the sustainable and balanced use of forests. The expenses for this activity mainly consist of operational costs (22.9%), including service contracts, repairs, vehicles, and transportation. Personnel expenses (16.7%) and land and construction expenses (16.2%) follow in second place.

2.5 Non-Budgetary Funding Sources for Climate Action in Thailand

External sources of funding are crucial in supporting investments in climate change. The potential sources of funding within the country include

1) The Environmental Fund

The Environmental Fund was established according to the National Environmental Promotion and Conservation Act of 1992 for the financial measures that incentivize all sectors to participate in environmental protection and conservation, following the Polluter Pays Principle (PPP). The Fund supports both in the form of subsidies and low-interest loans. From the operational principles of the Fund, it is evident that the Fund is a potential source of funding to address climate change issues within the country. Currently, the fund is in the process of developing the **Thailand Climate Initiative** (ThaiCL) to promote operations related to greenhouse gas reduction, climate change adaptation, and knowledge building in climate change. This initiative will receive initial funding from the International Climate Initiative (IKI) of the Federal Republic of Germany, amounting to 214 million baht.

2) The Energy Conservation Fund

The Energy Conservation Fund was established in 1995 under the Energy Conservation Promotion Act of 1992. Its goal is to promote energy conservation measures among factories and facilities. The budget of The Energy Conservation Fund can be used for revolving funds, assistance funds, or subsidies for investments and operations in energy conservation or environmental remediation resulting from energy conservation. The revenue for the Fund comes from taxes collected on retail oil consumption by the public. The Energy Conservation Fund is utilized through various financial instruments, such as providing lower than market interest rates through financial institutions participating in investment projects aimed at enhancing energy efficiency and developing alternative energy usage projects.

The selection of bidding methods to provide subsidies to business operators to invest in energy-efficient machinery and equipment in one year. The companies offering the lowest subsidy rates receive priority in funding. This includes projects promoting investment in energy conservation and renewable energy (ESCO Fund), which collaborate with private sector enterprises in energy efficiency and renewable energy projects targeting small and medium-sized enterprises and small businesses.

3) Fund raising in the form of bonds for sustainability

The Bonds for Sustainability refers to the bonds in which issuers raise funds to operate their business under the concept of Environmental, Social and Governance or ESG Bonds. These bonds include: 1) Green Bonds are the Bonds aimed at raising capital for environmental conservation; 2) Social Bonds are the Bonds focused on raising funds for community development and improving people's quality of life; and 3) Sustainability Bonds are debt securities raised to conserve the environment and develop society. In Thailand, the first Green Bond was issued in 2018 and has experienced rapid growth. In 2020, the total value of ESG Bonds raised amounted to 86.4 billion baht. These bonds were purchased by various government agencies, such as the Ministry of Finance and the Ministry of Transport, state enterprises, such as the Bank for Agriculture and Agricultural Cooperatives (BAAC) and the National Housing Authority, as well as private companies like PTT Public Company Limited, Global Power Synergy Public Company Limited (GPSC), BTS Group Holdings Public Company Limited, and Ratch Group Public Company Limited.

2.6 Source of overseas funding to support climate change

Under the framework of the UNFCCC, which member countries collectively agreed to address climate change issues, one of the most crucial mechanisms to achieve common goals is mobilizing funds from developed countries to assist developing countries in both greenhouse gas reduction and adaptation efforts. Thailand needs to rely on foreign funding sources to support its climate change operations, alongside domestic fundraising. The key international funding sources supporting climate change operations include.

1) The Green Climate Fund (GCF)

The Green Climate Fund (GCF) is the primary financial mechanism of the UNFCCC framework and the Paris Agreement and is the largest global climate fund. The GCF supports projects that contribute to a paradigm shift towards sustainable greenhouse gas emission reduction and adaptation to climate change. It supports a 50% reduction in greenhouse gas emissions and a 50% adaptation to the impacts of climate change. The support for adaptation focuses on the least developed countries and small island developing states, accounting for 50%, with the remaining 50% directed towards developing countries. The fund focuses on eight areas: health and well-being, food security and water, livelihoods of people and communities, public infrastructure and facilities, ecosystems and ecological services, production and access to low-carbon energy, buildings, urban areas, industries, and electric appliances, low-carbon transportation, forests, and land use.

The sources of the GCF come from governments and non-governmental organizations from various countries. The Cabinet assigned the Office of Natural Resources and Environmental Policy and Planning as the National Designated Authority of the fund to oversee and ensure that the GCF activities align with the country's needs.

2.1 Example projects for which Thailand received support from the Green Climate Fund

The project **"Enhancing Climate Resilience in Thailand through Effective Water Management and Sustainable Agriculture"** implemented by the Department of Water Resources, Ministry of Agriculture and Cooperatives in collaboration with the United Nations Development Programme (UNDP) has a project duration from 2022 to 2027. This project is categorized as a small-scale project with a total project value of 33.9 million US dollars. It received funding in the form of grants from the Green Climate Fund (GCF) totaling 17.5 million US dollars.

Source: https://www.greenclimate.fund/countries/thailand

2) Global Environment Facility Trust Fund (GEF)

The Global Environment Facility Trust Fund (GEF) provides funding to support climate change projects as well as other environmental projects, including biodiversity conservation, waste and chemical management, and issues related to international waters, soil degradation, and sustainable food system management, forest management, and sustainable cities, along with other environmental issues. Thailand has been a member of the GEF since 1994, with the Permanent Secretary of the Ministry of Natural Resources and Environment serving as the Operational Focal Point of the fund. The Operational Focal Point has the authority to consider project certifications seeking support from the GEF and the Director-General of the Department of International Organizations, the Ministry of Foreign Affairs, acts as the Political Focal Point to coordinate the policy implementation of the fund. The Office of Natural Resources and Environmental Policy and Planning serves as the secretariat to review projects seeking funding support for climate change initiatives. The projects aimed at climate change adaptation supported by the GEF focus on sustainable energy technology transfer and innovation, measures to reduce greenhouse gas emissions that induce systemic changes, and integrating greenhouse gas reduction into sustainable development strategies.

2.2 Example project for which Thailand received funding support from the GEF

In 2021, Thailand received funding support from the GEF in the amount of 98 million baht for the project "Promotion of Energy-Efficient and Environmentally Friendly Residential Buildings." The project is implemented by the National Housing Authority in collaboration with the Electricity Generating Authority of Thailand and King Mongkut's University of Technology Thonburi. The project duration is 5 years, from 2021 to 2026.

Source: https://www.prd.go.th/th/content/category/detail/id/39/iid/27706

3) The Adaptation Fund (AF)

The Adaptation Fund (AF) aims to support projects that help vulnerable and at-risk communities from climate change in developing countries adapt better to the impacts. The sources of funding are gathered from both governments and the private sector in various countries, including a 2% share of the revenue from the sale of carbon credits from projects under the Clean Development Mechanism (CDM) of the Kyoto Protocol. The Thai Government has appointed the Ministry of Natural Resources and Environment as the designated authority to certify the projects, with the Office of Natural Resources and Environmental Policy and Planning serving as the supporting agency for the fund's operations.

2.3 Example project for which Thailand received funding support from the Adaptation

The Adaptation Fund (AF) provides support to Thailand and Vietnam with a total of 229 million baht for the climate change adaptation project using ecosystem-based approaches in the context of cooperation between developing countries in the Mekong River basin. The project is implemented by the Department of Water Resources and covers the period from 2021 to 2024.

