



PRELIMINARY ASSESSMENT REPORT

Green Viability and Climate Vulnerability Assessments in Healthcare-related Facilities in Thailand

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Executive Summary

Concerns over climate risks and vulnerabilities have recently been gaining ground in many parts of Thailand. The health sector is likely to be affected by the dynamic interplay between urbanization, climate change, and poverty, particularly in hospitals that offer Sexual, Reproductive, Maternal and Child Health (SRMCH) services which can have significant effects on the lives of women and girls at all ages. However, the comprehensive green viability and climate vulnerability assessments of health-related facilities have been conducted in some Asia-Pacific countries, but not in Thailand. Although the Ministry of Public Health has adopted the *Green and Clean Hospital* practice since 2011, the practice focuses on reducing greenhouse gas emission and achieving sustainable sanitation. Assessing green viability and climate vulnerability of the healthcare facilities can identify and address potential risks and challenges of providing effective healthcare in emergency situations. The results of these assessments can help establish baseline information and prioritize short- and long-term interventions for healthcare facilities in Thailand to mitigate and adapt to climate change. These coping and adaptive capacities of healthcare facilities are instrumental in protecting and improving health in fragile communities and vulnerable groups, especially women and girls who are likely to be disproportionately affected by climate change.

The main purposes of this report are to (1) review and synthesize the approaches and tools for green viability and climate vulnerability assessments that are applicable to Thailand; (2) conduct the green viability and climate vulnerability assessments in four healthcare facilities in Thailand in different areas with high climate vulnerability; and (3) develop policy recommendations for healthcare facilities in Thailand

Our proposed assessment tool is based on a combination of *the WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities*, the IPCC Fifth Assessment Report (AR5), and the U.S. Department of Health and Human Services' Sustainable and Climate Resilient Health Care Facilities Initiative (SCRHCFI). The SCRHCFI framework was adopted by the Thai Department of Health to assess the hospitals' preparedness for climate-related extreme weather patterns. The potential climate change impact consists of three (3) dimensions: hazard, sensitivity and exposure, and vulnerability. For hazard and sensitivity and exposure, the main indicators used in this study come from the SCRHCFI framework (i.e., the climate risks and community vulnerability dimension and the land use, building design, and regulatory context dimension). Vulnerability is divided into two sub-dimensions: coping capacity and adaptive capacity. Coping capacity denotes the ability of a healthcare facility to address, manage, and overcome adverse conditions in the short-medium terms. Adaptive capacity means the ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events. The two sub-dimensions are operationalized using the *WHO Guidance for Climate Resilient and*

Environmentally Sustainable Health Care Facilities, which considers environmental sustainability of healthcare and classifies vulnerability into four (4) sub-dimensions: (1) healthcare workforce, (2) WASH (Water, Sanitation, and Hygiene) and waste management, (3) energy, and (4) infrastructures, technologies, and products. The fifth dimension – stakeholder engagement and governance – has been added to highlight the importance of governance mechanisms (policy and planning, sufficient resources) and an open communication process

Based on our preliminary assessment of four healthcare facilities in Rayong, Pathumthani, and Chiang Mai, we offer the following observations:

- All four healthcare facilities are located in high climate-risk areas. Three out of four are prone to either fluvial or pluvial floods (or both). Rayong hospital – albeit located in an area that is never flooded or likely to be flooded— is projected to be severely affected by sea-level rise in 50 years’ time.
- The tertiary and secondary hospital have the same level of sensitivity and exposure to climate change and climate-related events. However, the two primary healthcare units have different sensitivity and exposure levels. The urban primary healthcare center has recently moved to a new building, which has been designed to prepare for climate-related disasters. The primary healthcare center in Chiang Mai, on the other hand, still uses its original building in which a majority of essential working systems and back-up systems are exposed.
- In this assessment, the coping capacity dimension provides direct measures for a healthcare facility’s climate vulnerability. Almost all healthcare facilities in this study have a low vulnerability level, indicating their preparedness to cope with climate-induced public health emergencies. The primary healthcare center in Chiang Mai, on the other hand, is highly vulnerable to climate change due to its heavy reliance on external agencies for public water supply, water quality audit and monitoring, water safety plan, and waste-related management systems.
- Several indicators in the adaptive capacity dimension specifically assess a healthcare facility’s ability to minimize negative environmental impacts and eradicate diseases by providing eco-friendly services and by reducing waste (i.e., Green Viability). Healthcare facilities with surplus resources have low vulnerability levels in the dimension, indicating that they have integrated environmental sustainability into their service operations. The primary healthcare centers need to pay close attention to the flexibility and adjustability of essential working systems, particularly water-related and waste management systems. Also, almost all healthcare facilities in this study still have not fully followed the national government’s green procurement policy. Neither have they adopted and implemented policies to provide eco-friendly services to their staff and patients, including promoting the use of public transportation and consumption of healthy and eco-friendly food, avoiding the use and consumption of goods and materials that contain toxic chemicals, and spearheading waste recycling effort.

We offer three (3) sets of recommendations based on our preliminary findings of green viability and climate vulnerability assessment as follows:

1. Healthcare facilities should:

- Actively harness informal local networks to access the necessary resources for an effective response to climate change, including specialized vehicles and alternative emergency sites.
- Work with the communities to jointly formulate and implement targeted mitigation strategies.
- Train their executives and personnel on climate change to prepare for its impacts, aiming to secure their buy-in and facilitate the adoption of climate-smart healthcare approaches.
- Work with local governments to develop a comprehensive climate preparedness and mitigation plan, especially for in-home care patients.

2. Ministry of Public Health, Ministry of Interior, and other national-level agencies should

- Prioritize the promotion of energy and resource efficiency policy and practices and extend this focus to include the public health sector.
- Embrace a comprehensive approach to climate awareness and preparedness for all sectors, including training, awareness campaigns, and substantial investments in climate friendly/resilient infrastructure and suitable technologies.
- Promote and facilitate multisectoral collaboration, especially between health-related and environmental agencies to design and implement climate adaptation and mitigation strategies.
- Integrate climate change considerations into the national budget planning/allocation process.
- Earmark a specific fund for climate mitigation and adaptation, particularly in the health sector.

3. UNFPA, FHI 360, and their partner organizations should:

- Conduct more assessments with hospitals and healthcare facilities throughout Thailand, including those not operated by the Ministry of Public Health and primary care clinics.
- Focus more on strengthening the coping and adaptive capacities of local governments and regional government agencies.
- Expand the assessments to in-home care teams, nursing homes, and facilities catering to other vulnerable groups, such as toddlers, children, and disabled individuals.
- Explore further collaboration with relevant government agencies in Thailand and like-minded partners to extend the scope of this project/assessment.

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Abbreviations

ANC	Antenatal Care
COP	Conference of the Parties
CUP	Contracting Unit for Primary Care
FHI 360	Family Health International
GHG	Greenhouse Gas Emission
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and Evaluation
NICU	Neonatal Intensive Care Unit
PAO	Provincial Administrative Organization
SCRHCFI	Sustainable and Climate Resilient Health Care Facilities Initiative by the U.S. Department of Health and Human Services
SDHPH	Subdistrict Health Promotion Hospital
SDGs	Sustainable Development Goals
SRMCH	Sexual, Reproductive, Maternal, and Child Health
UHC	Universal Health Coverage
UNFCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
VOC	Volatile Organic Compound
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization



CHAPTER 1

Introduction

CHAPTER 1

Introduction

1.1 BACKGROUND AND RATIONALE

The future of healthcare delivery will depend in part on the adaptive capacity of hospital infrastructure required to respond to the predicted health-related impacts of climate change (Stern, 2009; Solomon et al., 2009). The potential health risks posed by climate change may include higher prevalence of heat stroke, respiratory diseases from bush fires, and tropical vector diseases (e.g., Dengue fever and Malaria) (McMichael & Woodruff, 2007). While building design of a healthcare facility is widely recognized as a significant determinant of population health in the context of climate change, little is known about how the climate-induced changes affect healthcare facilities and their service delivery (Loosemore et al., 2011). Extreme weather events, such as tropical storms, heat waves, and wildfires, are likely to create unique physical and patient demand challenges that were not envisaged in original hospital designs. Evidence for this is clear from the many recorded instances of hospital buildings and infrastructure failing to support healthcare delivery during such events.

Nevertheless, healthcare facilities, including hospitals and community health centers, are expected to coordinate healthcare services and other types of assistance during natural disasters. An assessment of the vulnerability and adaptive capacity of healthcare facilities to cope with climate change is thus necessary to formulate appropriate strategies for property investment, asset and facilities management, and personnel development.

Apart from concern with climate-induced disasters, the healthcare sector is anticipated to play a crucial role in mitigating the effects of climate change on human health (Lee & Lee, 2022). The impacts of the healthcare industry on humanity and the environment stem from the resource-intensive nature of the industry (Dhillon & Kaur, 2015). Healthcare facilities are resource/energy-consuming institutions because they consume large quantities of disposable products and generate an enormous amount of toxic waste that contributes to environmental pollution (Tomson, 2015; Eckelman & Sherman, 2018). International donor agencies, third-sector organizations, and governments around the world have advocated the concept of green healthcare. Healthcare facilities are expected to maintain high-quality care in an environmentally sustainable way (Shaabani et al., 2020; Vogus et al., 2021). The need for green healthcare, green viability in the healthcare sector, or environmentally sustainable healthcare has steadily gained wider recognition as healthcare facilities consume a significant amount of public resources to provide medical services (Dhillon & Kaur, 2015). Howard (2003) defines green viability in healthcare as an attempt to concomitantly minimize negative environmental impacts and eradicate diseases by improving the relationship between human and environmental health. Green viability also encompasses the idea of eco-friendliness, denoting that it provides eco-friendly care services that aim at promoting personal health and the environment (Frumkin & Coussens, 2007). Green viability can also create economic value by reducing waste and operational costs, thereby increasing the value of healthcare and improving consumer/patient awareness about climate change (Jameton & McGuire, 2002). Nonetheless, despite these advantages, the implementation of green viability requires high-level

hardware requirements, such as green infrastructure components for the hospital (Lee & Lee, 2022). As such, various studies have been conducted on research and development, the evaluation criteria for green design and operations for healthcare facilities, and case studies on minimizing the environmental impact of patient treatment (Jametón & McGuire, 2002; Altomonte et al., 2019; Shaabani et al., 2020). However, there is still a paucity of empirical research on green viability practices in healthcare (Lee & Lee, 2022).

Over the past years, concerns over climate risks and vulnerabilities have been gaining ground in many parts of Thailand. The health sector is likely to be affected by the dynamic interplay between urbanization, climate change, and poverty, particularly in hospitals that offer Sexual, Reproductive, Maternal and Child Health (SRMCH) services which can have significant effects on the lives of women and girls at all ages.

The comprehensive green viability and climate vulnerability assessments of health-related facilities have been conducted in some Asia-Pacific countries, but not in Thailand. Although the Ministry of Public Health has adopted the *Green and Clean Hospital* practice since 2011, the practice focuses on reducing greenhouse gas emission and achieving sustainable sanitation. To address these challenges, this research seeks to develop a green viability and climate vulnerability assessment tool for healthcare facilities in Thailand by combining composite indicators on disaster risk reduction, mitigation, and environmental sustainability measures. Assessing green viability and climate vulnerability of the healthcare facilities can identify and address potential risks and challenges of providing effective healthcare in emergency situations. The results of these assessments can help establish baseline information and prioritize short- and long-term interventions for healthcare facilities in Thailand to mitigate and adapt to climate change. These mitigative and adaptive capacities of healthcare facilities are instrumental in protecting and improving health in fragile communities and vulnerable groups, especially women and girls who are likely to be disproportionately affected by climate change.

This report conveys the preliminary findings and lessons learned from applying this assessment tool to four healthcare facilities in Chiang Mai, Pathumthani, and Rayong. The rest of this chapter describes the public healthcare system in Thailand, followed by the research objectives and methods. The second chapter explains the conceptual framework, technical terms, and composite indicators used to assess the green viability and climate vulnerability of four healthcare facilities. The third chapter reports the preliminary findings from assessing the four healthcare facilities, as well as our suggestions for improvement for each facility. The final chapter summarizes the main conclusions from this preliminary assessment, followed by specific recommendations for consideration by UNFPA, FHI 360, and government entities in Thailand. Since only four healthcare facilities were conveniently selected for this study, the conclusions cannot be generalized to other healthcare facilities in Thailand. Lessons learned are intended to help UNFPA, FHI 360, and the research team improve the assessment instrument for future use. Recommendations are aimed at encapsulating the main challenges of assessing the green viability and climate vulnerability of healthcare facilities in Thailand, as well as the possible challenges of preparing the public healthcare system in Thailand for climate change.

1.2 PUBLIC HEALTHCARE SYSTEM IN THAILAND

The public healthcare system in Thailand is hierarchically structured and can be divided into primary and hospital care (Sudhipongpracha, 2021).

1. PRIMARY CARE

Primary care facilities in Thailand offer basic health services, including health education, disease prevention, health screening, rehabilitation, minor injury treatment, and antenatal care. As of October 2023, approximately 40% of primary care centers (officially referred to as subdistrict health promotion hospitals - SDHPHs) in Thailand have been devolved in the provincial administrative organizations (PAOs). The remaining 60% remain under the provincial health officers who report directly to the secretary-general of the public health ministry. Also, several municipal (city) governments have been responsible for running the primary care centers for decades. Despite the diversity of responsible agencies, the primary care system in Thailand is driven by the Contracting Unit for Primary Care (CUP) network approach with a district/community hospital as a network node overseeing SDHPHs and locally run primary care facilities (if applicable). Most of the funding from the Universal Health Coverage (UHC) scheme goes directly to CUPs, and the network nodes (i.e., district/community hospitals) allocate the UHC fund to each SDHPH and/or locally run primary care unit within their networks (Sudhipongpracha, 2021).

2. SECONDARY AND TERTIARY CARE

The majority of secondary and tertiary hospitals in Thailand are public. The Ministry of Public Health operates approximately 75% of the hospitals, while the remaining 25% are private hospitals (Tangcharoensathien et al., 2018). At the provincial and district levels, there is at least one secondary or tertiary hospital. Apart from managing primary care services by SDHPHs and/or the locally run primary care units, district or community hospitals offer secondary-level curative, preventive, and promotive care (Legido-Quigley & Asgari-Jirhandeh, 2018).

The Ministry of Public Health also runs general, regional, and specialized hospitals, which in varying size and capacity are responsible for tertiary care. In addition, the majority of public universities in Thailand own advanced tertiary hospitals, each of which serves as a teaching and research institute (Collingwood, 2022).

1.3 RESEARCH OBJECTIVES

This report seeks to achieve the following objective (s):

- (1) To review and synthesize the approaches and tools for green viability and climate vulnerability assessments that are applicable to Thailand.
- (2) To conduct the green viability and climate vulnerability assessments in four healthcare facilities in Thailand in different areas with high climate vulnerability.

1.4 METHODS

STEP 1 | ASSESSMENT TOOL DEVELOPMENT

Literature Review. Past theoretical frameworks and empirical works on green healthcare, sustainable healthcare, and climate resilient/ resilient healthcare were reviewed and synthesized to generate a detailed conceptual framework and a set of assessment tools for green viability and climate vulnerability of a healthcare facility in Thailand.

Brainstorming Workshop. A brainstorming workshop was organized to review the proposed assessment tools and get buy-in from government officials and healthcare professionals. The workshop participants (48 total) included officials from the Ministry of Public Health and the Ministry of Interior, as well as healthcare facility directors and representatives from partner international organizations. The main objective of this workshop was to discuss the proposed assessment tool and the work plan and solicit inputs/suggestions from key stakeholders.¹

Revision of the Assessment Tool. Several participants mentioned during the brainstorming workshop that the Department of Health in the Ministry of Public Health had launched a national assessment of healthcare facilities in Thailand in 2021². The assessment was based on *the World Health Organization (WHO) Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities* and *the U.S. Department of Health and Human Services' Sustainable and Climate Resilient Health Care Facilities Initiative (SCRHCFI)*. A representative from the Department of Climate Change also suggested that several recommendations from *the IPCC Fifth Assessment Report (AR5)* be incorporated into the assessment instrument, such as the use of geographic information system (GIS) in hazard monitoring, purchase of natural disaster insurance, and promotion of localized participatory approaches to climate change mitigation and adaptation. After revising the assessment tool, the researcher conducted several follow-up interviews with the following officials/individuals to determine whether the revised assessment tool was suitable for healthcare facilities in Thailand:

- An official from the Department of Health,
- An official from the Division of Health Administration (Office of the Secretary-general of the Ministry of Public Health),
- An official from the Bureau of Primary Health Care System Promotion (Office of the Secretary-general of the Ministry of Public Health),
- Director of a tertiary hospital in a central province,
- Director of a community hospital in a northeastern province, and
- Director of a subdistrict health promotion hospital in a southern province.

¹ Summary of the key stakeholders' inputs and suggestions can be found in Appendix A.

² See the assessment form at https://hia.anamai.moph.go.th/web-upload/12xb1c83353535e43f224a05e184d8fd75a/202108/m_magazine/35644/2925/file_download/fd75b323587c61a7a75c155c06760d40.pdf.



Figure 1-1. Brainstorming Workshop on August 4, 2023

STEP 2 | ASSESSMENT AND ON-SITE VISIT

Data collection: face-to-face interviews with the facility director, manager, and emergency coordinator from each healthcare facility, using the questions from the assessment tool.

On-site visit: four healthcare facilities were selected as follows.

1) Rayong Hospital, Rayong

Level of Care: Tertiary

Date of Site Visit: August 29, 2023

Climate Vulnerabilities: Perennial flooding, rising sea level, poor solid waste management regime in the local area.