Source: The Office of Natural Resources and Environmental Policy and Planning

4) The NAMA Facility Fund (Nationally Appropriate Mitigation Actions: NAMA)

The NAMA Facility (Nationally Appropriate Mitigation Actions: NAMA) was established to support developing countries and emerging economies in implementing projects to reduce greenhouse gas emissions, leading to significant transformative changes in various sectors towards carbon neutrality or zero carbon emissions. The NAMA Facility focuses on projects for reducing greenhouse gas emissions that are suitable for each specific area and have the potential to be expanded or scaled up at the national level. The NAMA Facility was established through collaboration between the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the UK Department for Business, Energy and Industrial Strategy (BEIS) since 2013. The Facility also received support from the Governments of Denmark and the European Union in 2019. As of 2024, the Facility has announced a total of 7 calls for proposals.

2.4 Example project for which Thailand received the NAMA Facility Fund support

- The Refrigeration and Air Conditioning Nationally Appropriate Mitigation Actions **(RAC NAMA)** project aims to enhance energy efficiency and reduce greenhouse gas emissions in the refrigeration and air conditioning industry, tailored to the country's needs. Established in December 2017, the RAC NAMA fund was set up with a total capital of 8.3 million euros or approximately 300 million baht. The Electricity Generating Authority of Thailand (EGAT) acted on behalf of the Thai government as the fund manager to promote the production and consumption of environmentally friendly refridgerant technologies and energy efficiency. Over a period of more than 2 years, EGAT was supported by the fund through various financial measures in the production, consumption, and service sectors as followed:

- Over 10 million baht funding support to incentivize consumers to use environmentally friendly products.

- Funding for the short-term credit support of 52 million baht, interest-free for 1 year, to enable manufacturers to change their production lines.

- Grant funding of over 90 million baht to help manufacturers with a transition of their production lines to use natural refrigerant technology.

- Funding of 15 million baht to procure training equipment and establish 8 training centers nationwide.

- Interest-free funding support of over 155 million baht for marketing activity operations to increase sales.

2.4 Example project for which Thailand received s supported by the NAMA Facility Fund support in Thailand (continued)

Source: RAC NAMA (2021)

2.4 Example project for which Thailand received s supported by the NAMA Facility Fund support in Thailand (continued)

- The THAI RICE NAMA project received support from the NAMA Facility in 2017 through collaboration between the Ministry of Agriculture and Cooperatives, the Ministry of Natural Resources and Environment, and the German Corporation for International Cooperation (GIZ). The project supported rice farmers in transitioning from traditional rice growing methods to alternate wetting and drying (AWD) with irrigation and Laser Land Levelling, significantly reducing methane emissions during rice cultivation. THAI RICE NAMA covered 100,000 households of rice farmers in Thailand, in cooperation with farmers and various farmers' associations, as well as machinery and technical service providers. The project developed incentive models, including financial support, focusing on six provinces in central Thailand: Chai Nat, Ang Thong, Pathum Thani, Sing Buri, Ayutthaya, and Suphan Buri. The project plans to promote further changes at the national and regional levels in the future.

Source: https://www.thai-german-cooperation.info/th/thai-rice-nama-project-selected-for-full-proposal/

5) Funds related to the REDD+ projects

The REDD (Reducing Emission from Deforestation and Forest Degradation) project refers to reducing greenhouse gas emissions resulting from deforestation and forest degradation. According to IPCC data, the emissions from deforestation and forest degradation in tropical areas due to human activities account for approximately 20% of global greenhouse gas emissions. The concept of REDD has been developed since the COP 11 meetings, with the idea that developed countries would pay to incentivize developing countries to develop strategies for reducing deforestation and forest degradation. Subsequently, the activities related to conservation, sustainable forest management, and increasing carbon stocks in forest areas were expanded under the name REDD-Plus (REDD+). Developed countries, including developing countries with high economic growth, tend to demand carbon credits from REDD+ mechanisms to help achieve greenhouse gas reduction targets, as the reduction of greenhouse gasses in the forest sector is lower than the reduction of industrial gasses. The REDD project typically utilizes funding support from industrialized countries in the form of intergovernmental funds, with the support being provided through governmental agencies. Currently, there are REDD+ pilot projects such as the Forest Carbon Partnership Facility (FCPF), which began operating in June 2009, considered a global partnership helping developing countries prepare for the REDD+ framework implementation, supported by the World Bank and the UN-REDD Programme, a collaboration between the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the Food and Agriculture Organization of the United Nations (FAO) in Thailand. As for the climate change in the forest sector, the Forest and Plant Conservation Research Office, Department of National Parks, Wildlife and Plant Conservation, is the main agency responsible for implementing the REDD+ projects in the country. In 2016, Thailand received a 3.6 million dollar grant from the FCPF to prepare for the REDD+ project implementation.

6) International Climate Initiative (IKI)

The International Climate Initiative (IKI) was established in 2008 under the responsibility of the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU). Subsequently, the ministry responsible for IKI was reassigned to the Federal Ministry for Economic Affairs and Climate Protection (BMWK) in 2022. The IKI program is a significant part of Germany's government support for implementing actions under the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity (CBD). The IKI aims to assist developing countries in reducing carbon dioxide emissions, building climate change adaptation, as well as protecting forests to increase natural carbon reserves and maintain biodiversity conservation. Since 2009, the IKI has provided funding for over 13 Thai-German bilateral cooperation projects, totaling 1,785 million baht.

The Role of Parliament Concerning the Climate Finance Mechanism

3

The role of the Parliament in supporting the climate finance adaptation in Thailand can be divided into 4 aspects: legislation, regulation, budget allocation, and representation of the Thai people. The objectives of each aspect are shown in Figure 3.1.

In this section, issues for consideration, operational guidelines, and experiences of parliaments in other countries are presented to promote the role of the members and staff of the Parliament in the climate finance.

Legislation:	Designing financial and treasury laws related to greenhouse gas reduction and supporting climate change adaptation.
Regulation:	Supervising service providers to minimize gaps in the financial operations for climate change adaptation, ensuring the most efficient use of resources to address climate change.
Budgetary process:	Consider allocating the budget in accordance with the objectives of climate change action plans to ensure the establishment of an administration capable of conducting operations concretely and effectively.
Representation of the people:	Listening to the problems of all groups of people to ensure genuine participation in addressing climate change issues.

Figure 3.1: Parliament's role related to the climate finance adaptation

3.1 Role of legislation

The Parliament plays a crucial role in considering drafting laws related to addressing climate change issues, including amending the existing laws to facilitate the climate finance adaptation. The initial guidelines that the Parliament can undertake include:

1) Supporting independent research on the impact of climate change in order to provide a basis for drafting or amending the laws resulting in a comprehensive and concrete integration of climate change dimensions.
2) Establishing goals and prioritizing the enactment or amendment of laws necessary in finance and treasury to promote activities or projects pertaining to greenhouse gas emission reduction or supporting adaptation across various sectors.

3) Reducing legal barriers that impede the operations of the various sectors, especially private sector investors in renewable energy projects, such as providing subsidies for fossil fuels, not only serves as a significant obstacle to reducing greenhouse gas emissions but also involves the use of vast budgets that should be directed towards developing clean energy projects. Additionally, outdated land use laws may hinder the adaptation of households or communities and are not conducive to long-term adaptation planning.

4) Employing proactive approaches to engage stakeholders and affected parties considering drafting laws regarding the climate finance adaptation.

Experiences from abroad

Scotland: The Role of the Parliament in Enacting Climate Change Legislation

Scotland has been commended for its political readiness and institutional mechanism of operations to respond to climate change more effectively than most countries worldwide, particularly its rigor of its climate change laws (Wolstenholme, 2010). The enactment of the Climate Change Act in 2009 was an important basis for subsequent amendments, particularly climate finance laws.

The Climate Change Act of Scotland is significant in setting the annual greenhouse gas reduction targets as a legally binding obligation. The Government sets the targets subject to approval by the Parliament (Secondary Legislation). These targets outline the legal framework for reducing the country's greenhouse gas emissions by 42% by 2020 and 80% by 2050, compared to total emissions, with no more than 20% of the reduction allowed to be offset through carbon credits abroad. To ensure compliance with the goals set forth in the law, the Act establishes yearly targets for greenhouse gas emissions reduction from 2010 to 2050. Moreover, the Act outlines the government's responsibilities in reporting on the mechanisms used to reduce greenhouse gas emissions to the Parliament.

The role of the Parliament is crucial in considering and amending climate change legislation through the collaborative efforts of the Transport, Infrastructure, and Climate Change Committee (TiCCC) as the main committee, and the Rural Affairs and Environment Committee as the subordinate committee for legislative review. Additionally, the Economy, Energy, and Tourism Committee, Finance Committee, along with the Finance Committee and Subordinate Legislation Committee, assess the tasks that relevant agencies must undertake. These committees have proposed amendments to the climate change legislation. The Climate Change Act, as approved by the Parliament, has significantly increased the number of chapters compared to the initial draft, by up to 30%. Examples of content in the legislation that have been altered after the Parliament's review include:

- Setting the target for reducing greenhouse gas emissions from 50% by 2030, which is more challenging than the 42% target in 2020.
- Establishing annual targets for greenhouse gas emissions reduction to achieve the reduction goals in 2020 and 2050.
- Clearly and appropriately defining reduction targets within the country to ensure genuine efforts to reduce greenhouse gas emissions, rather than relying on purchasing carbon offsets from other countries.
- Increasing the importance of government agencies' roles in addressing climate change.
- Enhancing the details of strategies for climate change adaptation and land use.

The Climate Change Act assigns tasks to the Transport, Infrastructure, and Climate Change Committee (TiCCC) for considering draft subordinate legislation and reporting on government performance according to legal requirements. These tasks include drafting government greenhouse gas reduction targets and frameworks for climate change action. During the year of considering this legislation, the committee convened a total of 28 meetings. Factors influencing the conduciveness of Scotland's Parliament in addressing climate change include:

The **institutional capacity** conveys the importance of considering differing opinions from various sectors, the ability to assess conflicting evidence or data from different stakeholder groups, the capability to prioritize tasks, and the ability to evaluate feasible and effective problem-solving or management approaches.

Engagement and interaction includes:

1. The sources of information on climate change; the Parliamentary officers, especially the members of the House of Representatives, rely on information from multiple sources. Primary sources of information include briefing documents from the Scottish Parliament Information Centre (SPICe), which is non-political and provides synthesized and analyzable data. especially, the data from governmental agencies are not extensively utilized by the Parliament officers. Additionally, significant data come from the Intergovernmental Panel on Climate Change (IPCC) and civil society organizations such as the Scottish Environment Link and Stop Climate Chaos Scotland (SCCS). These organizations reflect the views of various stakeholder groups. If necessary, committees can seek consultation from experts or hire consultants to study specific topics further.

2. In terms of data exchange in draft legislation on climate change, the main committees, such as the Transport, Infrastructure, and Climate Change Committee, rely on and benefit from data from various sources, not solely from government agencies. Non-Governmental Organizations (NGOs) involved in providing consultancy to these committees include research institutions like the Tyndall Center10 and organizations like SCCS , which have the largest network in Scotland, with over 2 million members. They play a significant role in representing the voices of socially disadvantaged groups.

Singapore: Carbon Pricing Act

Singapore became the first country in Southeast Asia to enact the Carbon Pricing Act in 2018 (with amendments in 2020), requiring reporting and taxation based on greenhouse gas emissions. All business facilities emitting more than 25,000 metric tons of carbon dioxide equivalent per year are subject to a carbon tax starting at 5 SGD dollar per ton from 2019 to 2023, or $25 SGD per ton in 2024-2025, then further to $45 SGD per ton in 2026-2027, and between $50 to $80 SGD per ton by 2030. (S&P Global Commodity Insight, March 2022). This taxation aims to generate sufficient funds for investing in greenhouse gas reduction technologies in the country.

Critics argue that the tax rates under this law are among the lowest compared to other countries globally applying carbon taxation. However, in terms of coverage, this law applies to approximately 40 companies responsible for emitting up to 80% of the country's total greenhouse gas emissions, a coverage level much higher than the 40% coverage in European countries with similar taxes.

The role of the Singapore Parliament is manifested through the initiation of discussions and debates among its Members of Parliament. Key points of debate include **expanding the carbon tax base** to cover companies emitting carbon dioxide equivalent to 2,000 tonnes or more. These companies already have reporting obligations under the law for their greenhouse gas emissions. Another point under consideration is the tiered tax rates proposal, **where smaller companies would have lower tax rates compared to larger ones. There is a demand for government transparency in setting future carbon tax adjustment plans. Additionally, there are suggestions to utilize carbon tax revenue to assist low-income households or offset production costs for low-income groups, assist workers affected by the phasing out of fossil fuel-related industries, providing them with alternative employment opportunities,** to support workers affected by layoffs in industries related to fossil fuels to find new jobs, and the issue **of allowing carbon offsetting** from greenhouse gas reduction activities in other developing countries. (Tseng, 2022)

Indonesia: Conflict of Interest with Carbon Tax Rate Setting

The government of Indonesia has announced plans to implement a carbon tax at a rate of 2 United States dollars per ton, which is the lowest carbon tax rate globally. Research related to appropriate carbon tax rates indicates that such low rates are unlikely to result in the targeted reduction of greenhouse gas emissions. Studies on carbon tax effectiveness in addressing the climate crisis point to conflicts of interest. (Conway & Hermann, 2021).

[10] Tyndall Center is a research institution focusing on climate change resulting from collaborations between the University of East Anglia (UEA) (main office), Cardiff University, University of Manchester, Newcastle University, the Centre for Social Climate Change and Social Transformations, and Fudan University in Shanghai, People's Republic of China.

In the Government and legislatures, the influence on setting appropriate carbon tax rates for a country can be affected. For example, in Indonesia, where politicians are not required to report their shareholding or business interests to prevent conflicts of interest in performing their duties, research indicates that the conflicts of interest with intense greenhouse gas emissions business interests of the Indonesian parliamentarians are a significant obstacle to implementing carbon tax measures.

3.2 The Role of Regulation

Another important role of the Parliament is to regulate the governance of the country to ensure the efficient and effective use of public funds in government administration. This includes enforcing laws and overseeing various financial projects related to climate change. The Members of the Parliament have a role in directly regulating the Government's work and can also collaborate with other regulatory agencies.

3.2.1 Regulation of the Government's Work in Climate Finance

The regulation of government work aims to reduce any gaps in the financial mechanism related to climate change to ensure the most efficient use of resources in addressing the climate crisis. Regulation can be broadly categorized into two main approaches: the mechanism of parliamentary committees tasked with regulating the government operations and setting up questioning during parliamentary sessions.

1) **Parliamentary Committees' Regulation on Climate Change.**
   Parliamentary committees play a crucial role in assessing the effectiveness of policy implementation and projects in-depth, and providing recommendations for necessary improvements if the objectives cannot be achieved. Regulation can be conducted by requesting relevant government agencies to provide project data, interviewing involved officials, or conducting field visits. The parliamentary committees also serve as bridges to the broader public, especially vulnerable or disadvantaged groups in society who may have less capacity to adapt to climate change. As for the composition of the regulatory committee, the climate change issues involve various sectors, and it may be necessary to establish a new committee with clear missions for overseeing climate change-related activities and serving as a focal point for coordination with relevant committees For example, committees such as the Land, Natural Resources, and Environment Committee, the Disaster Prevention and Mitigation Committee, the Energy Committee, the Health Committee, and others., could be involved. To ensure clearer and more effective regulation of climate change activities, it's important not only to establish specialized committees but also to review and refine the mandates of relevant committees to align them with the country's climate change plans or goals. This alignment would maximize the effectiveness of regulation at the parliamentary level.

Questions for thought

- Has there been a review of the missions and responsibilities of the various Parliamentary Committees to screen and consolidate the tasks related to climate change?
- What mechanism promotes and enhances the regulation of the climate finance within the Parliamentary Committees?