SRMCH-related Services: Family planning counseling, antenatal care (ANC), delivery, skilled birth attendance, postpartum care, emergency obstetric and neonatal care, immunization, neonatal intensive care unit (NICU)



Figure 1-2. On-site Visit at Rayong Hospital on August 29, 2023

2) San Sai Hospital, Chiang Mai

Level of Care: Secondary

Date of Site Visit: August 23, 2023

Climate Vulnerabilities: Flash flooding

SRMCH-related Services: Family planning counseling, antenatal care (ANC), delivery, skilled birth attendance, postpartum care, emergency obstetric and neonatal care, immunization

3) Suthep Community Health Center, Chiang Mai

Level of Care: Primary

Dates of Site Visit: August 23-24, 2023

Climate Vulnerabilities: Flash flooding, bush fire, air pollution

SRMCH-related Services: Family planning counseling, antenatal care (ANC), immunization

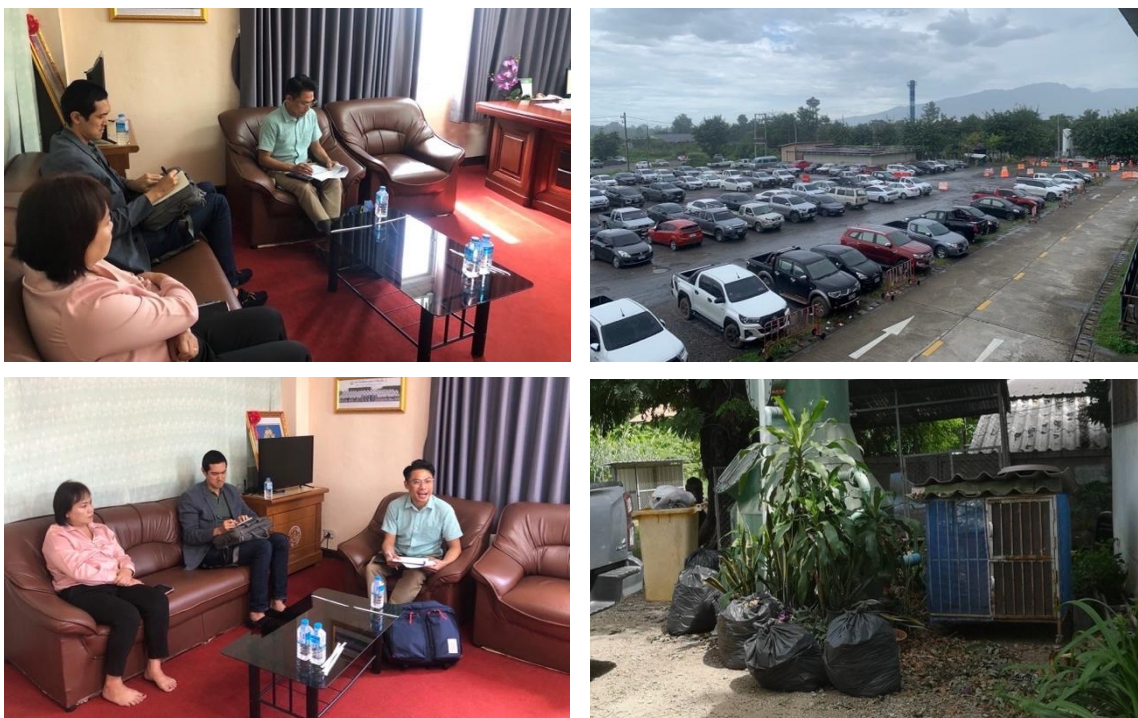


Figure 1-3. On-site Visits at San Sai Hospital and Suthep Community Health Center, Chiang Mai on August 23-24, 2023

4) Bueng Yitho Medical and Rehabilitation Center, Pathumthani

Level of Care:	Primary
Tentative Date (s) for Site Visit:	August 25, 2023
Climate Vulnerabilities:	Flooding, air pollution
SRMCH-related Services:	Family planning counseling, antenatal care (ANC), immunization



Figure 1-4. On-site Visit at Bueng Yitho Medical and Rehabilitation Center, Pathumthani on August 25, 2023

STEP 3 | POST-ASSESSMENT

A post-assessment conference was held on September 22, 2023 to disseminate the findings and to encourage Thai policymakers and government officials, international donor agencies, and international non-profit organizations to consider the final assessment tool and proposed policy recommendations. Approximately 70 participants participated in this event.

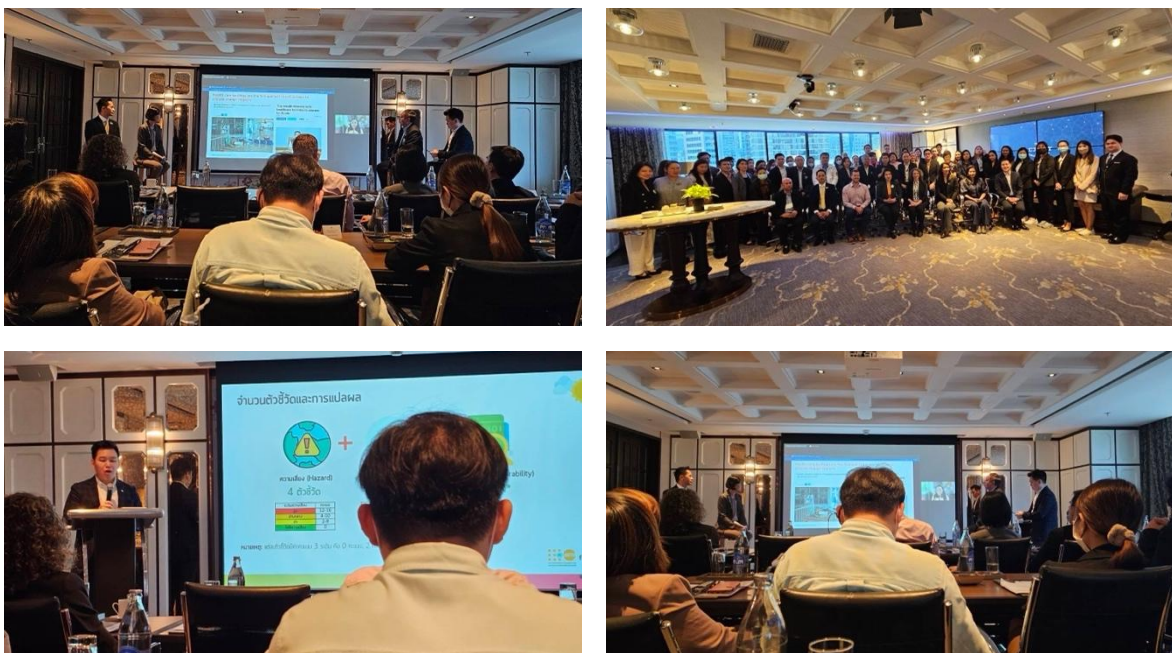


Figure 1-5. Post-Assessment Conference on September 22, 2023



CHAPTER 2

Conceptual Framework

CHAPTER 2

Conceptual Framework

2.1 POLICY CONTEXT OF CLIMATE ACTION IN THE PUBLIC HEALTH SECTOR IN THAILAND

ORGANIZATIONAL STRUCTURES, POLICIES, AND PLANS

The National Climate Change Committee reports to the Cabinet with the Prime Minister as the chairperson. The committee has four sub-committees on climate change: (1) negotiation and supporting, (2) adaptation, (3) the National Appropriate Mitigation Actions (NAMAs), and (4) Measuring, Reporting, and Verification System (MRV). The Office of Natural Resources and Environmental Policy and Planning (ONEP) within the Ministry of Natural Resources and Environment (NMRE) is the national focal point. Representatives from the Ministry of Public Health participate in the National Climate Change Committee and in the Sub-Committees on Climate Change Adaptation and on Technical Supporting.

The national policies and plans related to climate change include: (1) Constitution of The Kingdom of Thailand, (2) 20-year National Strategy, (3) National Economic and Social Development Plan, (4) National Strategy on Climate Change, (5) National Master Plan on Climate Change, and (6) National Energy Conservation Plan. Specific plans include: (1) National Industrial Development Master Plan, (2) National Energy Conservation Plan, (3) Transport Master Plan, (4) Master Plan for Climate Change in the Agricultural Sector, (5) National Strategy for Research on Climate Change, and National Environmental Health Action Plan (NEHAP).

The constitution, the 20-year National Strategy, and the National Economic and Social Development Plan are the basis for the *National Strategy on Climate Change*. The *National Climate Change Master Plan* includes three main components, one of which is on adaptation. Within the adaptation component, public health is one of the priorities with objectives to:

- Support research and improve coping capacity of the public health sector to accommodate future risks;
- Disseminate study results on emerging diseases and vectorborne diseases;
- Prepare for post-disaster diseases;
- Health-care preparedness during crises;
- Improve efficiency and effectiveness on access to health-care services;
- Enhance capacity of health-care networks, especially with regards to risks to health from climate change; and
- Improve local health-care alert systems and emergency response.

The objectives of the National Environmental Health Action Plan include to: reduce environmental health problems and impacts in an efficient manner; create cooperation among agencies responsible for environment and health programs; and enhance the capacity for environmental management. Five (5) strategies were developed to reduce morbidity possibly due to environmental factors: developing environmental health management systems; preventing and reducing environmental health risks; promoting cooperation among relevant agencies, partners, network managers, all other

concerned sectors and people in environmental health management; promoting the roles of local government organizations in environmental health management; and creating knowledge and technology related to environmental health.

The vision of the draft National Strategy Plan on Climate and Health is that the public health system in Thailand is ready to cope with climate change impacts by collectively integrating all sectors' capability aimed for good health and well-being of the Thai population. Its mission is to:

- Communicate and distribute knowledge and understanding aimed at raising awareness of the Thai population about the health risks from climate change, as well as how public health adaptation can reduce those risks;
- Build mechanisms to promote and enable the government sector, private business and civil society to incorporate the health risks of climate change into their climate change risk management policies, programmes and activities;
- Develop disease surveillance systems and strengthen the health system capacity to cope with health risks from climate change; and
- Initiate research and development of knowledge of the health risks of climate change, explore and create tools for health vulnerability and adaptation assessment, as well as facilitate reduction of greenhouse gases in the health sector.

The objectives above are the national climate change and public health implementing framework for all sectors. The plan focuses on health at the center of development and highlights participation from all related sectors. The plan includes six strategies: (1) Information and communication systems, (2) Cooperation mechanisms, (3) Health system strengthening, (4) Surveillance and early warning systems, (5) Research and development, and (6) Greenhouse gas reductions in public health and health-care service.

The Ministry of Public Health is responsible for developing details of programs and activities for each strategy. The ministry establishes a committee on climate change and health, which is charged with formulating a plan on climate change and health. Research and development is conducted at the district and national levels, including research on the health risks of climate change. Another component is to conduct a national vulnerability and adaptation assessment. A variety of activities are conducted from community to the national levels, including surveillance systems, clean water and sanitation management, air quality, early warning and disaster response systems, capacity-building and awareness raising, and mitigation of greenhouse gases. Within the Ministry of Public Health are a Health and Climate Change Committee of Thailand (HCCT), a Climate Change and Public Health Strategic Plan Steering Committee, and 10 other departments in the Ministry of Public Health (Figure 2-1).

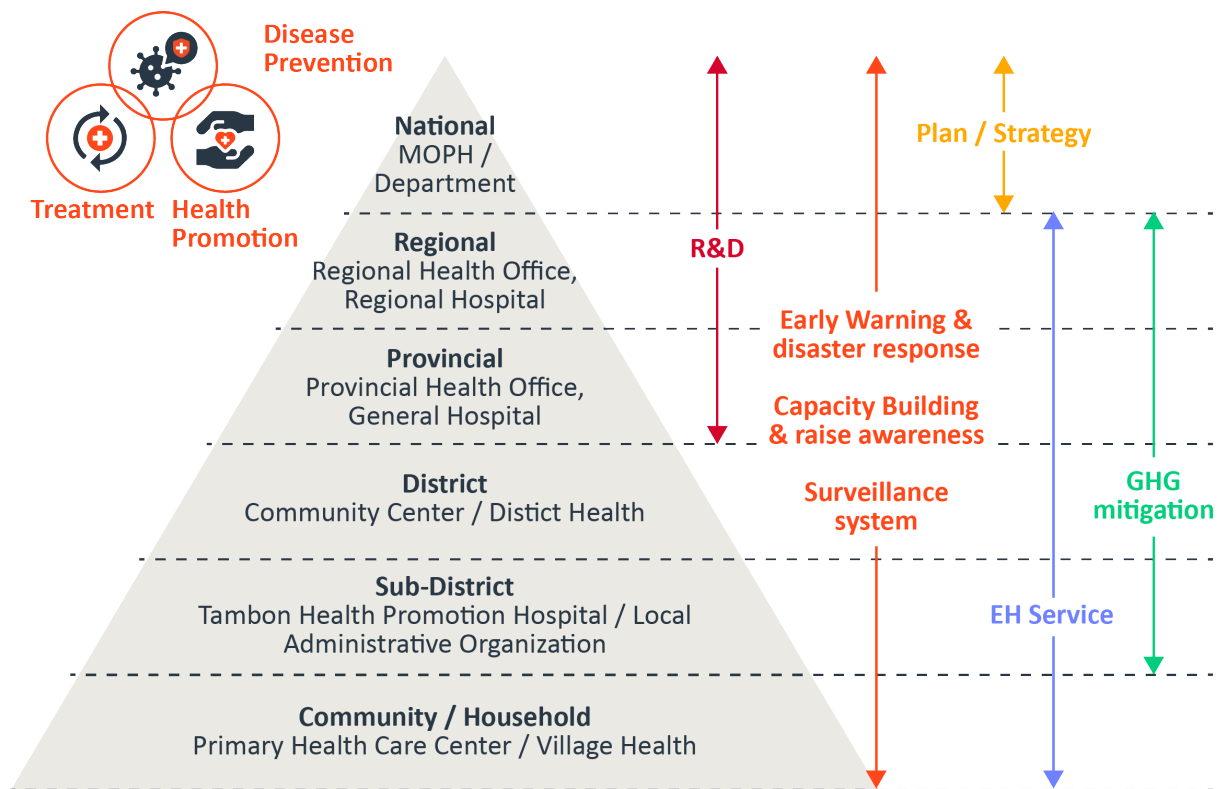


Figure 2-1. Public Health System in Thailand and Climate Change Activities. Source: World Health Organization (2006).

“GREEN AND CLEAN HOSPITAL” INITIATIVE

Hospitals and health-care facilities can be a significant source of greenhouse gas emissions because of their energy intensity. In 2010, the Ministry of Public Health implemented a policy to reduce the carbon footprint of the government’s tertiary and secondary hospitals. The Green and Clean Hospital Project is designed to (1) campaign on sustainable sanitation; (2) increase awareness, knowledge and understanding of public health personnel of the health risks of climate change; and (3) develop a good practice model for hospitals. The project is a voluntary basis. Activities of the “Green” components include: Garbage (solid waste management focusing on reduce, reuse and recycle), Restroom (emphasis on health, safety and accessibility standards), Energy (savings using renewable energy, such as wind, solar, and bio-gas), Environment (emphasis on preparing for climate change and improving environmental health), and Nutrition (food safety and energy savings from food transportation). The CLEAN components include: Communication, Leadership, Effectiveness, Activities, and Networking. The hospital’s carbon footprint is one indicator of success.

An example of best practice is the 17th Somdejphrasangkhraj Hospital in Suphanburi province. This 250-bed secondary hospital serves 1,000 patients per day, including 200 in-patients and 800 out-patients. The hospital has won national and international awards for its innovative programs, including the Thailand Energy Award, the ASEAN Energy Award, and the Shield of Honor on Green and Clean Hospitals. In 2011, the hospital reduced their emissions of carbon dioxide by 13.69% or 252.13 tons, which is the equivalent of planting 28,014 trees. The savings from electric energy,

thermal energy, and carbon dioxide were 5,230,605 baht. The average annual savings were 1,668,396 baht per year, including savings from water consumption (501,660 baht).



Policy Gap. Participation in this green and clean hospital initiative is on a voluntary basis. Since the emphasis is on tertiary and secondary hospitals, approximately 9,000 primary healthcare facilities have been left out. Most importantly, the “Green” and “Clean” indicators only focus on the “adaptive” dimension of climate action, but do not pay attention to the “coping/mitigation” aspect, especially strategies to deal with climate-induced emergencies.

LOCALLY RUN PRIMARY HEALTHCARE FACILITIES IN THAILAND

Prior to 2002, the Ministry of Public Health was responsible for providing public health services and for determining budget allocations for each type of service. Citizens working in the formal private sector are covered by the National Social Security Fund, while government officials are entitled to their medical benefits paid for by the Ministry of Finance. This system inadvertently left out more than fifty (50) percent of Thai population who were neither government officials nor formal private sector workers. In 2002, the national government established the National Health Security Fund (NHSF) as the main agency responsible for ensuring affordable and accessible healthcare for all. The Ministry of Public Health was stripped off its power to set budget allocations for health services and has since become only the country’s health service provider. All government tertiary and secondary hospitals remain under the public health ministry’s auspices. Starting in 2009, the Ministry of Public Health has gradually transferred 84 primary healthcare centers to municipalities and sub-district administrative organizations. In 2021, approximately 3,323 primary healthcare centers (or subdistrict health promotion hospitals) were transferred from the Ministry of Public Health to 49 provincial administrative organizations.



Policy Gap. These local government units are semi-autonomous agencies with an arm’s length relationship with the Ministry of Interior. The ministry is responsible for overseeing these local government units to ensure that their actions are within the scope of their prescribed powers and functions. Yet, based on our interview with officials from the Department of Local Administration, the ministry currently does not have a clear climate action plan for locally run primary healthcare units, except a national campaign to encourage the local governments to use solar energy.³

³ For more information, see: <https://www.thaipost.net/politics-news/450438/>.

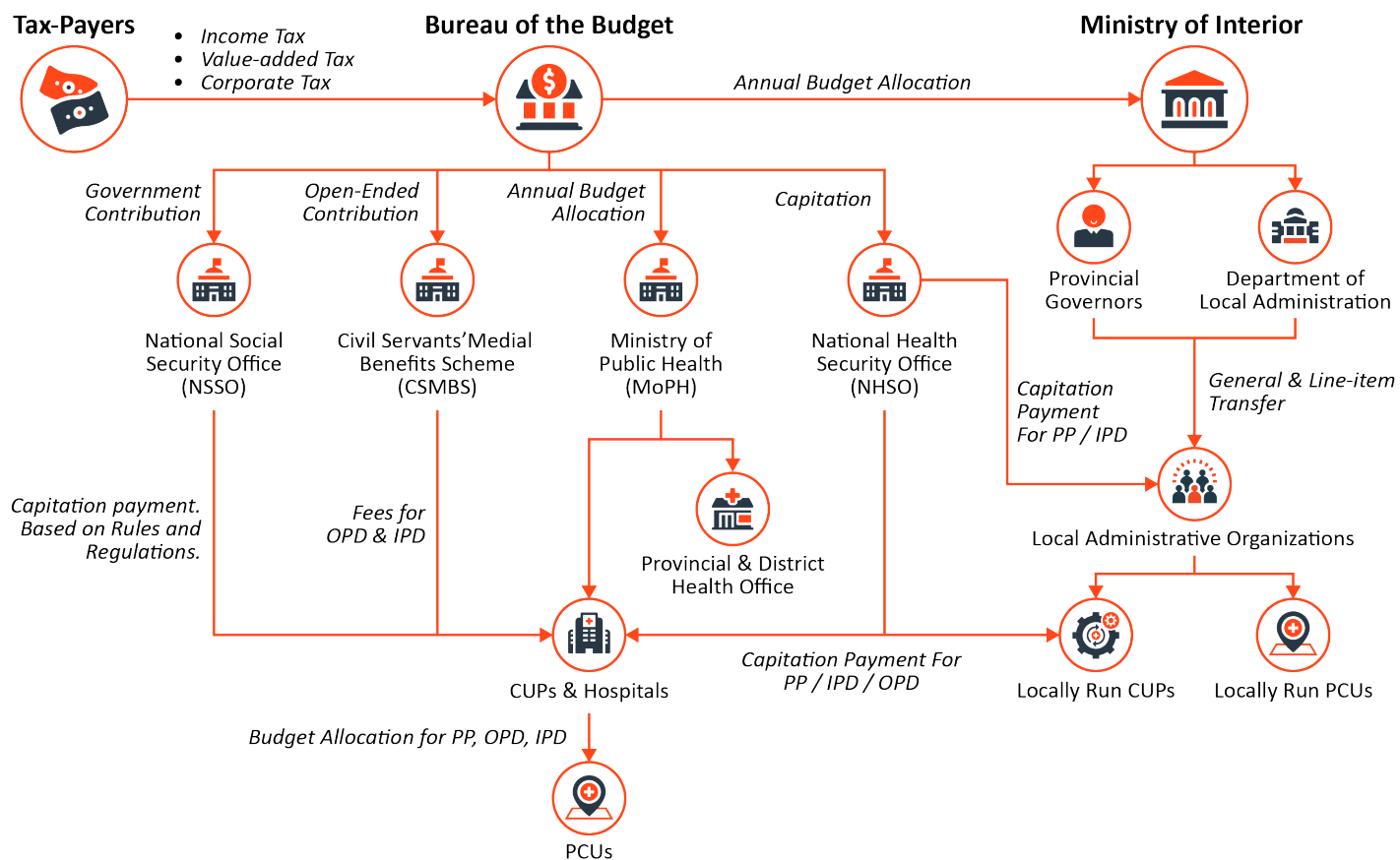


Figure 2-2. Thailand's Post-2002 Public Health System

- Notes:**
1. Abbreviations for public health-related budget acronyms are as follows: PP = Promotion & Prevention; OPD = Out-Patient Department; IPD = In-Patient Department.
 2. PCU is abbreviated for primary care unit. CUP is short for contracted unit for primary care. The difference between the two types of primary healthcare facility is that a PCU is responsible for primary health services in a specific area, while a CUP is a network of primary health care service providers who share resources, budget, and personnel.