2) Setting inquiries

Setting inquiries is a crucial mechanism for scrutinizing the government's actions regarding climate finance initiatives. Also, it helps significantly to raise public awareness about these matters. Inquiries may encompass the overall progress of projects related to climate change or investigate the specific details of individual projects. For instance, inquiries could focus on the progress of policies supporting greenhouse gas reduction technologies or initiatives to assist vulnerable groups in mitigating the impacts of climate change.

Experiences from abroad

United Kingdom: International Development Committee

The Parliament of the United Kingdom, which provides assistance to developing countries in various areas, including climate change, utilizes proactive measures each year to oversee the aid sent to different countries, ensuring cost-effective budget utilization and effective development. One approach employed is the clear delineation of the Parliament's role in overseeing aid through the International Development Committee (IDC). This Committee, composed of 11 members of the House of Commons without ministerial or government-related positions, is tasked with scrutinizing and regulating the issues under its purview. This often takes the form of questioning relevant agencies to inform the public about the outcomes of aid operations in various countries.

Additionally, there is the Commission for Aid Impact (ICAI), an independent body from the government tasked with reviewing, examining, and preparing reports on the government's foreign aid spending and its outcomes or impacts.. These reports are then evaluated by the International Development Committee. Subsequently, there is a process of soliciting feedback on the reports and explanations from relevant government agencies regarding those aid projects.

3.2.2 Collaboration with other regulatory agencies

The parliament can collaborate with other government regulatory agencies. Examples of such oversight agencies include the Supreme Audit Institution, the National Human Rights Commission, the National Anti-Corruption Commission, and the National Environment Commission.

Questions for thought

- What channels does the Parliament have to regulate the allocation and utilization of funds from foreign sources (off-budget funds) that support investments in greenhouse gas reduction or climate change adaptation projects?
- Which Parliamentary Committees have a role in regulating projects funded by foreign sources for climate change, such as evaluating project outcomes or benefits?

In addition, regulation of whether the management implemented planned projects. The role of **corruption prevention and investigation in climate finance** is important to maximize resource utilization. A case study on the events of corruption in carbon tax policies indicates a risk of corruption at every stage of the policy process, similar to other tax policies. However, carbon taxes may pose a higher risk of corruption compared to other types of taxes. In terms of measurement, reporting, and verification (MRV) of greenhouse gas emissions, if carbon taxes are levied on fossil fuel consumption, the MRV process relies on measuring the quantity of fuel produced plus imported fuel and the quantity sold. This method is less complex and carries a lower risk of corruption compared to cases where carbon taxes are levied based on actual greenhouse gas emissions released in practice. Companies or businesses are responsible for reporting greenhouse gas emissions released, which may provide opportunities for businesses to bribe the inspectors or those who have the authority to approve reporting outcomes. Inspector bribery on reporting of greenhouse gas emissions occurs in many countries worldwide, such as Indonesia, India, Tunisia, and several countries in Europe. Furthermore, if carbon tax measures allow for the purchase of carbon offsets to reduce tax burdens for companies that are unable to reduce greenhouse gas emissions, it may create an opportunity for bribes to be paid to those responsible for inspecting the carbon offsets used.

Experiences from abroad

Brazil: Collaboration between the Parliament and the Federal Audit Court

Article 72 of the Brazilian Constitution stipulates the duties of the Parliamentary Budget Committee in collaboration with the Federal Audit Court in auditing irregularities in the preparation of annual budget expenditure laws, as well as the actual budget expenditures.
The Parliamentary Budget Committee has the authority to request ministries or state agencies to submit evidence and documents regarding budget expenditure. If these government entities fail to comply with the requests, the Federal Audit Court shall provide its opinion within 30 days regarding the appropriateness of the evidence or documents requested by the Parliamentary Budget Committee. If the Federal Audit Court approves the Committee's request, the government agencies must proceed to submit the evidence or information for further examination by the Parliamentary Budget Committee.

Tunisia: The Commission for Sustainable Development and the Rights of Future Generations

The Constitution of Tunisia, enacted in 2014, provides for the establishment of independent organizations to carry out various missions of the country. The Commission for Sustainable Development and the Rights of Future Generations is one such independent organization established in accordance with the constitution. The Committees were elected by the House of Representatives to serve for a 6-year term. The Committees' duties include providing feedback on draft laws and development plans related to the country's economic, social, and environmental aspects.

Question for Thought

- Does the Parliament have clear guidelines or systems in collaboration with other agencies to regulate operations of climate finance?

3.3 Role Related to The Budgeting Process

The Parliament has a role in supporting the development of budgets to accommodate climate change (Climate Responsive Budgeting), which aims to ensure expenditure aligns with the country's goals or targets set through budget allocation sufficient for effective project implementation, transparency, and accountability in budget expenditure. The integration of climate change issues into the annual budgeting process of the country has three main objectives:

1) Increasing access to other funding sources from the private sector or international sources to fill the budgetary gap for climate change efforts that are currently insufficient to achieve the country's goals.

2) Focusing on the effectiveness of projects in addressing climate change issues.

3) Planning budget allocations in the medium term to address long-term climate change challenges.

To achieve these objectives, the Parliament plays a role in the national budget process, which consists of four related steps: 1) Budget preparation, 2) Budget review and audit, 3) Budget management, and 4) Budget monitoring and assessment, as illustrated in Figure 3.2. The main roles of the Parliament are in the stage of budget review and audit of the draft annual expenditure budget proposed by the government for approval, and in monitoring and assessing the budget to ensure that the implementation is carried out in line with project objectives and agency's achievements, as well as the public spending regulations under the law, which are accomplished through the assignments of various committees, submitting the queries, and debating in the Parliament sessions.

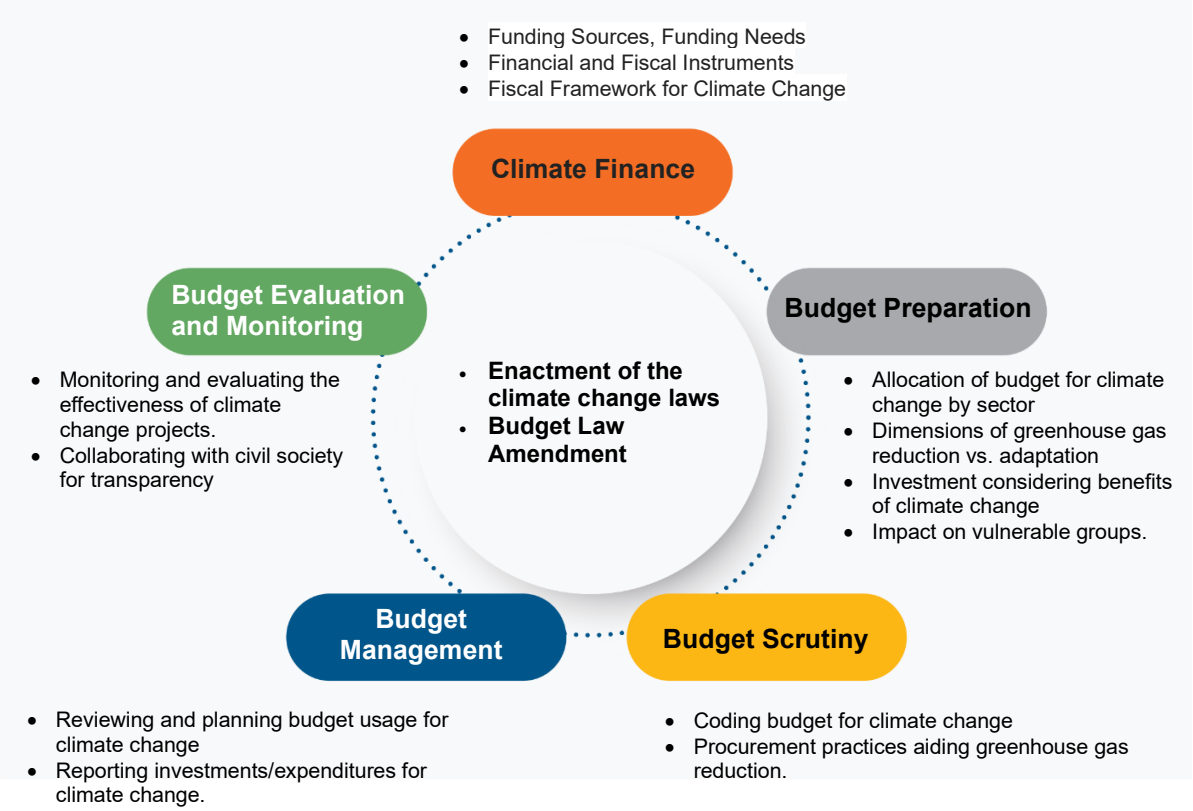


Figure 3.2 Integrated Climate Financein the Budgeting Process
Source: Adapted from Misra (2022)

3.3.1 Roles Related to Budget Preparation and Management

Members of the House of Representatives can contribute to budget preparation and management, with the Government as the main operator. The guidelines for creating the environment to support or drive the integration of climate change financial mechanisms into concrete budgeting can be divided into two main areas. Firstly, guiding through the agencies responsible for budget analysis and driving from local level agencies where representatives in which the Representatives of the House of Representatives are present. They should be able to understand the problems, risks, and vulnerabilities of communities to climate change and support local agencies in considering projects and budgets that focus on climate change adaptation or greenhouse gas reduction as per the actual needs of the locality. Key issues that should be addressed are

- The macro-economic and fiscal framework for the annual budgeting framework should include indicators at the macroeconomic level to forecast the impact of climate change on future government revenue. For example, projections from the International Monetary Fund (IMF) indicate that a 0.5-degree Celsius increase in average global temperature would result in a 1% contraction in the economy (Regional Economic Outlook, 2020). The economic benefits of reducing losses from climate change will reflect the necessity of investing in adaptation and greenhouse gas reduction measures for the country.

- Support for budgetary units (Budget Bureau) to initiate the use of Climate Budget Tagging (CBT) in preparing the annual expenditure budgets, to inform about the allocation of budgets for climate change activities, and to facilitate systematic planning of budget allocations in the future to achieve the stated goals.

- Support the use of Medium Term Expenditure Framework (MTEF) in investing in greenhouse gas reduction or adaptation measures at the sectoral level. This could start with flagship projects for greenhouse gas reduction targets set annually. From experiences in several countries like Bangladesh, India, Nepal, and Pakistan, MTEF has been utilized in sectors related to forest management, agriculture, and water resources. However, they were not explicitly identified as expenditure for climate change, even though such budgets may be indirectly related to adaptation efforts (UNDP, 2021).

- The alignment of budget allocation with the goals set by the government in its plans and policies regarding climate change includes considering budgets for greenhouse gas reduction operations to meet targets, allocating budgets according to the urgency of natural disaster risk reduction policies, and ensuring sufficient budget allocation to agencies primarily responsible for climate change operations.

- Allocating a budget for adaptation measures that address the issue of social vulnerability to the impacts of climate change among marginalized groups such as farmers, impoverished households, and the elderly. The instrument for budget analysis, such as data distribution on participation or benefits received from projects according to social variables across various dimensions.

- Support relevant agencies to annually report the progress of climate change operations by the ministry or related agencies. This facilitates current budget planning adjustments and improvements.

- Support the integration of climate change funds from international sources alongside the budgetary funds to create a holistic understanding of resources and efficiently manage the country's investments in each sector, and ensure transparency. This measure, for example, includes the proportion of foreign funding in greenhouse gas reduction missions classified by industry or type, and the level of the proportions of foreign funding allocated for adaptation or enhancing adaptive capacity.

Experiences in other countries

Bangladesh: Budgeting for Renewable Energy Development

More than two-thirds of the population residing in rural areas of Bangladesh (approximately 70% of the total population) have access to electricity. The country's electricity production relies primarily on natural gas and imported fossil fuels, with the majority of additional generation capacity coming from coal-fired power plants. However, in the year 2014, the Bangladesh government announced a budget allocation for two initiatives aimed at developing renewable energy generation capacity within the country. These initiatives include 1) allocating funds to establish the Sustainable and Renewable Energy Development Authority (SREDA) with a budget of $190,000 and 2) allocating funds to establish a Renewable Energy Fund worth $51.65 million. The allocation of funds for renewable energy development resulted from the continuous advocacy of the Members of the Parliament. Since 2012, the members of the Parliament from various political parties have established the Climate Parliament Group, supported by the non-governmental organization (NGO) Climate Parliament and UNDP. The Climate Parliament Group has jointly developed an action plan to address climate change issues, such as lobbying the government agencies to increase the proportion of renewable energy in the country's electricity generation capacity and supporting the formulation of policies to promote financial and technological support for renewable energy use. Furthermore, in 2012, the Climate Parliament Group played a crucial role in the approval of a draft bill to establish SREDA as a central agency to support and develop sustainable energy.

Nepal: The Parliament Committee Function in the Budget Preparation

The committees of the Nepalese parliament held discussions with various community groups and representatives of ministries during the preparation of the draft annual budget bill. The objective was to present urgent questions regarding key issues and provide comprehensive information for the ministry's budget drafting process to support the allocation of funds in urgent activities according to the needs of the people.

3.3.2 Role of Budget Scrutiny

This section will present considerations to support the work of Members of Parliament, Senate members, as well as officers of the Parliamentary Budget Office in supporting the financial integration of climate change in the process of scrutinizing the draft annual budget expenditure bill as follows:

- Is the budget allocated for climate change operations sufficient to achieve the set goals?
- From the total climate change budget, how much is allocated to greenhouse gas reduction projects and adaptation projects? Which projects are key in terms of greenhouse gas reduction and adaptation?
- Which areas in the country are particularly vulnerable to the impacts of climate change, and has there been any special budget allocation for these areas?
- How does the Government prioritize the adaptation projects and build resilience against climate change, and are there implementations according to the National Climate Change Adaptation Plan?
- How does the Government prioritize greenhouse gas reduction projects, and are there implementations according to the national greenhouse gas reduction roadmap?
- How is the budget allocated for research and development of climate change knowledge?

Experiences from Different Countries

Rwanda: Elevating the Role of Overseas Aid Fund Scrutiny

The Rwandan Parliament sought to transform the country's budgeting process by advocating for the creation of more detailed information during the government's budget preparation stage, especially in categorizing expenditure data by project rather than solely by department, since 2008. The members of the Rwandan Parliament have urged for the compilation of budget-related data, particularly regarding gender dimensions and details of foreign aid. A systematic database has been established, including units tasked with fund management and the sources of these funds, enabling the government to systematically consider these funds in budget preparation, leading to increased transparency.

3.3.3 The Role of Budget Monitoring and Evaluation

Another important role of the Parliament in the budgeting process is **monitoring the expenditure of funds related to climate change by the Admistration, taking into account the achievement of spending objectives.** For example, the quantity of greenhouse gasses reduced or assistance in mitigating agricultural production losses from drought; Enhancing the resilience of vulnerable groups to the impacts of climate change, as well as the effectiveness of budgetary investments, which reflects the efficient use of the country's resources. Some guidelines for members to promote Parliament's role in this regard include:

- The Members of the Parliament can monitor budget expenditure for climate change by using the direct feedback channel from the local people in order to provide feedback to the planning and budget allocation process.

- Collaboration with the government agencies responsible for collecting statistical data (such as provincial statistical offices) to support the collection of in-depth data distributed across social and vulnerability dimensions, such as gender, household composition, poverty levels, occupational groups, and other dimensions. Additionally, focus on collecting data on the impacts of climate change and adaptation to track the effectiveness of budget utilization and the extent of the impact reduction from climate change.