2.2 EXISTING ASSESSMENT TOOLS FOR GREEN HEALTHCARE AND CLIMATE VULNERABILITY OF HEALTHCARE FACILITIES

Globally, one of the most critical and sought-after services today is healthcare, which is an essential part of the wellbeing of all communities. Healthcare is also one of the fundamental human rights. To emphasize that importance, the United Nations' Sustainable Development Goals (SDGs) specifically address healthcare in Goal 3: "Good Health and Well-being," while three other goals (i.e., Goal 2 "Zero Hunger," Goal 6 "Clean Water and Sanitation," and Goal 7 "Affordable and Clean Energy") seek to provide a better living environment for all humans and as a result, the elimination of the causes of diseases (ElMitainy & El-Haggar, 2019). Yet, healthcare spending is projected to rise due to the rapid increase of elderly population, the technological advancements that are currently being used by the healthcare industry, and the accompanied rise in service providers cost (Dhillon & Kaur, 2015; Deloitte, 2023). High healthcare costs worsen the rationing and limiting of healthcare services and disproportionately affect vulnerable groups, such as women, children, and low-income seniors. In the wake of COVID-19 pandemic, the healthcare sector was required to provide rapid and advanced services, which caused both an increase of healthcare expenditure and a contraction in the global economy (ElMitainy & El-Haggar, 2019; WHO, 2022).

Healthcare facilities consume a significant amount of resources to maintain the service level, including electricity, water, food, labor, and other materials. For example, a fully functioning hospital operates 24 hours a day with a wide range of clinical and other services, such as clinical laboratory, indoor air quality control, water sanitation, and waste management (Dhillon & Kaur, 2015). Greenhouse gas (GHG) emissions from the healthcare facilities have played an important role in strengthening the greenhouse effect (ElMitainy & El-Haggar, 2023). According to a report by Health Care Without Harm et al. (2019), the healthcare sector's estimated contribution in GHG emissions was 4.4% of the global emissions and made up 29% of the energy-related emissions. In developed countries, the healthcare sectors in the United States, Australia, and the United Kingdom accounted for 8%, 7%, and 3%, respectively, of each country's GHG emissions (Chung & Meltzer, 2009; NHS Sustainable Development Unit, 2016; Malik et al., 2018). In developing countries, the healthcare sectors' resource and energy consumption was equally or even more unsustainable (Salem, Soares, & Tolmasquim, 2004).

GHG emissions caused by unsustainable resource use in the healthcare sector around the world have a strong link to climate change, which in turn adversely affects population health (ElMitainy & El-Haggar, 2023). Vulnerable populations, including women, children, and persons with special healthcare needs, bear the brunt of climate-related changes. Overall, climate change can potentially cause additional 250,000 deaths per year and an increase of US \$ 2-4 billion per year in healthcare costs by 2030 (WHO, 2017).

Amid the reportedly high resource consumption and accompanying climate footprint around the world, the health sector has an opportunity to lead by example by reducing the contribution to climate change and preparing for climate-induced disasters. Over the years, international donor agencies, third-sector organizations, and governments around the world have adopted frameworks, guidelines, and strategies to ensure sustainable and climate-resilient healthcare (Puntub & Greiving, 2022; ElMitainy & El-Haggar, 2023):

- The Hyogo Framework for Action (2005-2015) that prioritized safe hospitals under the World Disaster Reduction Campaign,
- Multiple frameworks adopted by WHO and its partner agencies in 2015, including the Emergency Management in Health Care framework, the Comprehensive Safe Hospital Framework, the Hospital Safety Index, and the Operational Framework for Building Climate Resilient Health Systems,
- WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities released in 2020,
- COP26 Health Program adopted in Glasgow in 2021 to form the Alliance for Transformative Action on Climate and Health (ATACH) with the commitment from high-emitting countries to *Net Zero* health system emissions, and
- International agreements at the COP27 to further coordinate the role of ATACH, highlight the negative impacts of rising global temperatures and pollution on human health, and encourage capacity enhancement of healthcare professionals regarding climate change.

Similarly, environmentally sustainable healthcare or green healthcare can be defined in many ways (Balabel & Alwetaishi, 2021). According to the U.S. Office of the Federal Environmental Executive (OFEE), “Sustainable hospitals can be defined as the practice of designing, constructing, operating, maintaining, and removing buildings in ways that conserve natural resources and reduce pollution” (OFEE, 2003, p.1). The Green Guide for Healthcare (GGHC – Version 2.2) integrates environmental and health principles and practices into the planning, design, construction, operations, and maintenance of healthcare facilities. GGHC is divided into two sections: construction and operations. The construction section targets new construction projects and major renovations, while the operations section is designed as a continuous improvement tool for existing operational facilities.

Apart from the international guidelines, some countries have designed and employed their own national assessment criteria for climate resiliency and sustainability for healthcare facilities, such as the “Canadian Health Care Facility Climate Change Resiliency Toolkit” (CCGHC, 2021), Climate change resiliency indicators for health care facilities (Paterson et al., 2014), and the U.S. Sustainable and Climate Resilient Health Care Facilities Toolkit” (HHS, 2018). Although these national-level toolkits may help capture the local contextual variables, they are often in a checklist format, rather than indices that can track responses, mitigation, and adaptation in both individual healthcare facilities and service networks (Puntub & Greiving, 2022). In addition, most of these tools lack clear guidance on ways forward (i.e., adaptation or resilience action plans).

Composite indicators gain worldwide popularity as a tool for understanding how healthcare facilities and their service networks cope with and adapt to climate change (Hinkel, 2011). A composite indicator is derived from compiling individual indicators into a single index based on a particular underlying model. Composite indicators are capable of summarizing the reality of complex and multidimensional phenomena, which can neither be captured by a single indicator nor directly measurable. However, the debate on the application of composite indicators never settled. Composite indicators receive strong critiques, especially statistical misconception, lack of transparency, raising false expectations, misleading policy implications, and drawing simplistic policy conclusions (Nardo et al., 2005; Hinkel, 2011; Paruolo et al., 2013; Becker et al., 2017). Yet, simplicity is an important feature of composite indicators that help reduce difficulty in complex data

interpretation and enable communication to policy decision makers and general audience (Puntub & Greiving, 2022).

Although the healthcare sector has increasingly emphasized evidence-based research, conventional healthcare monitoring and evaluation (M&E) cannot adequately project health-related impacts caused by climate and socio-economic changes (Ebi et al., 2018). The challenges that restrain healthcare facilities from adopting the climate resilience strategies are lacking awareness of climate change impact on health outcomes, insufficient (or absence of) attention to long-term scenario planning and understanding of the uncertainties of climate projects, underdeveloped organizational learning, and unawareness of the complex interactions of climate change and health determinants (Ebi et al., 2018). As Biddle and colleagues (2020) observe, most healthcare facilities only emphasize coping or adaptive strategies, but not the transformative aspect of resilience.

2.3 PROPOSED GREEN VIABILITY AND CLIMATE VULNERABILITY ASSESSMENT TOOL FOR HEALTHCARE FACILITIES IN THAILAND

Conventional local public health planning and monitoring insufficiently address the conjugated impacts of demographic transition and climate change. Climate resilient and environmentally sustainable healthcare facilities contribute to a high quality of care and accessibility of services, particularly in the extreme weather situations. Donor agencies, research institutes, and intergovernmental panels have developed a variety of assessment and capacity-building toolkits to enhance the capacity of hospitals and healthcare facilities to address the consequences of climate-induced events. This proposed assessment tool is based on a combination of *the WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities*, the IPCC Fifth Assessment Report (AR5), and the U.S. Department of Health and Human Services' Sustainable and Climate Resilient Health Care Facilities Initiative (SCRHCFI). The SCRHCFI framework was adopted by the Thai Department of Health to assess the hospitals' preparedness for climate-related extreme weather patterns. As explained in Chapter 1, a brainstorming workshop and interviews with selected hospital executives and officials from relevant agencies in Thailand were conducted to ensure suitability of the assessment tool.

COMPONENTS OF THE PROPOSED ASSESSMENT TOOL

Based on the IPCC Fifth Assessment Report (AR5), the potential impact is a multiplication of three (3) dimensions: hazard, sensitivity and exposure, and vulnerability. For hazard and sensitivity and exposure, the main indicators used in this study come from the SCRHCFI framework (i.e., the climate risks and community vulnerability dimension and the land use, building design, and regulatory context dimension).

Vulnerability is divided into two sub-dimensions: coping capacity and adaptive capacity. Coping capacity denotes the ability of a healthcare facility to address, manage, and overcome adverse conditions in the short-medium terms. Adaptive capacity means the ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events. The two sub-dimensions are operationalized using the *WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities*, which considers

environmental sustainability of healthcare and classifies vulnerability into four (4) sub-dimensions: (1) healthcare workforce, (2) WASH (Water, Sanitation, and Hygiene) and waste management, (3) energy, and (4) infrastructures, technologies, and products. The fifth dimension – stakeholder engagement and governance – has been added to highlight the importance of governance mechanisms (policy and planning, sufficient resources) and an open communication process that emphasizes “the optimization of an entire community health system” instead of “the optimization of a healthcare facility in isolation.”

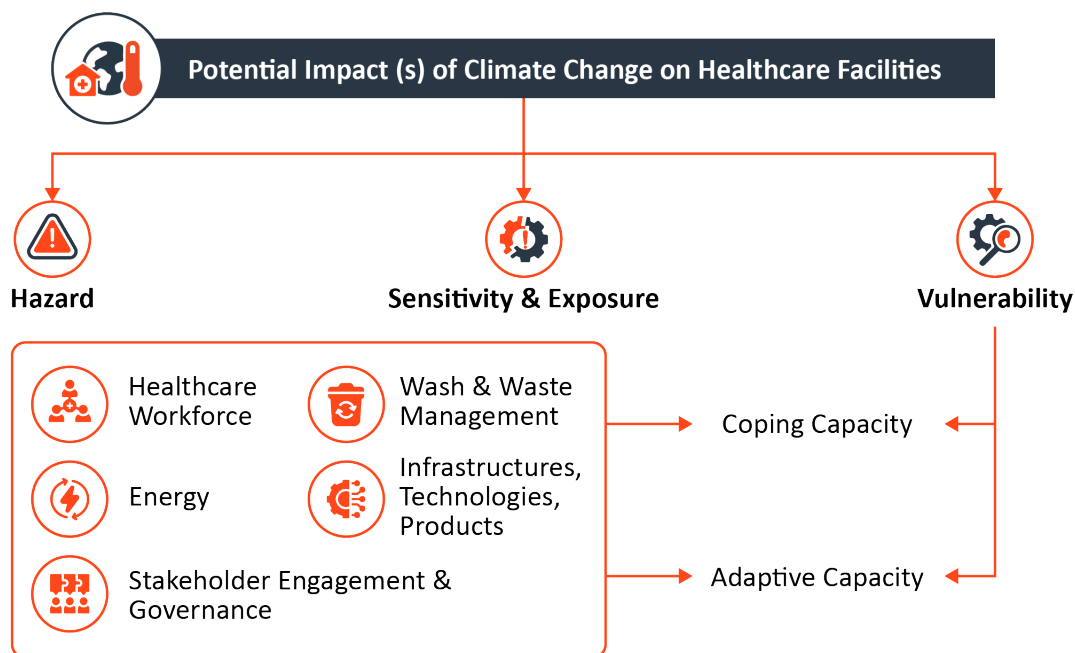


Figure 2-3. Conceptual Framework of the Proposed Green Viability and Climate Vulnerability Assessment Tool for Healthcare Facilities in Thailand

OPERATIONAL DEFINITION (S)

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. In this study, the term hazard usually refers to climate-related physical events or trends or their physical impacts (IPCC, 2014).

Disaster: A serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts (UNISDR, 2015).

Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected by climate-related events (IPCC, 2014).

Vulnerability: The propensity or predisposition to be adversely affected by climate-related events. Vulnerability encompasses a variety of concepts and sub-dimensions, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (Puntub & Greiving, 2022).

Sensitivity: The degree to which a healthcare facility is affected, either adversely or beneficially, by climate-related hazards (Puntub & Greiving, 2022).

Resilience: The capacity of a healthcare facility to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function and structure, while also maintaining the capacity for adaptation, learning, and transformation (Corvalan et al., 2020).

Coping capacity: The ability of a healthcare facility to address, manage, and overcome adverse conditions from climate change in the short-medium terms (WHO, 2014).

Adaptive capacity: The ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events (IPCC, 2014).

Green viability: The ability of a healthcare facility to concomitantly minimize negative environmental impacts and eradicate diseases by providing eco-friendly services and by reducing waste (Lee & Lee, 2022).

INDICATORS⁴

The proposed assessment tool consists of three dimensions. The *hazard* dimension has four indicators with a maximum aggregated score of 16. The *sensitivity and exposure* dimension has four indicators with a maximum aggregated score of 16. The *vulnerability* dimension has two sub-dimensions: coping and adaptive capacities. With an emphasis on a healthcare facility’s climate vulnerability, the *coping capacity* consists of 18 indicators with a maximum aggregated score of 72. On the other hand, the *adaptive capacity* emphasizes the green viability part of the assessment tool, encompassing 24 different indicators with a maximum aggregated score of 96.⁵

Table 2-1 Summary of Dimensions and Indicators

Dimension (s)	Number of indicator(s)	Maximum aggregated score
Dimension I: Hazard	4	16
Dimension II: Sensitivity and Exposure	4	16
Dimension III: Vulnerability		
Sub-dimension 3.1 Coping Capacity	18	72
(1) Healthcare workforce	2	
(2) Energy	2	
(3) WASH and waste management	2	
(4) Infrastructures, technologies, and processes	8	

⁴ See the assessment tool (questions and scales) in Appendix 2 and how each aggregated score is calculated in Appendix 3.

⁵ Healthcare facilities are resource-intensive organizations that consume a significant amount of resources, including water, electricity, and food to provide health services (Dhillon & Kaur, 2015). In the context of global climate change where humanity and the natural environment are under constant threat, it is imperative that healthcare sector needs to “adjust its operations and adopt sustainable practices” while attempting to address increasingly complex health problems (Vogus et al., 2021, p. 562). Also, as Weiman and Patel (2017) suggest, the “green viability” concept can generate high financial returns for healthcare institutions; and healthcare institutions can play a leadership role in a transition to an environmentally sustainable economy. Therefore, this research argues that to enhance a healthcare facility’s adaptive capacity, “green viability” components should be the central components. In other words, healthcare services in the context of global climate change can be improved by “going green” or adopting environmentally sustainable practices.

Dimension (s)	Number of indicator(s)	Maximum aggregated score
(5) Stakeholder engagement and governance	4	
Sub-dimension 3.2 Adaptive Capacity	24	96
(1) Healthcare workforce	5	
(2) WASH and waste management	3	
(3) Energy	2	
(4) Infrastructures, technologies, and processes	6	
(5) Stakeholder engagement and governance	8	

DATA ANALYSIS

A healthcare facility's green viability and climate vulnerability consists of three dimensions: (1) hazard, (2) sensitivity and exposure, and (3) vulnerability. Scoring rubrics are used to analyze each individual dimension. Guidelines for calculating scores for each dimension are provided in Appendix 3. For instance, for the hazard dimension, Hospital A receives an aggregated score of 12, which indicates that the hospital is situated in an area with a high level of climate-related hazard. A sensitivity/exposure aggregated score of ten suggests that the essential working systems and types of patients served at this hospital currently experience a moderate degree of sensitivity and exposure to climate change and climate-related events. In terms of its coping capacity, Hospital A has a moderate degree of vulnerability (Score of 42). Considering its high-hazard location and the moderate degree of sensitivity and exposure, Hospital A may not be able to fully mitigate the adverse effects of climate-related emergencies or hazards. Further, the hospital currently has a seriously low capacity to adapt to the effects of climate change.

Table 2-2 Example of Data Analysis

Hospital A	Aggregated Score (s)	Percentage (s)	Level/intensity
Hazard	12		High
Sensitivity/Exposure	10		Moderate
Vulnerability (Coping Capacity)	42		Moderate
Vulnerability (Adaptive Capacity)	60		High



CHAPTER 3

Preliminary Findings of Green Viability and Climate Vulnerability Assessments

CHAPTER 3

Preliminary Findings of Green Viability and Climate Vulnerability Assessments

3.1 RAYONG HOSPITAL, RAYONG

Situated in an eastern province of Rayong, Rayong hospital is a 535-bed regional hospital administered by the Ministry of Public Health. It mainly provides tertiary care services for the Rayong provincial area and nearby provinces. In FY2022-FY2023, the hospital served 40,721 emergency patients and 467,539 outpatients. In the same year, almost 4,200 patients received out-of-office services from Rayong hospital. The hospital served a variety of vulnerable patients, including oxygen- and dialysis-dependent patients, persons with disability and self-movement difficulty, elderly, infants and toddlers, pregnant women, and mentally ill patients. Despite its large number of personnel (873 medical professionals and more than 1,000 supporting staff members), one of the key informants from Rayong hospital pointed out that the number of patients using the hospital services far exceeded the hospital's capacity.



Figure 3-1. Rayong Hospital (Main Building). Source: <https://www.rayonghospital.go.th>

HAZARD DIMENSION

As shown in Figure 3-2, Rayong Hospital – albeit located in a Tha Pradu subdistrict that is never flooded or likely to be flooded – is in a 10-kilometer radius of the areas prone to pluvial and fluvial flooding. Nonetheless, Surachit and Jeefroo (2022) found that the Tha Pradu subdistrict will be severely affected by sea-level rise in 50 years' time. As such, Rayong Hospital received a score of "2" ("Not flooded, but fluvial flooding is possible") and a score of "2" ("Not flooded, but pluvial flooding is possible").

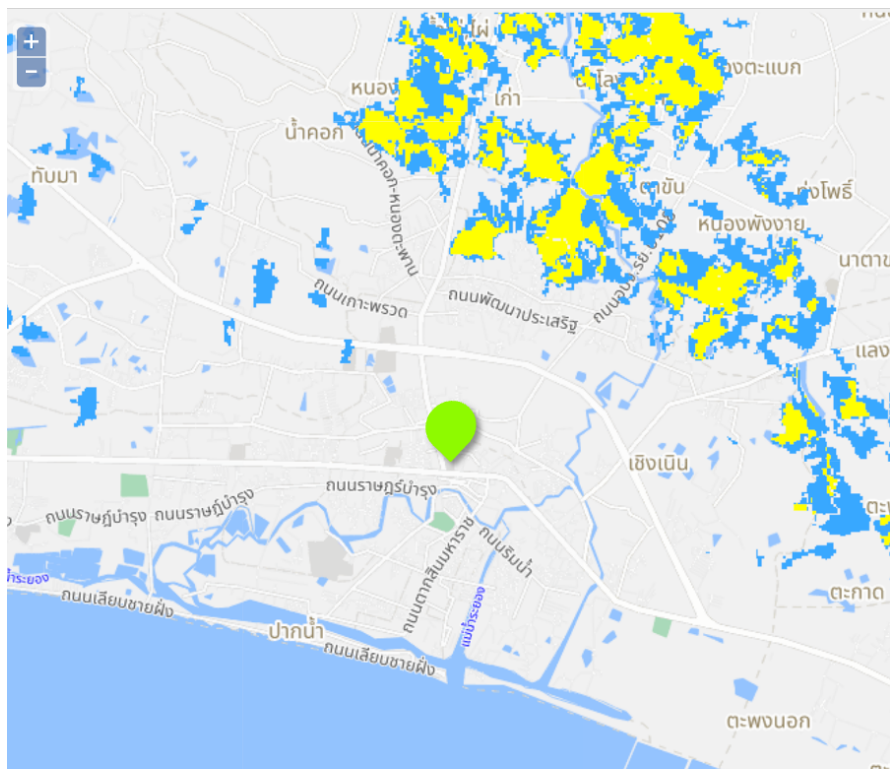
In terms of water scarcity, the hospital has access to safe and adequate running water to fulfill its needs. In fact, the Rayong Muang district has not experienced a major disruption of water supply and infrastructure over the past decade. Yet, water management system in Rayong and other eastern provinces is different from other parts of Thailand. Until 2022, the Royal Thai government had contracted out water management in the eastern provinces to Eastwater Group – a listed company in which the Provincial Waterworks Authority (PWA) holds 40% of share capital. Beginning in 2022, the contract has changed hands to Wong Siam Construction Company. Despite the contractor change, water supply and water quality in Rayong and the rest of the eastern region have been threatened by climate change, especially amid El Nino that started in mid-2023.⁶ In light of the potential climate-induced water stress, Rayong Hospital obtained a score of "2" ("Never experience water scarcity, but water scarcity is possible").

Due to its proximity to the Map Ta Phut Industrial Estate, Rayong Muang district where Rayong Hospital is located has been declared a pollution control zone by the National Environmental Commission in 2009. Air pollutants, such as particulate matters (PM) and volatile organic compounds (VOCs), have posed serious risk to environmental and human health in the Rayong Muang district for a long time due to industrial activities in the area (Paneangtong, MaleeHuan, & Chamchod, 2012). Thus, Rayong Hospital was rated "4" ("Regularly experienced air pollution") for its possibility to experience air pollution.

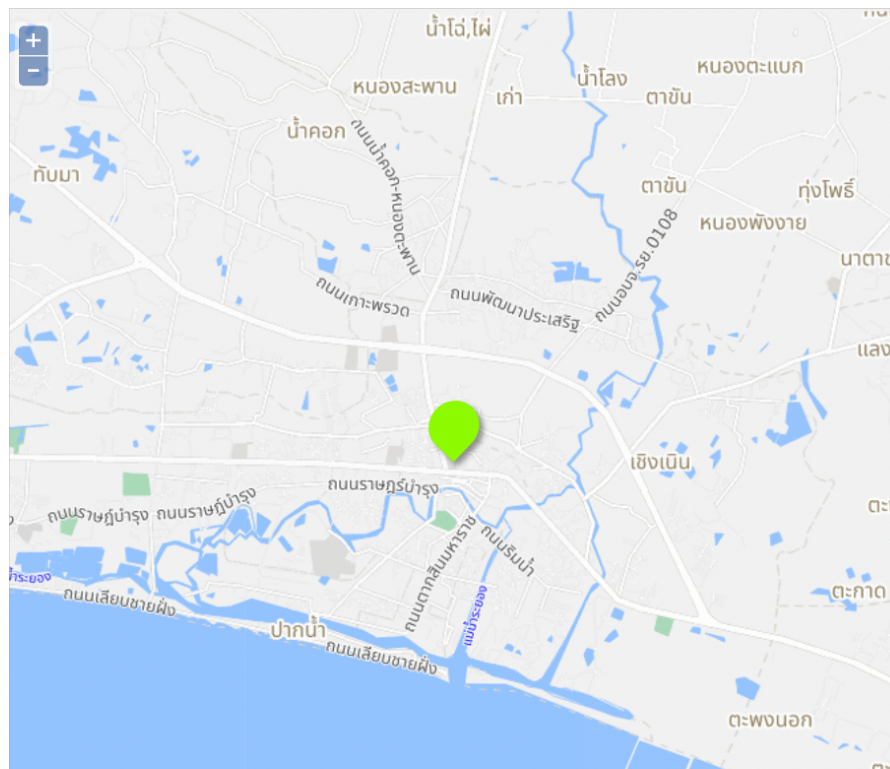
Overall, Rayong Hospital has a total hazard score of 10/16 or 62.50%, which is a medium level of climate-related hazard.


⁶ For more information, see: <https://www.bangkokbiznews.com/politics/894795> and <https://www.bangkokpost.com/thailand/general/2619199/eec-to-have-steady-water-supplies>.


Flood Map (In Thai)



Geographical Map (In Thai)



 Rayong hospital

 Pluvial flood area


 Fluvial flood area

Figure 3-2. Flood Map of Rayong Hospital and the Muang Rayong district Area. Source: Geo-Informatics and Space Technology Development Agency (GISTDA) Flood Monitoring System (<https://flood.gistda.or.th/indexEN.html>)

Table 3-1. Rayong Hospital’s Scores for the Hazard Dimension

Indicator (s)	Rayong Hospital’s Score (s)
(1) Possibility of hospital and healthcare facility buildings to experience <i>fluvial flood</i>	●● 2 Not flooded, but flooding is possible
(2) Possibility of hospital and healthcare facility buildings to experience <i>pluvial flood</i>	●● 2 Not flooded, but flooding is possible
(3) Possibility of hospital and healthcare facility buildings to experience <i>water scarcity</i>	●● 2 Never experience water scarcity, but water scarcity is possible
(4) Possibility of hospital and healthcare facility buildings to experience <i>air pollution</i>	●●●● 4 Regularly experience air pollution

Note: Rayong hospital has a hazard score of 10/16 (62.50%) – medium level of hazard.

SENSITIVITY/EXPOSURE DIMENSION

Rayong hospital has a total score of 12/16 or 75.00%, which can be interpreted as a medium level of sensitivity and exposure (Table 3-2). Many of the essential working systems are located less than three meters from the ground level (i.e., located on the first floor), such as drinking and potable water storage, water purification system, water supply, and infectious and hazardous waste storage. Back-up systems, such as back-up power sources, back-up liquid fuel, and back-up water filter and purification system, are also located on the first floor. This explains why some essential (and back-up) systems would face a moderate (or high) impact from potential disruption caused by climate-induced disasters. Since Rayong hospital is responsible for a variety of vulnerable patients (e.g., the elderly, dialysis-dependent patients, pregnant women), dysfunctional working systems would severely compromise the health and wellbeing of these vulnerable groups.

Although the hospital takes full responsibility of infectious and hazardous waste, storage, treatment, transportation, and disposal of waste have been outsourced to the Rayong Provincial Administrative Organization (PAO). If the PAO encounters any disruptions to its waste treatment, transportation, and disposal systems, the hospital operations would be severely affected due to absence of a back-up plan for waste storage and management.

Table 3-2. Rayong Hospital’s Scores for the Sensitivity/Exposure Dimension

Indicator (s)	Rayong Hospital’s Score (s)
(1) Exposure of 23 essential working systems	●● 2 At least one (1) essential working system is located at <3 m from the ground level or lower

Indicator (s)	Rayong Hospital's Score (s)
(2) Exposure of 12 back-up systems/resources	●● 2 At least one (1) back-up system/resource is located at <3 m from the ground level or lower
(3) Sensitivity of selected essential working systems to downtime/disruption/shortage	●●●● 4 "Medium" to "high" impacts on the majority of essential systems
(4) Variety of vulnerable patients	●●●● 4 Six types or more

Note: Rayong hospital has a sensitivity/exposure score of 12/16 (75.00%) – medium level of sensitivity and exposure.

VULNERABILITY DIMENSION

Coping Capacity

Rayong hospital has a coping capacity score of 18/72 or 25.00%, which can be interpreted as a low level of vulnerability (Table 3-3). When converting the raw scores for each coping capacity sub-dimension into percentages, healthcare workforce has the highest vulnerability level (75.00%), followed by infrastructures, technologies, and processes (33.33%) and stakeholder engagement and governance (25.00%). Details of these sub-dimensions are as follows:

- **Healthcare workforces (75.00% vulnerability level)** – Like other government hospitals in Thailand, Rayong Hospital struggles to provide healthcare services that exceed its capacity. Support system in emergency situations is in place for hospital staff, but not extended to their families.
- **Infrastructures, technologies, and processes (33.33% vulnerability level)** – As previously mentioned, Rayong Hospital has contracted out its entire waste treatment, transportation, and disposal to the Rayong PAO. Without a clear back-up plan, any future disruptions to the PAO's waste treatment, transportation, and disposal system would affect the hospital's operations. In terms of securing an alternate site in emergency situations, the hospital has produced an evacuation plan and set aside a sufficient budget for the plan. However, no referral hospitals or alternative sites for patients in emergency situations have been clearly specified.
- **Stakeholder engagement and governance (25.00% vulnerability level)** – Rayong hospital lacks sufficient resources to effectively implement a self-help plan for climate-induced natural disasters. Even the availability and accessibility of financial resources for business-as-usual operations in emergency situations remain questionable.

Table 3-3. Rayong Hospital’s Scores for Coping Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
(1) Healthcare workforce <i>2 indicators</i>	(1.1) Balance between service capacity and service demand	●●●● 4 No, having service demand more than service capacity	6/12 (75.00%)
	(1.2) Support system for staff and family in the case of climate-related disasters or hazards	●● 2 The support system is in place, but incomplete	
(2) WASH and waste management <i>2 indicators</i>	(2.1) Water-related systems Three (3) systems: <ul style="list-style-type: none"> • Water quality audit and monitoring • Water safety plan • Water supply 	0 A healthcare facility has functioning water-related systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all three systems)	0/8 (0%)
	(2.2) Waste management systems Four (4) systems: <ul style="list-style-type: none"> • Healthcare/infectious waste treatment • Hazardous waste treatment • General waste management • Wastewater treatment 	0 A healthcare facility has functioning waste management systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all four waste management systems)	
(3) Energy <i>2 indicators</i>	(3.1) Adoption of an energy efficiency and conservation program/plan	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	0/8 (0%)

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	(3.2) Implementation of resource conservation plan	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	
(4) Infrastructures, technologies, and processes <i>8 indicators</i>	(4.1) Downtime/disruption/shortage of the 22 essential working systems	●● 2 Average downtime/disruption/shortage of the 22 essential working systems between <1 hr and 2 days	8/32 (33.33%)
	(4.2) Procurement of special vehicle type for carrying goods and passengers during emergencies or hazards	●●●● 4 None	
	(4.3) Alternate safe accessible route	0 A healthcare facility has surveyed/designed alternate safe accessible route (s) and conducted regular maintenance	
	(4.4) Assignment of alternate care site (s)	●● 2 A healthcare facility <i>is drafting an evacuation plan, or has an evacuation plan, but has no designated referral hospital (s) and insufficient resources for implementation</i>	
	(4.5) SOPs for recording a patient medical data	0 Yes	
	(4.6) A back-up plan for getting help from outside during communication system failures	0 Yes	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	(4.7) Air conditioning and ventilation	0 A healthcare facility has functioning air conditioning and ventilation system with extensive coverage and regular review and/or maintenance (Grade of "A")	
	(4.8) Protective environment room (with positive or negative pressure)	0 A healthcare facility has functioning protective environment room with regular review and/or maintenance (Grade of "A")	
(5) Stakeholder engagement and Governance <i>4 indicators</i>	(5.1) Responsive plan for natural disasters	0 A healthcare facility has a plan with regular review/drills with sufficient resources for implementation	4/20 (25.00%)
	(5.2) Self-help plan for natural disasters	●● 2 A healthcare facility has a plan, personnel, budget, and resources for initial self-help, while awaiting external support, or has a plan, personnel, budget, and resources for self-help with little need for external support	
	(5.3) Availability and accessibility of financial resources for business-as-usual operations	●● 2 A healthcare facility has sufficient financial resources for business-as-usual operations, but no surplus	
	(5.4) A plan for coordinating and collaborating with surrounding communities and	0	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	stakeholders in the case of emergencies or natural hazards	A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	

Note: Rayong hospital has a total coping capacity score of 18/72 or 25.00% - low level of vulnerability

Adaptive Capacity

Rayong hospital has an adaptive capacity score of 38/96 or 39.58%, which is considered a low level of vulnerability (Table 3-4). However, when considering the vulnerability score as a percentage of the total score for each adaptive capacity sub-dimension, WASH and waste management has the highest vulnerability level (66.67%), followed by energy (50.00%) and infrastructures, technologies, and processes (50.00%). Details of these three sub-dimensions are as follows:

- **WASH and waste management (66.67% vulnerability level)** – If confronted with climate-related events, the water filter and purification and pumping systems at Rayong hospital can be moved or adjusted by technicians. However, as reported by the hospital staff, efficiency of the two systems would significantly decrease after moving or adjustment. In terms of waste-related systems, the hospital has contracted out its waste management function to Rayong PAO whose mode of operation in the climate-related events is not clear. As result, flexibility and adjustability of the waste management system at Rayong hospital in the climate-related events are questionable. For wastewater treatment, the hospital operates its own facility with a contingency plan, which clearly lays out how the wastewater treatment system can be moved or adjusted by a technician without affecting the efficiency and productivity level. Further, the hospital has started its waste recycling program, but program execution is limited to several wards.
- **Energy (50.00% vulnerability level)** – Consistent with the public health ministry’s Smart Energy and Climate Action (SECA) policy, Rayong hospital has a plan to use solar energy as both primary and secondary lines for power. Financial resources have already been earmarked in the annual budget plan for renewable energy. However, there is no official plan to encourage the hospital staff, patients, and visitors to use public transportation. Based on an interview with the hospital staff, promoting the use of public transportation is outside the scope of authority for hospital administration.
- **Infrastructures, technologies, and processes (50.00% vulnerability level)** – As explained in the previous section, waste and wastewater management systems at Rayong Hospital are exposed to climate-related risks because both systems have been contracted out to an external organization (Rayong PAO) with no back-up plan in place. In addition, having experienced the COVID-19 pandemic, the hospital has developed a plan to set up a one-stop service area with the highest protective level in emergency situations. However, due to limited financial resources, Rayong hospital must put in its plan an activity to mobilize support from other government agencies, local governments, and the military. Also, taking the green viability concept into consideration, Rayong hospital is planning to eliminate the use of materials and products that contain toxic chemicals, such as VOC, and implement the “Green Procurement Policy.” These two measures, however, are in the early stage. Based on an interview with the hospital staff, the hospital currently has no plan to introduce healthy and sustainable food policy.

Table 3-4. Rayong Hospital’s Scores for Adaptive Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
(1) Healthcare workforce <i>5 indicators</i>	(1.1) In-house capacity building and awareness raising among healthcare workers	0 A healthcare facility a plan, sufficient resources, and coordination for implementation	6/20 (30.00%)
	(1.2) Workforce contingency plan and implementation	•• 2 <i>A healthcare facility is formulating such plan, or has a plan with no regular review/drill, or has a plan with regular review/drill but with no/insufficient resources for implementation</i>	
	(1.3) Training on working with no electricity or limited resources	•• 2 <i>A healthcare facility is drafting a plan, or organizes training at least 1 time/year with insufficient resources and coordination, or organizes training <1 time/year</i>	
	(1.4) Evacuation plan implementation (both partial and full evacuation)	•• 2 <i>A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(1.5) Volunteer and external help management plan implementation	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
(2) WASH & waste management <i>3 indicators</i>	(2.1) Flexibility and adjustability of water-related systems	•• 2 The majority of working systems have “medium” level of flexibility and adjustability	8/12 (66.67%)

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	(2.2) Flexibility and adjustability of waste management systems	●●●● 4 One of the systems has “medium” level of flexibility and adjustability, and the other has “low” level of flexibility and adjustability	
	(2.3) Waste recycling program	●● 2 A healthcare facility is <i>formulating such plan, or has a program, but the program is limited</i>	
(3) Energy 2 indicator	(3.1) Use of renewable energy as back-up or secondary line for power	0 A healthcare facility has a plan with regular review and drills, and with sufficient resources for implementation	4/8 (50.00%)
	(3.2) Promotion of use of public transportation by personnel, patients, relatives, and visitors	●●●● 4 A healthcare facility has no plan	
(4) Infrastructures, technologies & processes 6 indicators	(4.1) Flexibility and adjustability of essential working systems	●● 2 The majority of working systems have “medium” level of flexibility and adjustability	12/24 (50.00%)
	(4.2) Availability and accessibility of information on local future climate-related disaster risks	0 A healthcare facility has access to the information and uses it for risk management planning	
	(4.3) One-stop service area with the highest protective level, in the case of hazards or high level of emergency	●● 2 A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	(4.4) Avoidance of products/materials that contain toxic chemicals	●● 2 A healthcare facility <i>is planning to eliminate the use of materials/products that contain toxic chemicals, or has avoided the use of products/materials that contain toxic chemicals, but not a systematic practice</i>	
	(4.5) Green procurement policy	●● 2 A healthcare facility <i>is planning to follow the green procurement policy, or has followed the policy, but not systematically</i>	
	(4.6) Healthy and sustainable food policy/plan	●●●● 4 A healthcare facility has no plan	
(5) Stakeholder engagement & governance 8 indicators	(5.1) Availability and accessibility of financial resources for disaster risk preparation	●● 2 Insufficient but not difficult to acquire the resources from external sources or donation	8/32 (25.00%)
	(5.2) Business continuity plan implementation	●● 2 A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(5.3) Contingency plan implementation	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
	(5.4) Existence and efficiency of internal board of committee/working group on	0 A healthcare facility has regular meetings with sufficient resources and efficient coordination.	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s) Percentage (s)
	safe and clean facility, climate change, and disaster risk management		
(5.5)	Specific coordinator on disaster risk management	0 A healthcare facility has a clear designed coordinator (s) who disaster risk management is his/her main task.	
(5.6)	Stakeholder participation in disaster risk management planning	0 A healthcare facility involves stakeholders in the planning process and implements the plan with them regularly.	
(5.7)	Mainstreaming disaster risk management in an action plan or budget plan	0 A healthcare facility a plan with sufficient resources for coordination implementation	
(5.8)	Climate-related hazards risk insurance	●●●● 4 None	

Note: Rayong hospital has a total adaptive capacity score of 38/96 or 39.58% - low level of vulnerability

SUMMARY

In the hazard dimension, Rayong hospital receives an aggregated score of 10/16 (62.50%), which indicates that the hospital is situated in an area with a high level of climate-related hazard. A sensitivity/exposure aggregated score of 12/16 (75.00%) suggests that the essential working systems and types of patients served at this hospital currently experience a moderate degree of sensitivity and exposure to climate change and climate-related events. In terms of its coping capacity, Rayong hospital has a low degree of vulnerability (A score of 18/72 or 25.00%), suggesting that the hospital is well-prepared for climate-related emergencies. Similarly, in terms of its adaptive capacity, the hospital has a low degree of vulnerability (A score of 38/96 or 45.00%). This indicates that in the context of global climate change, Rayong hospital has effectively adjusted its operations and adopted environmentally sustainable practices.