- Collaboration with the administration **in budget allocation activities for monitoring and evaluation adequately and appropriately**. This operation could start with an assessment of the outcomes of large-scale greenhouse gas reduction projects, as the assessment takes a shorter time frame compared to the adaptation projects, which may take longer to demonstrate effectiveness.

- It is advisable to **monitor the progress of climate change projects that receive funding from foreign sources**. This may involve hiring economic consultants or collaborating with non-profit organizations or NGOs specializing in climate change. Evaluating budget expenditure within the constraints of parliamentary budget monitoring committee personnel is also recommended.

Guidelines for monitoring and evaluating government spending on climate change should include assessing progress in both greenhouse gas reduction and adaptation to climate change. An example of a tool that the parliament can use to measure the effectiveness of state investments in reducing greenhouse gasses is **the Climate Change Performance Index (CCPI)**[11]. This index measures annual progress in reducing greenhouse gas emissions in 60 countries and the European Union. Developed by Germanwatch, the CCPI evaluates and reports on each country's performance, representing 92% of global emissions. The CCPI comprises four dimensions: 1) greenhouse gas emissions (40% of the total score), 2) renewable energy production (20% of the total score), 3) total energy use (20% of the total score), and 4) climate policy (20% of the total score), as shown in Figure 3.3.

[11]For further details, visit https://ccpi.org/

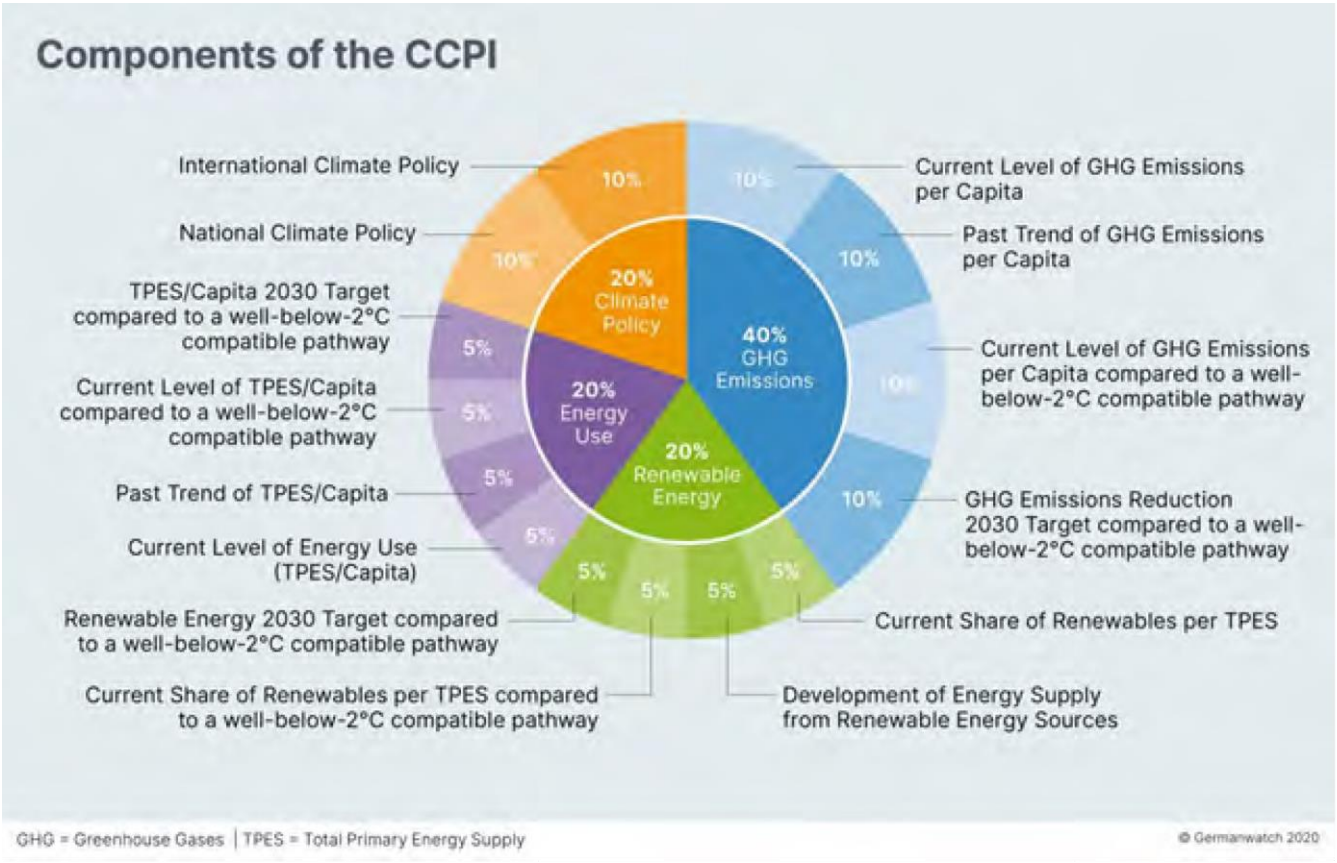


Figure 3.3 Components of the CCPI Calculation
Source: https://ccpi.org/

In 2022, Thailand's CCPI score was 55.01, ranking 31st among countries assessed by the CCPI, categorized as a "Medium-performing Country" in terms of climate change action. The parliament can utilize CCPI principles and guidelines to monitor progress and effectiveness of investments in greenhouse gas reduction. It can assess overall performance or break down into the four dimensions to identify areas needing adjustments in budget allocation to align with performance outcomes. The parliament can collect relevant data from relevant agencies and ensure continuous monitoring to observe trends in performance. If directly using CCPI results, it should focus on scores rather than rankings, as changes in rankings are influenced by other countries' performances. Therefore, improvements or declines in rankings may not accurately reflect Thailand's actual progress. However, using the CCPI has limitations in comparison with top-performing countries, but it doesn't necessarily indicate sufficient efforts to meet greenhouse gas reduction targets set in the Paris Agreement.

In monitoring budget expenditure for adaptation, tracking project outcomes for vulnerable groups in each dimension can determine the level of access to adaptation projects. However, assessing the effectiveness of expenditure on long-term adaptation poses challenges due to resource constraints within the parliament. Collaboration with research institutions or specialized independent organizations in this field can facilitate a more objective evaluation, overcoming the limitations of parliamentary resources.

Experience from abroad

Morocco: Enhancing the Parliament's Capacity for Budget Monitoring and Evaluation

The Budget Analysis Bureau of the Moroccan Parliament has expanded its scope to support the work of parliamentary members and budget committees. This expansion includes producing reports analyzing annual budget expenditures, **assessing the government's public debt management success, and studying the appropriateness of the parliament's work duration related to the budget expenditure process.** This has extended the parliament's involvement in the budget process from 70 days to 6 months. Additionally, the Budget Analysis Bureau is tasked with researching or studying issues requested by parliamentary members, such as providing information for considering various legislation drafts beyond the budget bill.

Source: GOPAC, UNDP & IDB (2016).

Serbia: Utilizing Innovation to Monitor Sustainable Development Budget Objectives

The Serbian Parliament, in collaboration with two organizations, GOPAC and UNDP, has developed a portal for tracking budgets and expenditures accessible through a single website. The Committee on Finance, State Budget, and Control of Public Spending works with the officers from the Ministry of Finance, having signed an MOU and developed data-sharing agreements between the two agencies. This initiative links audit findings from the State Audit Institution, the Public Procurement Office, and the Public Debt Agency into a unified system. This integration enables the Serbian Parliament's finance committee to systematically audit budget expenditures.

Source: GOPAC, UNDP & IDB (2016).