Table 0-15 Table 0-2Table 0-3Table 0-4Table 0-5Table 3-5. Summary of Rayong Hospital's Aggregated Scores and Percentages

Dimension	Hazard	Sensitivity/ Exposure	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
Aggregated Score (s)/ Percentage (s)	10/16 (62.50%)	12/16 (75.00%)	18/72 (25.00%)	38/96 (45.00%)
Level or intensity	High	Medium	Low	Low

When comparing each sub-dimension of the coping capacity and adaptive capacity dimensions, healthcare workforce and WASH and waste management show substantial differences. Regarding healthcare workforce, Rayong hospital has higher vulnerability level in the coping capacity dimension than the adaptive capacity dimension. In terms of adaptive capacity, the hospital has several plans in place for raising staff awareness of climate change, staff substitution, staff training for emergency situations, and evacuation. On the contrary, the hospital has limited coping capacity due to the demand for health services far exceeding the hospital workforce.

In terms of WASH and waste management, Rayong hospital is fully equipped with essential working systems, particularly the water-related and waste management facilities. This explains why it has 0% vulnerability or high coping capacity. In sharp contrast, because the hospital has contracted out the waste management function to Rayong PAO, it is difficult to determine whether the system would continue to work efficiently when facing climate-related events. Similarly, it was found that the efficiency and productivity of the hospital's water filter and purification system and water supply would be significantly affected by climate change. In addition, although the hospital has adopted a waste recycling program, but the implementation is confined to a small number of wards and departments within Rayong hospital.

Table 0-6 Table 3-6. Comparing Rayong Hospital's Coping Capacity and Adaptive Capacity

Vulnerability Sub-dimension (s)	Vulnerability Level (Coping Capacity)	Vulnerability Level (Adaptive Capacity)
(1) Healthcare Workforce	75.00%	30.00%
(2) Energy	0%	50.00%
(3) WASH and Waste Management	0%	66.67%
(4) Infrastructures, Technologies, and Processes	33.33%	50.00%
(5) Stakeholder Engagement and Governance	25.00%	25.00%

3.2 SAN SAI HOSPITAL, CHIANG MAI

San Sai hospital is a 183-bed community hospital under the Ministry of Public Health. It provides secondary and primary care services for patients in the San Sai district, Chiang Mai. In Fiscal Year 2022, the hospital served 112 emergency patients/day and 715 patients/day. In its effort to provide in-home services, San Sai hospital took care of five homecare patients per day. Like Rayong hospital, San Sai hospital is responsible for a variety of vulnerable populations, particularly infants and toddlers, pregnant women, and the elderly. As is typical of government hospital in Thailand, the number of patients served exceeded the hospital's capacity.



Figure 3-3. San Sai Hospital, Chiang Mai. Source: <http://do1.new.hss.moph.go.th:8080/>

HAZARD DIMENSION

As shown in Figure 3-4, San Sai hospital is situated in an area prone to both fluvial and pluvial floods. The flood map in Figure 3-4 is consistent with the previous research finding by Mingtipon, Powjinda, and Techa (2015). However, although the hospital never experiences water scarcity, the hospital staff reported that water scarcity is possible in the future (Table 3-6). On the other hand, air pollution has been a longstanding problem in many parts of Thailand, particularly the northern region where San Sai hospital is located. Over the past few years, air pollution levels have spiked in

the North due to forest fires and widespread open burning during the “slash and burn” farming season.⁷ This problem has affected the hospital staff, patients, and visitors.

Table 0-1 Table 3-7. San Sai Hospital’s Scores for the Hazard Dimension

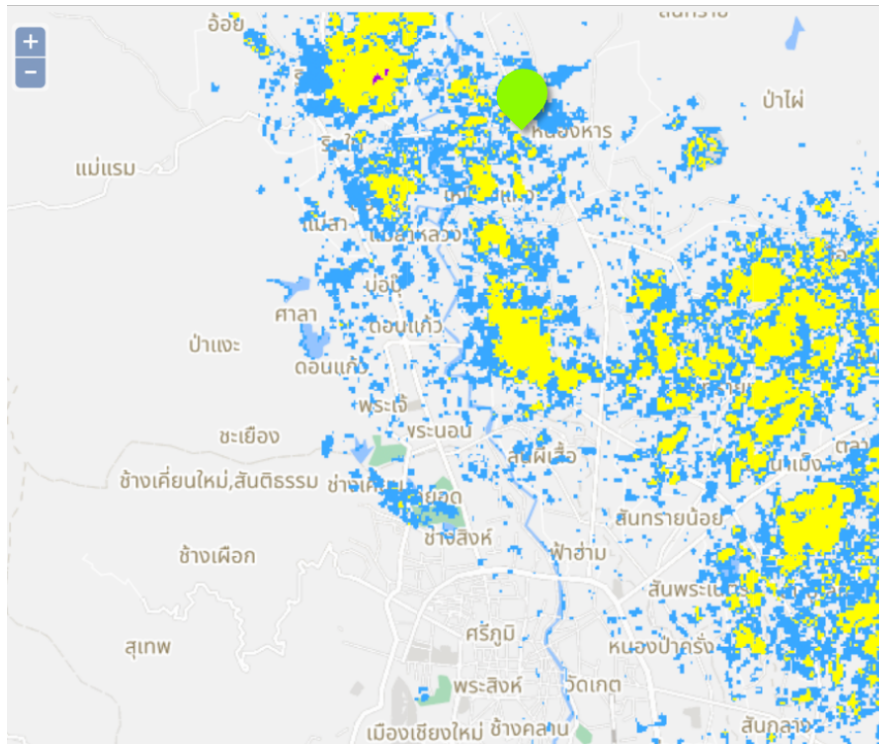
Indicator (s)	San Sai Hospital’s Score (s)
(1) Possibility of hospital and healthcare facility buildings to experience <i>fluvial flood</i>	●●●● 4 Regularly flooded or flooding is possible
(2) Possibility of hospital and healthcare facility buildings to experience <i>pluvial flood</i>	●●●● 4 Regularly flooded or flooding is possible
(3) Possibility of hospital and healthcare facility buildings to experience <i>water scarcity</i>	●● 2 Never experience water scarcity, but water scarcity is possible
(4) Possibility of hospital and healthcare facility buildings to experience <i>air pollution</i>	●●●● 4 Regularly experience air pollution

Note. San Sai hospital has a hazard score of 14/16 (87.50%) – high level of hazard.

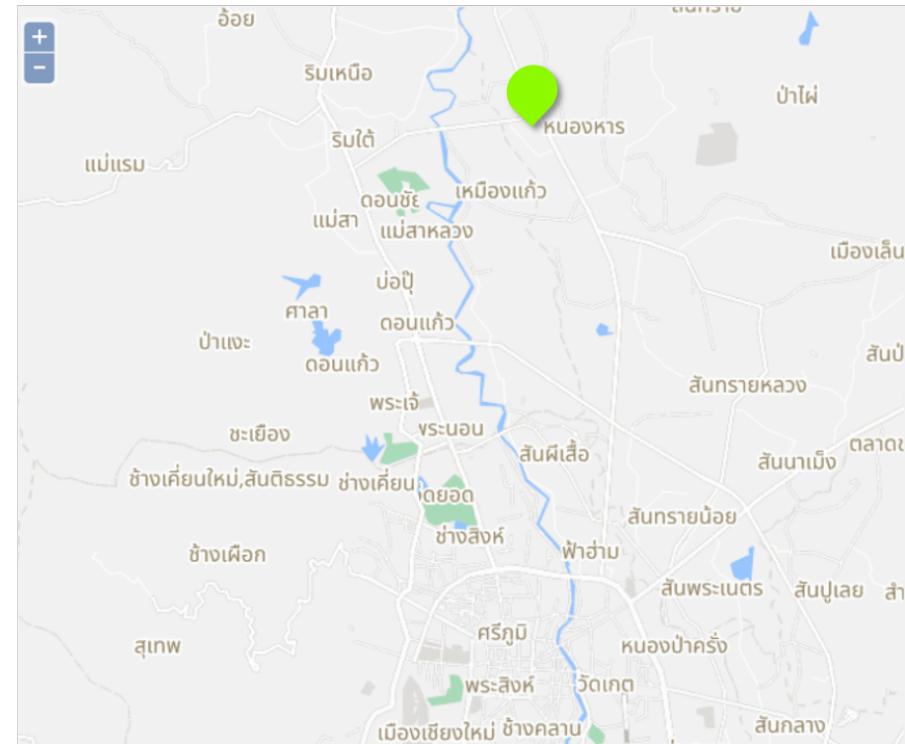
Overall, San Sai hospital has a total hazard score of 14/16 or 87.50%, which can be interpreted as a high level of climate-related hazard.

⁷ For more information, see: <https://www.bbc.com/thai/articles/cw4wppvg0dzo>.


Flood Map (In Thai)



Geographical Map (In Thai)



 San Sai hospital

 Pluvial flood area


 Fluvial flood area

Figure 3-4. Flood Map of San Sai Hospital and the San Sai district Area. Source: Geo-Informatics and Space Technology Development Agency (GISTDA) Flood Monitoring System (<https://flood.gistda.or.th/indexEN.html>)

SENSITIVITY/EXPOSURE DIMENSION

San Sai hospital has a total score of 12/16 or 75.00%, which is a moderate level of sensitivity and exposure (Table 3-7). The majority of essential working systems and back-up systems are located on the first floor of the hospital, such as electricity power control, computer/server control center, medical record archive, pumping system, and waste disposal and storage. As a result, hospital services would be greatly affected by emergency situations or climate-induced events (e.g., pluvial and fluvial floods) due to the exposure of several working and back-up systems. Dysfunctional working and back-up systems would lead to a substantial decrease in wellbeing of the vulnerable groups (e.g., the elderly, children, pregnant women) for which San Sai hospital is responsible.

Waste management system at San Sai hospital has been outsourced to a private waste management company, which is the main contractor for medical waste disposal services in the Chiang Mai – Lamphun – Lampang area. Based on our interview with the hospital administrator, it is unclear what San Sai hospital would do if the company could not perform its services. The water-related systems, particularly water supply, are in a similar situation. Although the hospital staff reported that water shortages rarely occur in the San Sai district, public water supply disruption that lasts more than 12 hours would have a high impact on San Sai hospital. Potential downtime, disruption, or shortage of other essential working systems (e.g., computer and server system, internet system, medicine and medical supplies, staff) would also have medium and high impacts on hospital services, especially the services for vulnerable patients.

Table 3-7. San Sai Hospital’s Scores for the Sensitivity/Exposure Dimension

Indicator (s)	San Sai Hospital’s Score (s)
(1) Exposure of 23 essential working systems	●● 2 At least one (1) essential working system is located at <3 m from the ground level or lower
(2) Exposure of 12 back-up systems/resources	●● 2 At least one (1) back-up system/resource is located at <3 m from the ground level or lower
(3) Sensitivity of selected essential working systems to downtime/disruption/shortage	●●●● 4 “Medium” to “high” impacts on the majority of essential systems
(4) Variety of vulnerable patients	●●●● 4 Six types or more

Note: San Sai hospital has a sensitivity/exposure score of 12/16 (75.00%) – medium level of sensitivity and exposure.

VULNERABILITY DIMENSION

Coping Capacity

San Sai hospital has a coping capacity score of 24/72 or 33.33%, which can be interpreted as low vulnerability (Table 3-8). Like Rayong hospital, the healthcare workforce sub-dimension has the highest vulnerability level (75.00%), followed by energy (50.00%) and stakeholder engagement and governance (37.50%). Each of these sub-dimensions can be explained as follows:

- **Healthcare workforce (75.00% vulnerability level)** – The service demand that San Sai hospital experiences far exceeds its capacity. This does not come as a surprise because inadequate staffing has always been a chronic problem for healthcare facilities in Thailand. Further, the hospital provides its staff with support services in emergency situations, but with no family support services.
- **Energy (50.00% vulnerability level)** – the hospital has adopted and implemented an energy conservation plan (e.g., installation of solar panels, use of energy-saving LED light bulbs), but to a limited extent due to resource scarcity.
- **Stakeholder engagement and governance (37.50% vulnerability level)** – San Sai hospital has set up a plan, personnel, budget, and resources for initial self-help in emergency situations, but still needs to rely on external support. Also, based on our interview, the hospital has sufficient financial resources for business-as-usual operations in emergency situations, but no budget surplus for large-scale preparation and community engagement

Overall, San Sai hospital has adopted a number of coping measures on energy conservation, stakeholder engagement, and governance. However, implementation of these measures is limited due to a lack of resources. The hospital has sufficient resources only for business-as-usual operations, but not for investment in large-scale climate change mitigation projects.

Table 3-8. San Sai Hospital’s Scores for Coping Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce <i>2 indicators</i>	(1.1) Balance between service capacity and service demand	●●●● 4 No, having service demand more than service capacity	6/8 (75.00%)
	(1.2) Support system for staff and family in the case of climate-related disasters or hazards	●● 2 The support system is in place, but incomplete	
(2) WASH and waste management <i>2 indicators</i>	(2.1) Water-related systems Three (3) systems: <ul style="list-style-type: none"> Water quality audit and monitoring Water safety plan Water supply 	0 A healthcare facility has functioning water-related systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all three systems)	0/8 (0.00%)
	(2.2) Waste management systems Four (4) systems: <ul style="list-style-type: none"> Healthcare/infectious waste treatment Hazardous waste treatment General waste management Wastewater treatment 	0 A healthcare facility has functioning waste management systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all four waste management systems)	
(3) Energy <i>2 indicators</i>	(3.1) Adoption of an energy efficiency and conservation program/plan	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	4/8 (50.00%)
	(3.2) Implementation of resource conservation plan	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with</i>	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		<i>regular review/drills, but without sufficient resources for implementation</i>	
(4) Infrastructures, technologies, and processes 8 indicators	(4.1) Downtime/disruption/shortage of the 22 essential working systems	●● 2 Average downtime/disruption/shortage of the 22 essential working systems between <1 hr and 2 days	8/32 (25.00%)
	(4.2) Procurement of special vehicle type for carrying goods and passengers during emergencies or hazards	●●●● 4 None	
	(4.3) Alternate safe accessible route	●● 2 <i>A healthcare facility is formulating such plan or has surveyed/designed alternate safe accessible route (s), but lacks regular maintenance</i>	
	(4.4) Assignment of alternate care site (s)	0 A healthcare facility has an evacuation plan with sufficient resources and has designated referral hospital (s)	
	(4.5) SOPs for recording a patient medical data	0 Yes	
	(4.6) A back-up plan for getting help from outside during communication system failures	0 Yes	
	(4.7) Air conditioning and ventilation	0 A healthcare facility has functioning air conditioning and ventilation system with extensive	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		coverage and regular review and/or maintenance (Grade of “A”)	
	(4.8) Protective environment room (with positive or negative pressure)	0 A healthcare facility has functioning protective environment room with regular review and/or maintenance (Grade of “A”)	
(5) Stakeholder engagement and Governance <i>4 indicators</i>	(5.1) Responsive plan for natural disasters	0 A healthcare facility has a plan with regular review/drills with sufficient resources for implementation	6/16 (37.50%)
	(5.2) Self-help plan for natural disasters	●● 2 <i>A healthcare facility has a plan, personnel, budget, and resources for initial self-help, while awaiting external support, or has a plan, personnel, budget, and resources for self-help with little need for external support</i>	
	(5.3) Availability and accessibility of financial resources for business-as-usual operations	●● 2 A healthcare facility has sufficient financial resources for business-as-usual operations, but no surplus	
	(5.4) A plan for coordinating and collaborating with surrounding communities and stakeholders in the case of emergencies or natural hazards	●● 2 <i>A healthcare facility is formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	

Note: San Sai hospital has a total coping capacity score of 24/72 or 33.33% – low level of vulnerability

Adaptive Capacity

In the adaptive capacity dimension, San Sai hospital has a medium vulnerability level (64/96 or 66.67%). The hospital scores 6/8 (75.00%) in the energy sub-dimension, meaning that the hospital is most highly vulnerable in this sub-dimension and needs to integrate climate adaptation into its energy consumption. The second and third most vulnerable sub-dimensions are healthcare workforce (14/20 or 70.00%) and stakeholder engagement and governance (22/32 or 68.75%)

Details of these highly vulnerable subdimensions are as follows:

- **Energy (75.00% vulnerability level)** – The hospital intends to use renewable energy (i.e., solar energy) as a primary line for power, especially in the daytime. Insufficient resources prevent the hospital from transitioning to renewable energy. Also, it has no plan to promote the use of public transportation by personnel, patients, relatives, and visitors.
- **Healthcare workforce (70.00% vulnerability level)** – Due to limited budget, San Sai hospital has conducted a limited number of capacity-building activities to raise awareness among its staff about climate change. For the same reason, the hospital has a workforce contingency plan and an evacuation plan, but cannot fully implement them. Currently, there are no training programs that aim to enable the hospital staff to work with no electricity and limited resources. Also, there is no plan to mobilize volunteers and external assistance to prepare San Sai hospital for climate change.
- **Stakeholder engagement and governance (68.75% vulnerability level)** – San Sai hospital has appointed an internal working group on safe and clean facility, climate change, and disaster risk management. This working group meets regularly, but lacks adequate resources. However, the hospital has not designated a specific coordinator on climate-induced disaster risk management. Neither has it incorporated disaster risk management into its annual budget nor purchased a climate-related hazard risk insurance. Due to budget constraints, the hospital has to acquire financial resources for disaster risk preparation from external sources or donation. Thus, despite having put together a business continuity plan (BCP) and a contingency plan, San Sai hospital cannot fully implement them. Further, stakeholders in healthcare, such as community leaders, local government officials, the elderly, and business owners, have been involved in disaster risk management and planning at San Sai hospital, but not on a regular basis.

Table 3-9. San Sai Hospital’s Scores for Adaptive Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce 5 indicators	(1.1) In-house capacity building and awareness raising among healthcare workers	●● 2 A healthcare facility has a plan, but does not implement it, or has a plan, but has no/insufficient resources and coordination for implementation	14/20 (70.00%)
	(1.2) Workforce contingency plan and implementation	●● 2 A healthcare facility is formulating such plan, or has a plan with no regular review/drill, or has a plan with regular review/drill but with no/insufficient resources for implementation	
	(1.3) Training on working with no electricity or limited resources	●●●● 4 None	
	(1.4) Evacuation plan implementation (both partial and full evacuation)	●● 2 A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation	
	(1.5) Volunteer and external help management plan implementation	●●●● 4 A healthcare facility has no plan	
(2) WASH & waste management 3 indicators	(2.1) Flexibility and adjustability of water-related systems	●● 2 The majority of working systems have “medium” level of flexibility and adjustability	6/12 (50.00%)
	(2.2) Flexibility and adjustability of waste management systems	●● 2 Both waste management systems have “medium” level of flexibility and adjustability, or one of the systems has	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		“medium” level of flexibility and adjustability, and the other has “high” level of flexibility and adjustability, <i>or</i> one of the systems has “low” level of flexibility and adjustability, and the other has “high” level of flexibility and adjustability	
	(2.3) Waste recycling program	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	
(3) Energy 2 indicator	(3.1) Use of renewable energy as back-up or secondary line for power	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	6/8 (75.00%)
	(3.2) Promotion of use of public transportation by personnel, patients, relatives, and visitors	●●●● 4 None	
(4) Infrastructures, technologies & processes 6 indicators	(4.1) Flexibility and adjustability of essential working systems	●● 2 All working systems or the majority of working systems have “medium” level of flexibility and adjustability	16/24 (66.67%)
	(4.2) Availability and accessibility of information on local future climate-related disaster risks	●● 2 A healthcare facility <i>is aware of the information, but has limited access, or is aware of and has access to the information, but does not use it for risk management planning</i>	
	(4.3) One-stop service area with the highest protective level, in the	●● 2	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	case of hazards or high level of emergency	A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(4.4) Avoidance of products/materials that contain toxic chemicals	●●●● 4 No	
	(4.5) Green procurement policy	●● 2 A healthcare facility <i>is planning to follow the green procurement policy, or has followed the policy, but not systematically</i>	
	(4.6) Healthy and sustainable food policy/plan	●●●● 4 A healthcare facility has no plan	
(5) Stakeholder engagement & governance 8 indicators	(5.1) Availability and accessibility of financial resources for disaster risk preparation	●● 2 Insufficient but not difficult to acquire the resources from external sources or donation	22/32 (68.75%)
	(5.2) Business continuity plan implementation	●● 2 A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(5.3) Contingency plan implementation	●● 2 A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(5.4) Existence and efficiency of internal board of committee/working group on	●● 2 A healthcare facility <i>is forming such committee/working group, or has such committee/working group, but never</i>	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	safe and clean facility, climate change, and disaster risk management	<i>convenes, or has regular meetings, but lack resources and efficient coordination</i>	
(5.5)	Specific coordinator on disaster risk management	●●●● 4 None	
(5.6)	Stakeholder participation in disaster risk management planning	●● 2 A healthcare facility <i>involves stakeholders in the planning process, but does not implement the plan or implements the plan without their involvement, or involves stakeholders in the planning process and implements the plan with them (but not on a regular basis).</i>	
(5.7)	Mainstreaming disaster risk management in an action plan or budget plan	●●●● 4 A healthcare facility has no plan	
(5.8)	Climate-related hazards risk insurance	●●●● 4 None	

Note: San Sai hospital has a total adaptive capacity score of 64/96 or 66.67% - medium level of vulnerability

SUMMARY

San Sai hospital has an aggregated hazard score of 14/16 (87.50%), which indicates a high risk of climate-related hazards, particularly pluvial and fluvial floods and air pollution. The facility, its essential working systems, and back-up systems have a medium level of sensitivity and exposure to climate change (an aggregated score of 12/16 or 75.00%). This is a warning signal that downtimes/ disruptions/shortages of these essential working and back-up systems would have a significant impact on vulnerable patients. However, reflected in its aggregated score of 24/72 (33.33%), San Sai hospital demonstrates a high level of coping capacity or a low level of vulnerability to climate-related disasters. This suggests that despite its high sensitivity and exposure level, San Sai hospital is well-prepared for public health emergencies exacerbated by climate change. On the contrary, San Sai hospital has a medium level of vulnerability (an aggregated score of 64/96 or 66.67%) in terms of its adaptive capacity (i.e., the capacity to adapt to climate change by integrating the environmentally sustainable practices into its operations).

Table 3-10. Summary of San Sai Hospital’s Aggregated Scores

Dimension	Hazard	Sensitivity/ Exposure	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
Aggregated Score (s)/ Percentage (s)	14/16 (87.50%)	12/16 (75.00%)	24/72 (33.33%)	64/96 (66.67%)
Level/intensity	High	Medium	Low	Medium

Table 3-11 compares the coping and adaptive capacities of San Sai hospital. The hospital is more vulnerable in the adaptive capacity dimension than in the coping capacity dimension. The largest difference between the coping and adaptive capacity dimensions is in the WASH and waste management sub-dimension (50.00% - 0.00% = 50.00%), followed by infrastructures, technologies, and processes (66.67% - 25.00% = 41.67%), stakeholder engagement and governance (68.75% - 37.50% = 31.25%), and energy (75.00% - 50.00% = 25.00%). Thus, we offer our preliminary conclusion that while San Sai hospital is well-prepared for climate-induced disasters and emergencies, it needs to integrate green or environmental sustainability issues into its management system and service operations.

Table 3-11. Comparing San Sai Hospital’s Coping Capacity and Adaptive Capacity

Vulnerability Sub-dimension (s)	Vulnerability Level (Coping Capacity)	Vulnerability Level (Adaptive Capacity)
(1) Healthcare Workforce	75.00%	70.00%
(2) Energy	50.00%	75.00%
(3) WASH and Waste Management	0.00%	50.00%
(4) Infrastructures, Technologies, and Processes	25.00%	66.67%

Vulnerability Sub-dimension (s)	Vulnerability Level (Coping Capacity)	Vulnerability Level (Adaptive Capacity)
(5) Stakeholder Engagement and Governance	37.50%	68.75%

3.3 SUTHEP COMMUNITY HEALTH CENTER, CHIANG MAI

Suthep community health center is a primary care unit operated by Suthep municipality. The center was transferred from the Ministry of Public Health to the municipal government under the Decentralization Act of 1999. After devolution, the municipality opened a second location of the community health center in the Suthep mountain area. Its main services include health promotion, vaccination, outpatient care, dental care, and rehabilitation. The community health center (both branches) serves approximately 40 patients per day and 4 emergency patients per day. A variety of population groups receive health services from this facility, including infants and toddlers, oxygen- and dialysis-dependent patients, the elderly, pregnant women, disabled persons, and mentally ill patients. The number of patients receiving care is consistent with the facility's service capacity.



Figure 3-5. Suthep Community Health Center, Chiang Mai. Source: Facebook Page แพทย์แผนไทย ศูนย์บริการสาธารณสุขเทศบาลสุเทพ

HAZARD DIMENSION

Based on Figure 3-6, Suthep community health center and the Suthep subdistrict– are situated in an area where fluvial flood has occurred in the past and is a perennial problem for the municipality⁸. However, since the center is located in a low-lying part of the municipality, it is not affected by pluvial flood. Where water scarcity is concerned, the center has never experienced water shortages. However, based on our interview with the subdistrict mayor, climate change could cause severe water crisis in the future for the subdistrict. Also, similar to other communities in the Chiang Mai city area, air pollution from open burning and wild fire is a regular problem for staff and patients at Suthep community health center

Table 3-12. Suthep Community Health Center’s Scores for the Hazard Dimension

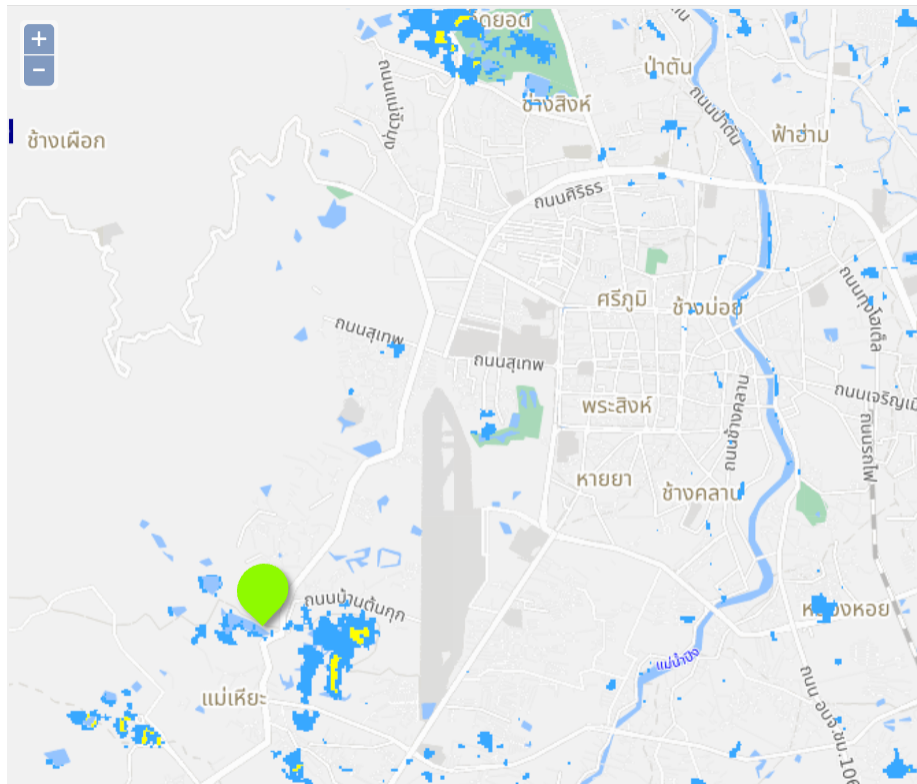
Indicator (s)	Rayong Hospital’s Score (s)
(1) Possibility of hospital and healthcare facility buildings to experience <i>fluvial flood</i>	●●●● 4 Regularly flooded or flooding is possible
(2) Possibility of hospital and healthcare facility buildings to experience <i>pluvial flood</i>	0 Neither flooded nor likely to be flooded
(3) Possibility of hospital and healthcare facility buildings to experience <i>water scarcity</i>	●● 2 Never experience water scarcity, but water scarcity is possible
(4) Possibility of hospital and healthcare facility buildings to experience <i>air pollution</i>	●●●● 4 Regularly experience air pollution

Note. Suthep community health center has a hazard score of 10/16 (62.50%) – high level of hazard.

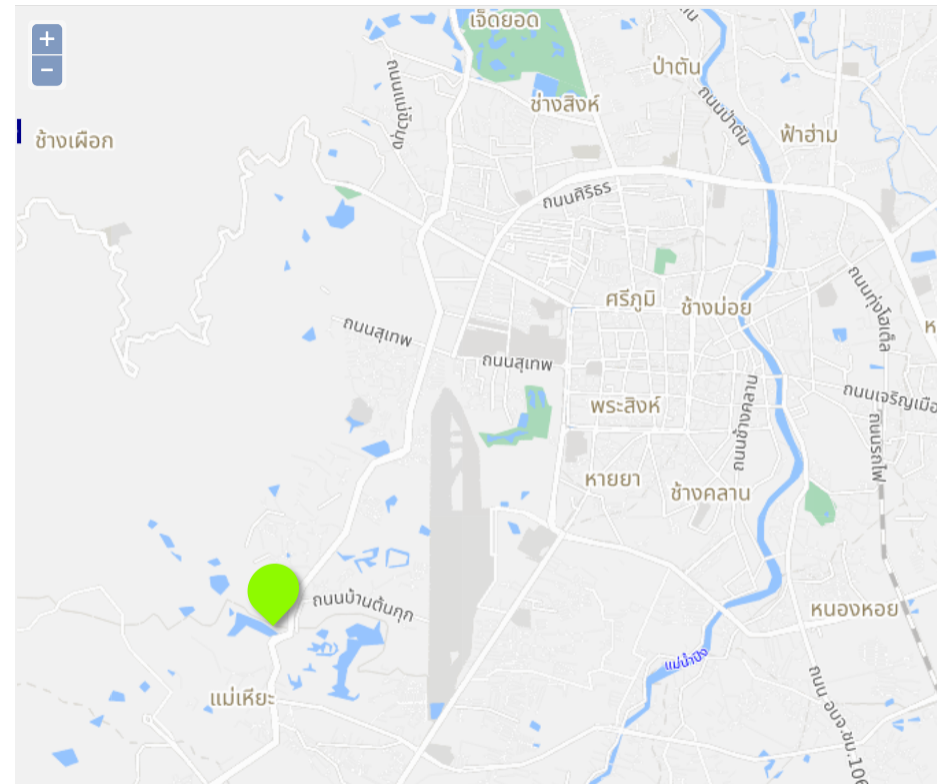
Overall, Suthep community health center has a total hazard score of 10/16 or 62.50%, which indicates a high level of climate-related hazard.

⁸ With a major royal irrigation canal going through the area, Suthep subdistrict is affected by fluvial flood every August-September. The canal broke its banks every year since 2022 and affected the entire subdistrict and the Chiang Mai University area. For information, see: <https://mgronline.com/local/detail/965000094395> and <https://www.amarintv.com/news/detail/149237>.

Flood Map (In Thai)



Geographical Map (In Thai)



Suthep community health center



Pluvial flood area



Fluvial flood area

Figure 3-6. Flood Map of Suthep Community Health Center and the Suthep Subdistrict Area. Source: Geo-Informatics and Space Technology Development Agency (GISTDA) Flood Monitoring System (<https://flood.gistda.or.th/indexEN.html>)

SENSITIVITY/EXPOSURE DIMENSION

The Suthep community health center has a total sensitivity/exposure score of 14/16 (87.50%), which is a high level of sensitivity and exposure to climate change and climate-induced disasters (Table 3-13). All of essential working systems are located on the first floor, particularly the electricity power control, medical record, waste storage and disposal, and medical and pharmaceutical storage. Similarly, relevant back-up systems and resources are located on the first floor of the community health center, including computers, servers, telephones, water supply, pumping system, medical and clinical supplies, and medical record.

When asked about the sensitivity of essential and back-up systems to climate-induced events, acting director of the Suthep community health center reported that all of the essential systems (e.g., electricity, water supply, computer, server, telephone, internet, waste management system) during downtime would generate “low” and “very low” impacts on the center’s operations.

Nevertheless, since the Suthep community health center serves more than six (6) groups of vulnerable patients, climate change and climate-induced disasters would interrupt the flow of services for the vulnerable populations, especially women, young children, and the elderly. With its essential working and back-up systems/resources located on the first floor, the next step will explore what the Suthep community health center has put in place to prepare for climate-related events, which have become increasingly unpredictable in the Suthep subdistrict in recent years.

Table 3-13. Suthep Community Health Center’s Scores for the Sensitivity/Exposure Dimension

Indicator (s)	Rayong Hospital’s Score (s)
(1) Exposure of 23 essential working systems	●●●● 4 A healthcare facility has all essential working systems located at <3 m from the ground level or lower
(2) Exposure of 12 back-up systems/resources	●●●● 4 A Healthcare facility has all back-up systems/resources located at <3 m from the ground level or lower
(3) Sensitivity of selected essential working systems to downtime/disruption/shortage	●● 2 “Low” and “Very low” impacts on the majority of essential systems
(4) Variety of vulnerable patients	●●●● 4 Six types or more

Note. Suthep community health center has a sensitivity/exposure score of 14/16 (87.50%) – high level of sensitivity and exposure.

VULNERABILITY DIMENSION

Coping Capacity

Suthep community health center has an aggregated coping capacity score of 44/68 (64.71%), which can be translated as a medium level of vulnerability (Table 3-14). The center scores 100% (i.e., the highest vulnerability level) in the WASH and waste management sub-dimension. The second and third most vulnerable sub-dimensions are infrastructures, technologies, and processes (68.75%), healthcare workforce (50.00%), and energy (50.00%). Details of these high-vulnerability sub-dimensions are as follows:

- **WASH and waste management (100% vulnerability level)** –The center relies entirely on public water supply and on the municipal government for water quality audit and monitoring and water safety plan. Based on an interview with the acting center director, it is not clear how the center would take care of its water-related and waste management systems if confronted with public health emergencies caused by climate change.
- **Infrastructures, technologies, and processes (78.57% vulnerability level)** – Suthep community health center has no plans to purchase special vehicles for carrying goods and passengers during public health emergencies, and to find alternate routes to the center and alternate care sites. Neither has it created a standard operating procedure (SOP) for managing a patient medical data in the event of an emergency. Also, we have found no back-up plan at the center for obtaining external assistance during communication failures. Nonetheless, the Suthep community health center has functioning air conditioning and ventilation system with regular review and maintenance. Based on our interview, air conditioning and ventilation has become an important working system in recent years due to air pollution caused by forest fires and widespread open burning.
- **Healthcare workforce (50% vulnerability level)** – Although the center has adequate staffing capacity for the service demand, it has no support system for staff and family in the case of climate-related disasters.
- **Energy (50% vulnerability level)** – The center has adopted an energy efficiency and conservation plan, and also implemented it for several years. The Suthep municipal government ensures that the center has adequate resources needed to implement the plan. However, there is no periodic monitoring, evaluation, and review of the plan.

Table 3-14. Suthep Community Health Center’s Scores for Coping Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce <i>2 indicators</i>	(1.1) Balance between service capacity and service demand	0 Yes, having service demand lower than service capacity	4/8 (50.00%)
	(1.2) Support system for staff and family in the case of climate-related disasters or hazards	●●●● 4 A healthcare facility has no support system for staff and family in the case of climate-related disasters or hazards	
(2) WASH and waste management <i>2 indicators</i>	(2.1) Water-related systems Three (3) systems: <ul style="list-style-type: none"> Water quality audit and monitoring Water safety plan Water supply 	●●●● 4 A healthcare facility has no water quality audit/monitoring, water safety plan, and water supply (Grade of “D” for all three systems)	8/8 (100.00%)
	(2.2) Waste management systems Four (4) systems: <ul style="list-style-type: none"> Healthcare/infectious waste treatment Hazardous waste treatment General waste management Wastewater treatment 	●●●● 4 A healthcare facility has no waste management systems (Grade of “D” for all four waste management systems)	
(3) Energy <i>2 indicators</i>	(3.1) Adoption of an energy efficiency and conservation program/plan	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	4/8 (50.00%)

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(3.2) Implementation of resource conservation plan	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	
(4) Infrastructures, technologies, and processes 8 indicators	(4.1) Downtime/disruption/shortage of the 22 essential working systems	●● 2 Average downtime/disruption/shortage of the 22 essential working systems between <1 hr and 2 days	22/28 (78.57%)
	(4.2) Procurement of special vehicle type for carrying goods and passengers during emergencies or hazards	●●●● 4 None	
	(4.3) Alternate safe accessible route	●●●● 4 None	
	(4.4) Assignment of alternate care site (s)	●●●● 4 None	
	(4.5) SOPs for recording a patient medical data	●●●● 4 No	
	(4.6) A back-up plan for getting help from outside during communication system failures	●●●● 4 No	
	(4.7) Air conditioning and ventilation	0 A healthcare facility has functioning air conditioning and ventilation system with extensive	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		coverage and regular review and/or maintenance (Grade of "A")	
	(4.8) Protective environment room (with positive or negative pressure)	Irrelevant	
(5) Stakeholder engagement and Governance <i>4 indicators</i>	(5.1) Responsive plan for natural disasters	●● 2 <i>A healthcare facility is formulating a plan, or has a plan, but without regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	6/16 (37.50%)
	(5.2) Self-help plan for natural disasters	●● 2 <i>A healthcare facility has a plan, personnel, budget, and resources for initial self-help, while awaiting external support, or has a plan, personnel, budget, and resources for self-help with little need for external support</i>	
	(5.3) Availability and accessibility of financial resources for business-as-usual operations	0 <i>A healthcare facility has surplus financial resources for business-as-usual operations</i>	
	(5.4) A plan for coordinating and collaborating with surrounding communities and stakeholders in the case of emergencies or natural hazards	●● 2 <i>A healthcare facility is formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	

Note: Suthep community health center has a total coping capacity score of 44/68 (64.71%) - medium level of vulnerability

Adaptive Capacity

As show in Table 3-15, Suthep community health center has an adaptive capacity score of 72/96 (75.00%), which can be interpreted as a high level of vulnerability to climate change. The sub-dimension with the highest vulnerability score is infrastructures, technologies, and processes (22/24 or 91.67%), followed by WASH and waste management (10/12 or 83.33%) and energy (6/8 or 75.00%). Details of these three sub-dimensions are as follows:

- **Infrastructures, technologies, and processes (91.67% vulnerability level)** – When asked about the flexibility and adjustability of essential working systems, acting director of the Suthep community health center reported that two essential working systems (i.e., electricity power system and water filter and purification) are highly flexible and adjustable. Back-up power source, computer/server/internet system, medical record, and water supply have a moderate degree of flexibility and adjustability. Only medical and clinical supplies cannot be moved or adjusted. Further, Suthep community health center has no information on local future climate-related disaster risks. Neither has the center planned to designate a one-stop service area for climate-related emergencies, to avoid products and materials that contain toxic chemicals, or to adopt the green procurement and healthy and sustainable food policies.
- **WASH and waste management (83.33% vulnerability level)** – The water-related systems at Suthep community health center have medium levels of flexibility and adjustability. That is, they can be moved or adjusted in emergency situations, but the efficiency of water-related systems would significantly drop. Also, since the center relies on the municipal government for waste management, waste management systems have a low level of flexibility and adjustability. In terms of waste recycling, the Suthep community health center currently has no official policy.
- **Energy (75.00% vulnerability level)** – The center follows the Suthep subdistrict municipality’s renewable energy policy, but implementation is limited. Due to its broad scope, the municipal government’s renewable energy plan needs to be adjusted to match the community health center’s context. In addition, the center currently has no policy to promote the use of public transportation by staff, patients, relatives, and visitors.