3.4 Role for engaging with the various sectors

The Members of the Parliament and senators are representatives of the people who make decisions and implement measures regarding climate change. Working with various sectors and listening to feedback and suggestions from the public is crucial, especially in supporting technical aspects related to climate change that members of the Parliament may not be experts in. Public hearing helps the parliamentarians understand a wide range of problems and enables targeted problem-solving, especially regarding the differing regional impacts of climate change. Promoting adaptation strategies aligned with different lifestyles and enhancing the adaptive capacities of various groups in society are essential. Understanding the situations of vulnerable groups regarding climate change allows the Parliament to support or advise the executive branch to implement effective and sustainable climate finance adaptation. These mechanisms encourage private sector involvement, civil society organizations, and the general public, particularly concerning the disproportionate impacts on vulnerable groups and help develop sustainable climate finance adaptation in the country, including the following:

Working with civil society organizations

The members of the Parliament can collaborate with non-profit organizations, research institutions specializing in climate change, and civil society organizations to access comprehensive information for regulating the Administration's operation. Working with these organizations over the long term provides avenues to access diverse data on the impacts of and adaptation to climate change efficiently. Section 3.1 presents examples of environmental and climate change-focused organizations in Thailand.

Working with the media

Independent media plays a crucial role in promoting accountability and can significantly influence various policies today. By presenting issues and concerns from both government and civil society organizations, the members of the Parliament can leverage the media to access diverse news and information. They can also utilize the media as a platform to communicate the urgency of climate change issues, the necessity for public investment, or the use of financial tools to reduce greenhouse gas emissions and adapt. These actions may create pressure on the administration to implement necessary measures going forward.

3.1 Example of organizations working on climate change:

• The Thailand Environment Institute (TEI)

The Thailand Environmental Institute focuses on its role as a contemporary, accurate, and reliable source of environmental research and knowledge. It also emphasizes advocating for collaborative efforts among various sectors in society to link conservation and sustainable development of natural resources and the environment. The strategies of the institution's work include:

- Guidance on Policies and Support for Environmental Strategy Development Using Expertise, Empirical Evidence, and Field Experience
- Serving as the primary data source for both national and international stakeholders through a one-stop shop network
- Developing strong and standardized environmental research capabilities, and driving collaboration networks among the Government, private sector, and community stakeholders to translate policies into action
- Advocating, disseminating, and publicizing environmental knowledge, recommendations, and information

The TEI's Climate Change team expanded and extended the operation on climate change adaptation to a practical level and connected networks within Thailand and neighboring countries since 2009. The TEI's work emphasizes cooperation to strengthen various cities' readiness to deal with long-term climate change, as well as promoting the use of knowledge for policy development to achieve sustainable development goals. Examples of these projects include:

- Developing city networks in Asia to address climate change (Asian Cities Climate Change Resilience Network - ACCCRN) in collaboration with municipalities and network organizations in the Hat Yai and Chiang Rai urban areas.
- Building research capacity focused on becoming cities linked to regional and climate change action in various cities in Thailand, Myanmar, Vietnam, and Cambodia
- Strengthening cooperation with local civil society in order to build resilience to climate change in a sustainable and equitable manner

3.1 Examples of organizations working on climate change. (continued);

• The Stockholm Environment Institute (SEI Thailand)

The Stockholm Environment Institute (SEI) is an international research institution focused on environmental and development issues. Its goal is to disseminate knowledge and build capacity to address environmental challenges. SEI has a branch called SEI Asia, headquartered in Bangkok, which focuses on research areas such as the gender equality dimension, social inclusion, climate change adaptation, disaster risk reduction, and the development of renewable energy alongside urban development. SEI Thailand also collaborates with various sectors both domestically and in the Mekong region to address transboundary environmental and social issues, such as air pollution and greenhouse gas reduction.

• The Energy for Environment Foundation (EEF)

The Energy for Environment Foundation, a non-profit organization established in 2000, aims to support activities aligned with the government's energy policies, particularly in promoting the use of renewable energy sources domestically. It focuses on disseminating knowledge, ideas, and scientific research, as well as promoting the use of biomass to replace imported fossil fuels. The foundation has set up a "Bioenergy Promotion Center" to conduct various activities aimed at reducing constraints and obstacles in using biomass for electricity and heat production, as well as promoting efficient energy use. The foundation's goals include:

- Support governmental and private sector efforts regarding energy conservation and environmental protection, and promote renewable energy
- Demonstrate and disseminate energy conservation technologies, including designing building materials for energy-efficient use and promoting the efficient use of renewable energy with minimal environmental impact
- Promote the use of renewable energy for electricity and other forms of energy, such as heat and steam production
- Collaborate with the Government, governmental agencies, and various organizations both domestically and internationally to support energy conservation and the use of renewable energy

3.1 Example of organizations working on climate change (continued);

• The Green World Foundation

The Green World Foundation, established in 1991, aims to disseminate knowledge about Thailand's environment through various media channels to make it accessible to the general public. The foundation collaborates with various sectors, including schools, local communities, teachers, children, and families, to create learning experiences in the field, allowing locals or the general public to analyze their local environment directly without relying on experts or expensive equipment. Over the past decade, the foundation has shifted its focus to urban areas, revitalizing the urban connection with nature. Regular outdoor activities are organized to educate urban residents about their local environment and the biodiversity coexisting with people in the city. One of the primary campaigns is promoting Bangkok as a bicycle-friendly city to address various urban issues, including environmental, economic, and social challenges, making Bangkok a more livable city. The foundation is committed to innovating and developing community learning processes through real-life experiences and fostering the relationship between people and nature to create a sustainable environment and a resilient society for the future, believing that sustainable environmental problem-solving is driven by the people's power.

Experiences from abroad

Scotland: Strong cooperation between the Parliament and various sectors

The consideration of the draft Climate Change Act of Scotland serves as a prominent example of collaboration among civil society organizations working on climate change. It highlights efforts to push for amendments to the legislation to strengthen the draft law, particularly through the collective action by various civil society groups, the main organizations, Stop Climate Chaos Scotland, and the World Wide Fund for Nature (Wolstenholme, 2010).

Collaboration with local organizations to advocate for suitable climate finance

Climate finance, especially **investment in projects related to adapting to the impacts of climate change, is crucial and requires a deep understanding of the context and the impacts in each area to plan budget allocation or project implementation effectively**. Therefore, local government agencies and communities play a significant role in defining the adaptation goals for their own communities. The members of the Parliament also have a vital role in reflecting the real issues of the areas they represent. Regarding budget consideration for climate change adaptation, it may be channeled through the provincial development budget in the form of various proposed projects by the representatives during the annual budget approval process. Additionally, members of the Parliament may have an increased role in overseeing projects in their areas systematically through joint meetings with local government agencies and communities to define project objectives, targets, and realistic plans to achieve them.

Questions for thought

- Does the Parliament have mechanisms or processes to genuinely engage the public, especially vulnerable groups, in preparing the budgets or enacting the laws related to climate change adaptation? If so, how?
- What are the necessities or needs of the people, especially vulnerable groups, to conduct the activities related to climate change adaptation and greenhouse gas reduction?

3.5 Recommendations to promote the role of the Parliament in the climate finance

It has been almost 7 years since the Thai government announced its targets for reducing greenhouse gas emissions and adapting to climate change under the Paris Agreement within the framework of the UNFCCC. It may be appropriate for the Thai Parliament to recognize its crucial role in driving the country towards achieving these goals. This presentation will propose recommendations to initiate changes and enhance the long-term role of the Parliamentary Members in managing mechanisms and financial measures for more effective climate change adaptation in the country's future.

1. Enhancing capacity and allocating resources appropriately for regulation of the climate finance

The role of the Thai Parliament in terms of legislation, regulation of the administration, and budget allocation for integration of the climate finance adaptation in the country necessitates diverse technical knowledge. **The Thai Parliament may seek support from external agencies to develop capacities in various formats**, such as workshops, seminars, and the appointment of Climate Change Coaches to provide consultancy to the parliamentary members, senators, and parliamentary officers. As climate change work is a long-term endeavor requiring continuous policies or tools, **adequate allocation of personnel resources for oversight work of the climate finance adaptation** is crucial.