Table 3-15. Suthep Community Health Center’s Scores for Adaptive Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce 5 indicators	(1.1) In-house capacity building and awareness raising among healthcare workers	●● 2 A healthcare facility has a plan, but does not implement it, or has a plan, but has no/insufficient resources and coordination for implementation	14/20 (70.00%)
	(1.2) Workforce contingency plan and implementation	●● 2 A healthcare facility is formulating such plan, or has a plan with no regular review/drill, or has a plan with regular review/drill but with no/insufficient resources for implementation	
	(1.3) Training on working with no electricity or limited resources	●●●● 4 None	
	(1.4) Evacuation plan implementation (both partial and full evacuation)	●●●● 4 A healthcare facility has no plan	
	(1.5) Volunteer and external help management plan implementation	●● 2 A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation	
(2) WASH & waste management 3 indicators	(2.1) Flexibility and adjustability of water-related systems	●● 2 The majority of working systems have “medium” level of flexibility and adjustability	10/12 (83.33%)

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(2.2) Flexibility and adjustability of waste management systems	●●●● 4 Both waste management systems have “low” level of flexibility and adjustability, <i>or</i> one of the systems has “medium” level of flexibility and adjustability, and the other has “low” level of flexibility and adjustability	
	(2.3) Waste recycling program	●●●● 4 A healthcare facility <i>does not have a waste recycling program</i>	
(3) Energy <i>2 indicators</i>	(3.1) Use of renewable energy as back-up or secondary line for power	●● 2 A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i>	6/8 (75.00%)
	(3.2) Promotion of use of public transportation by personnel, patients, relatives, and visitors	●●●● 4 No	
(4) Infrastructures, technologies & processes <i>6 indicators</i>	(4.1) Flexibility and adjustability of essential working systems	●● 2 All working systems or the majority of working systems have “medium” level of flexibility and adjustability	22/24 (91.67%)
	(4.2) Availability and accessibility of information on local future climate-related disaster risks	●●●● 4 A healthcare facility has no information on local future climate-related disaster risks	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(4.3) One-stop service area with the highest protective level, in the case of hazards or high level of emergency	●●●● 4 A healthcare facility has no plan	
	(4.4) Avoidance of products/materials that contain toxic chemicals	●●●● 4 No	
	(4.5) Green procurement policy	●●●● 4 A healthcare facility has no plan	
	(4.6) Healthy and sustainable food policy/plan	●●●● 4 A healthcare facility has no plan	
(5) Stakeholder engagement & governance 8 indicators	(5.1) Availability and accessibility of financial resources for disaster risk preparation	●● 2 Insufficient but not difficult to acquire the resources from external sources or donation	20/32 (62.50%)
	(5.2) Business continuity plan implementation	●● 2 <i>A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	
	(5.3) Contingency plan implementation	●● 2 <i>A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i>	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(5.4) Existence and efficiency of internal board of committee/working group on safe and clean facility, climate change, and disaster risk management	●● 2 A healthcare facility <i>is forming such committee/working group, or has such committee/working group, but never convenes, or has regular meetings, but lack resources and efficient coordination</i>	
	(5.5) Specific coordinator on disaster risk management	●● 2 A healthcare facility <i>is considering a suitable candidate for this role, or has a designated coordinator, but disaster risk management is not his/her main responsibility</i>	
	(5.6) Stakeholder participation in disaster risk management planning	●● 2 A healthcare facility <i>involves stakeholders in the planning process, but does not implement the plan or implements the plan without their involvement, or involves stakeholders in the planning process and implements the plan with them (but not on a regular basis).</i>	
	(5.7) Mainstreaming disaster risk management in an action plan or budget plan	●●●● 4 A healthcare facility has no plan	
	(5.8) Climate-related hazards risk insurance	●●●● 4 None	

Note: Suthep community health center has a total adaptive capacity score of 72/96 (75.00%) – high level of vulnerability

SUMMARY

As show in Table 3-16, Suthep community health center has high levels of hazard and sensitivity/exposure to climate change and climate-related events, including fluvial flood and air pollution. The center has a moderate capacity to cope with disasters and public health emergencies . Its adaptive capacity, on the other hand, is low, making the services highly vulnerable to climate change and climate-related events. Its infrastructures, technologies, and processes in particular need further improvements to minimize the overall environmental impacts.

Table 3-16. Summary of Suthep Community Health Center’s Aggregated Scores

Dimension	Hazard	Sensitivity/ Exposure	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
Aggregated Score (s)/ Percentage (s)	10/16 (62.50%)	14/16 (87.50%)	44/68 (61.11%)	72/96 (75.00%)
Level/intensity	High	High	Medium	High

Based on Table 3-17, Suthep community health center has higher vulnerability levels in almost all sub-dimensions in the adaptive capacity dimension, except WASH and waste management. The largest differences between the coping and adaptive capacity dimensions are in the energy sub-dimension (75.00% - 50.00% = 25.00%) and stakeholder engagement and governance (62.50% - 37.50% = 25.00%). This suggests that not only should Suthep community health center consider integrating environmental sustainability into its energy use and consumption, it should also revisit all the plans and policies that address climate adaptation, business continuity during emergency situations, and disaster risk management. Also, the center should engage more local community leaders, university officials, senior citizens, parents, and youth in its climate action planning process.

Table 3-17. Comparing Suthep Community Health Center’s Coping Capacity and Adaptive Capacity

Vulnerability Sub-dimension (s)	Vulnerability Level (Coping Capacity)	Vulnerability Level (Adaptive Capacity)
(1) Healthcare Workforce	50.00%	70.00%
(2) Energy	50.00%	75.00%
(3) WASH and Waste Management	100.00%	83.33%
(4) Infrastructures, Technologies, and Processes	68.75%	91.67%
(5) Stakeholder Engagement and Governance	37.50%	62.50%

3.4 BUENG YITHO MEDICAL AND REHABILITATION CENTER, PATHUMTHANI

Similar to Suthep community health center, Bueng Yitho medical and rehabilitation center was transferred from the Ministry of Public Health to the Bueng Yitho municipality under the Decentralization Act of 1999. Prior to decentralization, the Bueng Yitho municipality had three other primary care centers scattered around the municipal area. After the Medical and Rehabilitation Center came under the municipal government management, the municipal council voted to merge the three original primary care facilities with the center and gradually expanded the services to include outpatient care, orthodontics, Traditional Chinese Medicine (TCM), and intermediate care. In 2022, Bueng Yitho medical and rehabilitation center served approximately 100-200 patients per day. Vulnerable populations living in the Bueng Yitho municipal area – including the elderly, disabled persons, pregnant women, and infants and toddlers – are the main group of patients receiving primary care services from the Bueng Yitho medical and rehabilitation center. Based on our assessment, the number of patients currently being served by the center are consistent with its service capacity.



Figure 3-7 Bueng Yitho Medical and Rehabilitation Center, Pathumthani. Source: <https://www.buengyitho.go.th/public/>

HAZARD DIMENSION

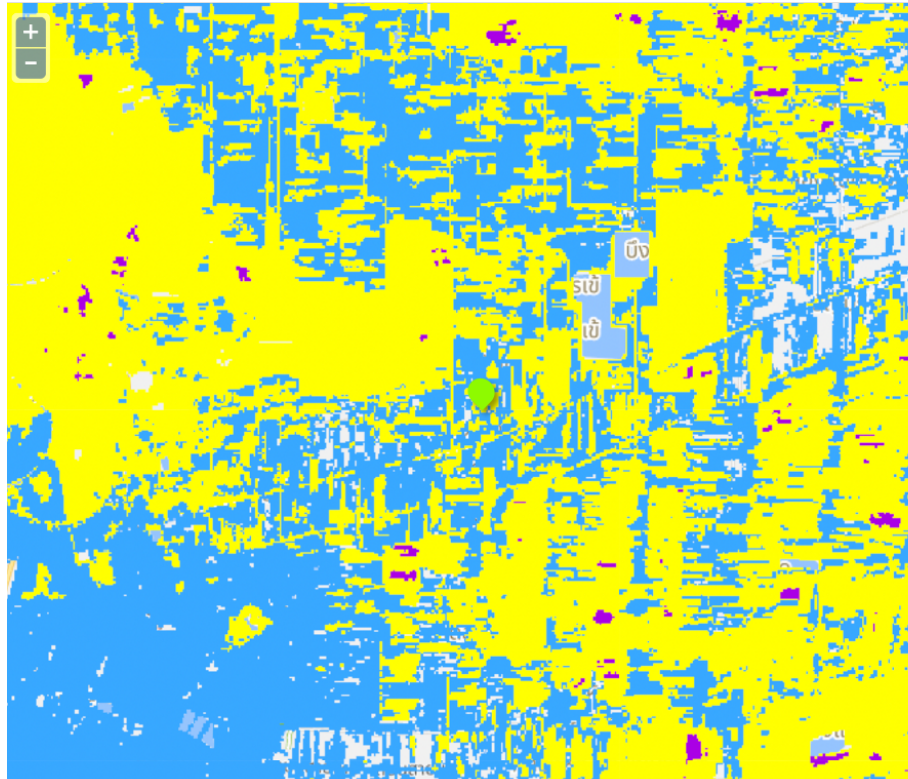
Bueng Yitho medical and rehabilitation center obtained an aggregated score of 12/16 (75.00%), suggesting that the center experiences a high level of climate-related hazard. The center and its surrounding area are situated near Rangsit canal, which used to overflow and inundate several neighborhoods in the Bueng Yitho municipal area. Based on Figure 3-8, flash floods or pluvial floods have also occurred in the area and are likely to intensify due to global warming. In addition, water scarcity is not likely to be a problem, but air pollution is a perennial challenge for people living in the area.

Table 3-18. Bueng Yitho Medical and Rehabilitation Center’s Scores for the Hazard Dimension

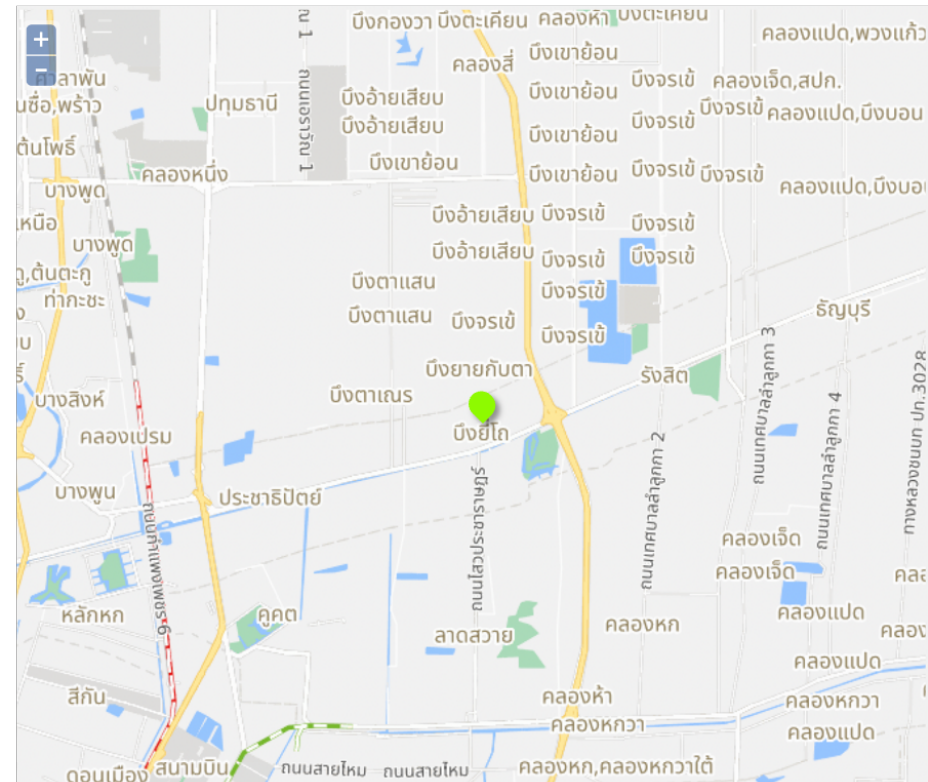
Indicator (s)	Rayong Hospital’s Score (s)
(1) Possibility of hospital and healthcare facility buildings to experience <i>fluvial flood</i>	●●●● 4 Regularly flooded or flooding is possible
(2) Possibility of hospital and healthcare facility buildings to experience <i>pluvial flood</i>	●●●● 4 Regularly flooded or flooding is possible
(3) Possibility of hospital and healthcare facility buildings to experience <i>water scarcity</i>	0 No possibility of water scarcity
(4) Possibility of hospital and healthcare facility buildings to experience <i>air pollution</i>	●●●● 4 Regularly experience air pollution


Note. Bueng Yitho medical and rehabilitation center has a hazard score of 12/16 (75.00%) – high level of hazard.


Flood Map (In Thai)



Geographical Map (In Thai)



 Buengyitho Medical and Rehabilitation Center

 Pluvial flood area


 Fluvial flood area

Figure 3-8. Flood Map of Suthep Community Health Center and the Suthep Subdistrict Area. Source: Geo-Informatics and Space Technology Development Agency (GISTDA) Flood Monitoring System (<https://flood.gistda.or.th/indexEN.html>)

SENSITIVITY/EXPOSURE DIMENSION

Based on Table 3-19, Bueng Yitho medical and rehabilitation center has a total sensitivity/exposure score of 10/16 (62.50%), indicating a medium level of sensitivity and exposure to climate change and climate-related events. At least one essential working system and one back-up system are exposed. However, any downtime, disruption, or shortage of essential working systems are not likely to affect the center’s operations. Yet, the center and municipal government have to prepare for any unexpected climate-related events because more than six types of vulnerable patients depend on the center’s services.

Table 3-19. Bueng Yitho Medical and Rehabilitation Center’s Scores for the Sensitivity/Exposure Dimension

Indicator (s)	Rayong Hospital’s Score (s)
(1) Exposure of 23 essential working systems	●● 2 At least one (1) essential working system is located at <3 m from the ground level or lower
(2) Exposure of 12 back-up systems/resources	●● 2 At least one (1) back-up system/resource is located at <3 m from the ground level or lower
(3) Sensitivity of selected essential working systems to downtime/disruption/shortage	●● 2 “Low” impacts on the majority of essential systems
(4) Variety of vulnerable patients	●●●● 4 Six types or more

Note. Bueng Yitho medical and rehabilitation center has a total sensitivity/exposure score of 10/16 (62.50%) – medium level of sensitivity/exposure

VULNERABILITY DIMENSION

Coping Capacity

Based on our preliminary assessment, Bueng Yitho medical and rehabilitation center has a strong coping capacity and a low vulnerability level (an aggregated score of 4/68 or 5.88%). The only indicator that the center did not implement is the purchase of special vehicle for carrying goods and passengers during emergencies or hazards. However, to address this gap in the infrastructures, technologies, and processes sub-dimension, Bueng Yitho medical and rehabilitation center works closely with the municipal public works department and the disaster mitigation and prevention division to prepare for any climate-related events and disasters.

Table 3-18. Bueng Yitho Medical and Rehabilitation Center’s Scores for Coping Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce <i>2 indicators</i>	(1.1) Balance between service capacity and service demand	0 Yes, having service demand lower than service capacity	0/8 (0.00%)
	(1.2) Support system for staff and family in the case of climate-related disasters or hazards	0 A healthcare facility has support system in place for staff and family	
(2) WASH and waste management <i>2 indicators</i>	(2.3) Water-related systems Three (3) systems: <ul style="list-style-type: none"> • Water quality audit and monitoring • Water safety plan • Water supply 	0 A healthcare facility has functioning water-related systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all three systems)	0/8 (0.00%)
	(2.4) Waste management systems Four (4) systems: <ul style="list-style-type: none"> • Healthcare/infectious waste treatment • Hazardous waste treatment • General waste management • Wastewater treatment 	0 A healthcare facility has functioning waste management systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all four waste management systems)	
(3) Energy <i>2 indicators</i>	(3.3) Adoption of an energy efficiency and conservation program/plan	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	0/8 (0.00%)

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(3.4) Implementation of resource conservation plan	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	
(4) Infrastructures, technologies, and processes <i>8 indicators</i>	(4.1) Downtime/disruption/shortage of the 22 essential working systems	0 No downtime/disruption/shortage of the 22 essential working system	4/28 (14.29%)
	(4.2) Procurement of special vehicle type for carrying goods and passengers during emergencies or hazards	●●●● 4 None	
	(4.3) Alternate safe accessible route	0 A healthcare facility has surveyed/designed alternate safe accessible route (s) and conducted regular maintenance	
	(4.4) Assignment of alternate care site (s)	0 A healthcare facility has an evacuation plan with sufficient resources and has designated referral hospital (s)	
	(4.5) SOPs for recording a patient medical data	0 Yes	
	(4.6) A back-up plan for getting help from outside during communication system failures	0 Yes	
	(4.7) Air conditioning and ventilation	0 A healthcare facility has functioning air conditioning and ventilation system with	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		extensive coverage and regular review and/or maintenance (Grade of "A")	
	(4.8) Protective environment room (with positive or negative pressure)	Irrelevant	
(5) Stakeholder engagement and Governance <i>4 indicators</i>	(5.5) Responsive plan for natural disasters	0 A healthcare facility has a plan with regular review/drills with sufficient resources for implementation	0/0 (0.00%)
	(5.6) Self-help plan for natural disasters	0 A healthcare facility has a plan, personnel, budget, and resources for self-help with no external support needed	
	(5.7) Availability and accessibility of financial resources for business-as-usual operations	0 A healthcare facility has surplus financial resources for business-as-usual operations	
	(5.8) A plan for coordinating and collaborating with surrounding communities and stakeholders in the case of emergencies or natural hazards	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	

Note. Bueng Yitho medical and rehabilitation center has a total coping capacity score of 4/68 (5.88%) -- a low level of vulnerability

Adaptive Capacity

Our preliminary assessment found that effective intraorganizational collaboration between the Bueng Yitho medical and rehabilitation center and other municipal departments enabled the center to adapt to climate change. As demonstrated in Table 3-20, Bueng Yitho medical and rehabilitation center obtained a total adaptive capacity score of 20/96 (20.83%), suggesting that the center is resilient to climate change. The missing actions that should be adopted in the future include promoting the use of public transportation among its personnel, avoiding products that contain toxic chemical, such as VOCs, and forming a formal working group on safe and clean facility, climate change, and disaster risk management.