An initiative in Samoa, supported by various UN agencies, including the International Labor Organization (ILO) and UNDP, involved the Samoa Parliament and state agencies in organizing an induction program on the Sustainable Development Goals (SDGs) for newly elected Members of the Parliament. The program aims to enhance their understanding of their role in guiding the Administrative Committee in the formulation and implementation of policies to achieve the SDGs. A key objective is to effectively address climate change challenges.

2. Setting ideal goals for the role of the Parliament in climate finance

As the Government implements various action plans to support climate change adaptation, the Members of the Parliament should establish ideal goals in all four aspects related to climate finance. This includes **developing suitable regulations and assessing budget allocations, as well as implementing financial mechanisms focusing on analyzing the impact of the state's policies or projects**. This could begin with regulating flagship projects or prominent policies related to spending aimed at reducing greenhouse gas emissions by key sectors. The responsible agencies should first be identified before expanding into other projects or analyzing budgets that clearly indicate the benefit recipients, especially vulnerable groups affected by climate change. This provides insights into the effectiveness of the policies and fiscal instruments used for climate change adaptation.

Furthermore, **establishing the mechanisms to drive the setting of goals for the Members of the Parliament** may follow a similar path to establishment of **the National Caucus of Environmental Legislators** (NCEL) in the United States. The NCEL is an independent organization with over 1,000 members from both the House of Representatives and Senate from the major political parties who are interested or specialized in environmental issues. The NCEL serves as a platform that allows the Members of the Parliament to share opinions and collaborate on environmental issues. One of the main issues addressed is climate change.

3. Enhancing the capability of the Parliament regarding budget consideration for climate change adaptation

Boosting the capacity of the Parliament officers in **collecting and analyzing the latest scientific, economic, and social data concerning the impact of climate change** in order to ensure relevance for budget approval aligned with the nation's greenhouse gas reduction goals and economic development. Additionally, engaging in discussions with the experts on greenhouse gas reduction projects across the various sectors and stakeholders affected by climate change policies, including vulnerable groups, and prioritizing the most urgent needs.

4. Developing channels for public participation in climate change adaptation

Establishing online platforms dedicated to addressing climate change issues, including feedback and comments on the current climate change policies, will help improve the mechanism for public participation. These platforms can serve as valuable sources of information for the members of the parliament in regulating administrative operational and budgetary considerations. Furthermore, **collaborating with civil society organizations** on climate change provides another **effective approach for accessing information and feedback from vulnerable populations**.

References

Karnikar, T., Thammaphanich, W., Wattanich, O., Bandit, B., Atsamnukh, A., Limsakul, A. et al. (2021). Reducing greenhouse gas emissions and adapting to climate change in the context of Thailand. Economic Research Institute, Puay Ung Phakorn.

Department of Health. (2010). Public health role in global warming. Retrieved from http://203.157.64.3/multim/media/14779.pdf.

Working Group on the Climate Change Adaptation Framework Plan. (2012). Study of public expenditure and institutional management related to climate change adaptation in Thailand. Complete report, June 2012.

Office of the Research Fund for Research Support. (2016). Synthesis report and status of Thailand's climate change knowledge synthesis project, 2016.

Office of the Natural Resources and Environmental Policy and Planning. (2018). National Climate Change Adaptation Plan. Access climate.onep.go.th/th/natinal_adaptation_plan/.

Office of the Natural Resources and Environmental Policy and Planning. (2017). Greenhouse Gas Reduction Roadmap for Thailand, 2021-2030. Retrieved from https://climate.onep.go.th/wp-content/uploads/2019/NDC-Roadmap-for-Printing.pdf.

The National Economic and Social Development Office. (2021). National Income of Thailand, Fiscal 2020.

The National Statistical Office. (2020). Survey of the employment status of the population at the provincial level, Quarter 3: July-September 2020, Ministry of Digital Economy and Society. Thammaphanich, W., Poonpipop, P., Kasemthap, S., Sakorn, S., Kuntawat, R., Suksaengchan, J., & Tongsri, T. (2021). Project to develop the human resources of the agricultural sector of Thailand, Fiscal Year 2021. Office of Agricultural Research and Development (State Enterprise).

Attavanich, W. 2017. Effect of Climate Change on Thailand’s Agriculture: New Results. Working Paper #25/2017. Department of Economics, Kasetsart University.

Attavanich, W. 2019. The Effect of Climate Change on Natural Rubber Production. Working Paper #15/2019. Department of Economics, Kasetsart University.

Conway, D.& Hermann, B. 2021. Dealing with corruption in adopting and implementing carbon taxes. U4 Brief 2021:5. U4 Anti-Corruption Resource Center in Partnership with Climate Focus.

Eckstein, D. Kuenzel V., Schaefer, L. 2021. Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000-2019. Briefing Paper. Germanwatch e.V.

GOPAC, UNDP & IDB. 2016. Parliament's Role in Implementing the Sustainable Development Goals: A Parliamentary Handbook.

IPCC. 2013. Climate change 2013: The physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Eds: Stocker TF, Qin D, Plattner G-K, Tignor M, Allen SK, Boschung J, Nauels A, Xia Y, Bex V and Midgley PM). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

Limsakul, A. 2020. Trends in Thailand's extreme temperature indices during 1955–2018 and their relationship with global mean temperature change. Applied Environmental Research, 42(2), 94–107.

Misra, V. 2022. Climate Finance Mainstreaming in the Planning and Budgeting Process and Role of Parliament. Slides presentation at Fostering Climate Ambition and Inclusive Climate Action: The Role of the Parliament Conference. 12 November 2021.

Office of Natural Resources and Environmental Policy and Planning. 2020. Thailand Third Biennial Update Report.

Pipitpukdee, S., & Attavanich, W. (2021). Future of rice production in Thailand under changes in climate and socio-economic conditions. Working paper.

Pipitpukdee, S., Attavanich, W., & Bejranonda, S. (2020a). Impact of climate change on land use, yield and production of cassava in Thailand. Agriculture, 10(9), 402.

Pipitpukdee, S., Attavanich, W., & Bejranonda, S. (2020b). Climate change impacts on sugarcane production in Thailand. Atmosphere, 11(4), 408.

RAC NAMA. 2021. GREENER THAILAND: Success Stories from RAC NAMA Project Implementation. NAMA Facility.

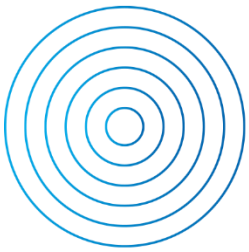
Rajbhandari, S., Limmeechokchai, B. & Masui, T. (2019). The impact of different GHG reduction scenarios on the economy and social welfare of Thailand using a computable general equilibrium (CGE) model. Energy, Sustainability and Society, 9(19), 1.

Swiss Re Institute. (2021). Economics of climate change: no action not an option. Access at https://www.swissre.com/dam/jcr:e73ee7c3-7f83-4c17-a2b8-8ef23a8d3312/swiss-re-institute-expertise-publication-economics-of-climate-change.pdf.

Tseng, S.D. 2022. Appraising Singapore's Carbon Tax Through the Lens of Sustainability. NUS Asia-Pacific Centre for Environment Law Working Paper 22/01.

UNDP. 2021. Budgeting for Climate Change: A Guidance Note for Governments to Integrate Climate Change into Budgeting with a Focus on Medium-Term Budgets. Technical Note Series.

WolStenholme, R. 2010. The role of parliamentarians in strengthening the climate change agenda: Scotland report. International Institute for Environment and Development.




UNDP

Sida
SWEDISH INTERNATIONAL
DEVELOPMENT COOPERATION AGENCY