Table 3-20. Bueng Yitho Medical and Rehabilitation Center’s Scores for Adaptive Capacity

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
(1) Healthcare workforce <i>5 indicators</i>	(1.1) In-house capacity building and awareness raising among healthcare workers	0 A healthcare facility a plan, sufficient resources, and coordination for implementation	0/20 (0.00%)
	(1.2) Workforce contingency plan and implementation	0 A healthcare facility has plan with regular review/drill, and sufficient resources for implementation	
	(1.3) Training on working with no electricity or limited resources	0 A healthcare facility organizes training at least 1 time/year, and our facility has sufficient resources and coordination	
	(1.4) Evacuation plan implementation (both partial and full evacuation)	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
	(1.5) Volunteer and external help management plan implementation	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
(2) WASH & waste management <i>3 indicators</i>	(2.1) Flexibility and adjustability of water-related systems	0 All working systems have “high” level of flexibility and adjustability	0/12 (0.00%)
	(2.2) Flexibility and adjustability of waste management systems	0 All working systems have “high” level of flexibility and adjustability	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(2.3) Waste recycling program	0 A healthcare facility has <i>a waste recycling program in place</i>	
(3) Energy <i>2 indicators</i>	(3.1) Use of renewable energy as back-up or secondary line for power	0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i>	4/8 (50.00%)
	(3.2) Promotion of use of public transportation by personnel, patients, relatives, and visitors	●●●● 4 No	
(4) Infrastructures, technologies & processes <i>6 indicators</i>	(4.1) Flexibility and adjustability of essential working systems	0 All working systems have “high” level of flexibility and adjustability	6/24 (25.00%)
	(4.2) Availability and accessibility of information on local future climate-related disaster risks	0 A healthcare facility has access to the information and uses it for risk management planning	
	(4.3) One-stop service area with the highest protective level, in the case of hazards or high level of emergency	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
	(4.4) Avoidance of products/materials that contain toxic chemicals	●●●● 4 No	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
	(4.5) Green procurement policy	●● 2 A healthcare facility <i>is planning to follow the green procurement policy, or has followed the policy, but not systematically</i>	
	(4.6) Healthy and sustainable food policy/plan	0 A healthcare facility has a healthy/sustainable food policy and plan in place	
(5) Stakeholder engagement & governance 8 indicators	(5.1) Availability and accessibility of financial resources for disaster risk preparation	0 Sufficient and no need to acquire the resources from external sources or donation	10/32 (31.25%)
	(5.2) Business continuity plan implementation	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
	(5.3) Contingency plan implementation	0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation	
	(5.4) Existence and efficiency of internal board of committee/working group on safe and clean facility, climate change, and disaster risk management	●●●● 4 None	
	(5.5) Specific coordinator on disaster risk management	●● 2 A healthcare facility <i>is considering a suitable candidate for this role, or has a designated</i>	

Sub-dimension (s)	Indicator (s)	Rating Score (s)	Total Score (s)
		<i>coordinator, but disaster risk management is not his/her main responsibility</i>	
(5.6)	Stakeholder participation in disaster risk management planning	0 A healthcare facility involves stakeholders in the planning process and implements the plan with them regularly.	
(5.7)	Mainstreaming disaster risk management in an action plan or budget plan	0 A healthcare facility a plan with sufficient resources for coordination implementation	
(5.8)	Climate-related hazards risk insurance	●●●● 4 None	

Note: Bueng Yitho Medical and Rehabilitation Center has a total adaptive capacity score of 20/96 (20.83%) – low level of vulnerability

SUMMARY

As show in Table 3-21, Bueng Yitho medical and rehabilitation center is situated in an area with a high level of climate hazard, but has experienced a medium level of sensitivity and exposure to climate change and climate-related events over the past two years. However, the center has demonstrated strong capacity to cope with and adapt to climate change.

Table 3-21. Summary of Bueng Yitho Medical and Rehabilitation Center’s Aggregated Scores

Dimension	Hazard	Sensitivity/ Exposure	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
Aggregated Score (s)/ Percentage (s)	12/16 (75.00%)	10/16 (62.50%)	4/68 (5.88%)	20/96 (20.83%)
Level/intensity	High	Medium	Low	Low

When comparing each sub-dimension of the coping and adaptive capacity dimensions, it is demonstrated that Bueng Yitho medical and rehabilitation center’s coping capacity is higher than its adaptive capacity (Table 3-22). This suggests that the center should pay more attention to environmental sustainability by promoting the use of public transportation among staff, patients, and visitors, by avoiding the use and consumption of goods and materials that contain toxic chemicals, by seriously implementing the green procurement policy, by establishing an internal working group on climate action, by designating a coordinator on disaster risk management, and by purchasing a climate-related hazard risk insurance policy.

Table 3-22. Comparing Bueng Yitho Medical and Rehabilitation Center’s Coping Capacity and Adaptive Capacity

Vulnerability Sub-dimension (s)	Vulnerability Level (Coping Capacity)	Vulnerability Level (Adaptive Capacity)
(1) Healthcare Workforce	0%	0%
(2) Energy	0%	50.00%
(3) WASH and Waste Management	0%	0%
(4) Infrastructures, Technologies, and Processes	14.29%	25.00%
(5) Stakeholder Engagement and Governance	0%	31.25%



CHAPTER 4

Conclusion

CHAPTER 4

Conclusion

4.1 SUMMARY OF PRELIMINARY FINDINGS

Based on our preliminary assessment of four (4) healthcare facilities in Rayong, Pathumthani, and Chiang Mai, we offer the following observations:



Location-based Hazard. All four (4) healthcare facilities are located in high climate-risk areas. San Sai hospital, Suthep community health center, and Bueng Yitho medical and rehabilitation center are prone to either fluvial or pluvial floods (or both). Rayong hospital – albeit located in an area that is never flooded or likely to be flooded— is projected to be severely affected by sea-level rise in 50 years’ time.



Sensitivity and Exposure. Rayong hospital and San Sai Hospital have the same level of sensitivity and exposure to climate change and climate-related events. On the contrary, the two (2) primary healthcare units have different sensitivity and exposure levels. Located in a urban area, Bueng Yitho medical and rehabilitation center has recently moved to a new building, which has been designed to prepare for climate-related disasters. As such, only one essential working system and one back-up system are exposed. Any downtime, disruption, or shortage of essential working systems are not likely to affect the center’s operations. Suthep community health center, on the other hand, still uses its original building in which a majority of essential working systems and back-up systems are exposed.

Table 4-1. Summary of Preliminary Findings

Name of Facility	Level of Care	Hazard	Sensitivity	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
1. Rayong Hospital	Tertiary	High (62.50%)	Medium (75.00%)	Low (25.00%)	Low (45.00%)
2. San Sai Hospital	Secondary	High (87.50%)	Medium (75.00%)	Low (33.33%)	Medium (66.67%)
3. Suthep Community Health Center	Primary	High (62.50%)	High (87.50%)	Medium (61.11%)	High (75.00%)
4. Bueng Yitho Medical and Rehabilitation Center	Primary	High (75.00%)	Medium (62.50%)	Low (5.88%)	Low (20.83%)

Climate Vulnerability. In this assessment, the coping capacity dimension provides direct measures for a healthcare facility’s climate vulnerability. Almost all healthcare facilities in this study, except the Suthep community health center, have a low vulnerability level, indicating their preparedness to cope with climate-induced public health emergencies. The Suthep community health center is highly vulnerable to climate change due to its heavy reliance on external agencies for public water supply, water quality audit and monitoring, water safety plan, and waste-related management systems.

Green Viability. Several indicators in the adaptive capacity dimension specifically assess a healthcare facility’s ability to minimize negative environmental impacts and eradicate diseases by providing eco-friendly services and by reducing waste. Healthcare facilities with surplus resources (i.e., Rayong hospital and Bueng Yitho medical and rehabilitation center) have low vulnerability levels in the dimension, indicating that they have integrated environmental sustainability into their service operations. Suthep community health center needs to pay close attention to the flexibility and adjustability of essential working systems, particularly water-related and waste management systems. Also, almost all healthcare facilities in this study, except the Bueng Yitho medical and rehabilitation center, still have not fully followed the national government’s green procurement policy. Neither have they adopted and implemented policies to provide eco-friendly services to their staff and patients, including promoting the use of public transportation and consumption of healthy and eco-friendly food, avoiding the use and consumption of goods and materials that contain toxic chemicals, and spearheading waste recycling effort.

4.2 LESSONS LEARNED

1. Although our assessment criteria include considerably fewer indicators than those proposed by World Health Organization (WHO) and previously deployed in other countries, participants in this study suggested that several indicators can be combined or eliminated altogether. For instance, the energy sub-dimension in the coping capacity dimension contains two indicators: (1) adoption of an energy efficiency and conservation program/plan and (2) implementation of resource conservation plan. These indicators can be combined to form one indicator that addresses an internal policy cycle in a healthcare facility that ultimately leads to adoption and execution of an energy/resource efficiency and conservation policy.
2. When designing the assessment tool, two attempts were made to ensure the “objectivity” of responses/information. First, two indicators (i.e., likelihoods to experience *fluvial* and *pluvial* floods) were created to enable the researchers/assessors to use external data sources (i.e., GISTDA flood monitoring map) to assess a healthcare facility. Second, other indicators require the researchers/assessors to use both self-reported responses and internal policy documents. Due to limited time and a large volume of documents, the researchers/assessors experience significant challenges in examining each sub-dimension in detail. If UNFPA and FHI 360 plan to expand this project and use the assessment tool in other areas, we recommend that a research/assessment team spends at least three (3) days at each healthcare facility. Also, UNFPA and FHI 360 should collaborate with GISTDA to take advantage of satellite technology to collect data on climate-induced hazard risks.
3. Healthcare facility staff that participated in this study were prone to “social desirability” biases. That is, they tended to provide responses that were inconsistent with the reality. Also, due to

the Official Information Act, B.E. 2540 (1997 A.D.), the assessors could not gain access to several important internal documents. Therefore, it is critically important that external assessors must be given adequate time to request access to important policy documents, such as purchase order (PO) and internal documents related to the procurement process.

4. Our assessment tool and technique are appropriate for tertiary and secondary healthcare facilities. However, for primary healthcare facilities, more attention should be given to community preparedness since the scope of primary healthcare currently extends to home-based care, care coordination, and long-term services and support. In other words, to assess the green viability and climate vulnerability of primary healthcare facilities, emphasis should be on the scope and area of services, not the facilities.
5. We notice a pronounced inequality in the green viability and climate vulnerability between two primary healthcare facilities, which operate under different local government authorities. In Thailand, local government authorities are independent government agencies with an arm's length relationship with the Ministry of Interior. Based on our analysis of current laws and policies in Chapter 2, the Ministry of Public Health emphasizes a climate action and preparedness strategy for tertiary and secondary hospitals, but not for primary healthcare facilities. Currently, approximately half of government primary healthcare facilities around the country are operated by local government authorities, including provincial administrative organizations, municipalities, and sub-district administrative organizations. Yet, the interior ministry, which is in charge of supervising local governments to ensure that they act within the scope of their prescribed powers and functions, does not have a clear climate action plan for locally run primary healthcare units.

4.3 RECOMMENDATIONS

We offer three (3) sets of recommendations based on our preliminary findings of green viability and climate vulnerability assessment as follows:

Recommendations for Healthcare Facilities

- Active interagency coordination and collaboration serve as crucial enablers for healthcare facilities to effectively address and prepare for the impacts of climate change. Rather than shouldering the full cost and responsibility individually, local healthcare facilities should actively harness informal local networks to access the necessary resources for an effective response to climate change, including specialized vehicles and alternative emergency sites.
- Close collaboration between healthcare facilities and surrounding communities is essential to foster a shared understanding of the impacts of climate change. Healthcare facilities should work with the communities to jointly formulate and implement targeted mitigation strategies.
- Healthcare facilities should actively train their executives and personnel on climate change to prepare for its impacts, aiming to secure their buy-in and facilitate the adoption of climate-smart healthcare approaches.
- Healthcare facilities should work with local governments to develop a comprehensive climate preparedness and mitigation plan, especially for in-home care patients.

Recommendations for Ministry of Public Health, Ministry of Interior, and Other National-level Agencies

- The government should actively prioritize energy and resource efficiency, extending this focus to include the public health sector. Beyond addressing climate change impacts on the agricultural sector which has been its main focus, the government should embrace a comprehensive approach to climate awareness and preparedness for all sectors, including training, awareness campaigns, and substantial investments in climate-friendly/resilient infrastructure and suitable technologies.
- The government should actively promote and facilitate multisectoral collaboration, especially between health-related and environmental agencies to design and implement climate adaptation and mitigation strategies.
- Climate change considerations should be integrated into the national budget planning/allocation process. The government should earmark a specific fund for climate mitigation and adaptation, particularly in the health sector.
- More policy measures and mechanisms for climate adaptation and mitigation, such as green procurement should be enacted and enforced, especially in government-operated healthcare facilities.

Recommendations for UNFPA, FHI 360, and Their Partner Organizations

- Conduct more assessments with hospitals and healthcare facilities throughout Thailand, including those not operated by the Ministry of Public Health and primary care clinics.
- Put more efforts in strengthening the coping and adaptive capacities of local governments and regional government agencies. They play an instrumental role in enabling local communities and healthcare facilities to effectively address the impacts of climate change.
- Expand the assessments to in-home care teams and nursing homes, which have gained increasing importance in communities with significant aging populations. Facilities catering to other vulnerable groups, such as toddlers, children, and disabled individuals, should also undergo assessments for both green viability and climate vulnerability.
- Explore further collaboration with relevant government agencies in Thailand and like-minded partners to extend the scope of this project/assessment.

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APPENDICES

APPENDIX 1

Summary of Comments on the Draft Assessment Tool Consultation Workshop

August 4, 2023 at Swissotel Bangkok Ratchada, Bangkok

1. CONCEPTUAL FRAMEWORK

Participants from the Office of Climate Change Management and Coordination (CCMC) pointed out that to assess climate viability and vulnerability of a healthcare facility, the tool should emphasize the facility's exposure and sensitivity to climate-related events and its capacity to manage and adapt to the consequences of climate change (i.e., climate viability and vulnerability = exposure + sensitivity + coping and adaptive capacity). This is consistent with the IPCC's and United States' climate resilience toolkit, which the Department of Health (DOH) in Thailand has used as a guiding framework to survey the hospitals' preparedness for extreme weather events.

The participants from CCMC and DOH suggested that the consultant should design the assessment tool by building on what the DOH has already done.

2. STRUCTURE OF THE ASSESSMENT TOOL

- 2.1 Participants from the tertiary and secondary hospitals suggested that there should be a general information section that gathers basic information on a healthcare facility, including the numbers of full-time healthcare providers, patients served, and locations of essential working systems. Some of this information can help shed light on the vulnerability of a healthcare facility that primarily serves vulnerable patients.
- 2.2 Data from secondary sources, such as GIS data, can be used to determine a healthcare facility's exposure to climate-related hazards.
- 2.3 The author should have used more specific terms to refer to the "climate-induced" extreme weather patterns that are commonly experienced in Thailand, such as pluvial and fluvial floods. Also, the term "drought" should be replaced with "water scarcity" to reflect the actual weather pattern in Thailand.
- 2.4 Most participants remarked that the assessment tool (the version prepared for this workshop) is too long and contains repetitive questions/indicators.

3. CONTENTS

- 3.1 The three levels of vulnerability and how to measure each level were not clear-cut. This would complicate the analysis and design of implementation measures, although the idea of a vulnerability map for each vulnerability dimension is interesting and can be helpful for administrators.
- 3.2 Each survey item does not have to use the same scale. The consultant should take into account the specificity of each sub-item and assign numerical values accordingly.
- 3.3 The assessment tool should avoid subjective questions and instead aim for evidence-based practices, such as the existence of a business continuity plan (BCP), and evidence of training sessions and drills.
- 3.4 Representatives from Chulalongkorn University and Mahidol University suggest that creating a separate assessment tool for each specific climate-related hazard (e.g., flood, storm, drought, air pollution) renders more than half of the assessment questions redundant. In fact, climate-related hazards can be combined into two categories (“Wet” or “Dry” hazards), and there is no need to have a separate assessment tool for each type of hazard. Using the most critical preparedness measures in a simple and straightforward questionnaire will help solicit more accurate information than an excessively long questionnaire.
- 3.5 The author should explain how information for each assessment item will be collected (e.g., hospital order, purchase order). This can appear in a separate assessment manual.
- 3.6 Other item-specific comments:
 - The consultant should identify the locations of essential working systems of a healthcare facility to accurately assess “exposure.” Also, working systems should be classified into primary (health service) and secondary working systems.
 - Governance is important, particularly for the adaptive capacity dimension. The consultant should emphasize governance by assessing whether a healthcare facility has clear plans, policies, or directives related to energy conservation/responses to climate change/environmental sustainability. Also, emphasis should be placed on implementation, coordination, and budget allocation for these plans, policies, and directives.
 - Determining indicators for coping strategy is onerous, but a proper indicator will help determine how effectively a healthcare facility can respond to extreme weather events caused by climate change. A composite indicator is preferred here by including multiple questionnaire items on the flexibility and adjustability of essential working systems during climate-related events. Also, it would be insightful to see where back-up systems of a healthcare facility are located.
 - The assessment tool should be more specific about what community means. Stakeholder would be more appropriate.
 - Business continuity plan is missing in the assessment tool. This is essential since climate-related events are becoming increasingly frequent and severe.
 - The consultant should have a “Key Terminology” section where essential terms, such as vulnerability, resilience, hazard, and exposure, are explained before introducing the first part of the questionnaire.

APPENDIX 2

Green Viability and Climate Vulnerability Assessment Tool for Healthcare Facilities in Thailand

แบบประเมินความอยู่รอดด้านสิ่งแวดล้อมและความเปราะบางต่อการเปลี่ยนแปลงสภาพภูมิอากาศของ
หน่วยบริการสาธารณสุขในประเทศไทย

ชื่อหน่วยบริการ (Name of Healthcare Facility)

จังหวัด (Province)

ระดับ (Level of Care)

ตติยภูมิ (Tertiary)

ทติยภูมิ (Secondary)

ปฐมภูมิ (Primary)

วันที่ประเมิน (Date)

Key Terminology (คำสำคัญ)

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. In this study, the term hazard usually refers to climate-related physical events or trends or their physical impacts.

อันตราย: เหตุการณ์ที่อาจเกิดขึ้นของเหตุการณ์หรือแนวโน้มทางกายภาพตามธรรมชาติหรือที่เกิดจากมนุษย์หรือผลกระทบทางกายภาพที่อาจก่อให้เกิดการสูญเสียชีวิต การบาดเจ็บ หรือผลกระทบต่อสุขภาพอื่นๆ ตลอดจนความเสียหายและการสูญเสียทรัพย์สิน โครงสร้างพื้นฐาน การดำรงชีวิต การให้บริการ ระบบนิเวศ และ ทรัพยากรสิ่งแวดล้อม ในการศึกษานี้ คำว่าอันตรายมักหมายถึงเหตุการณ์หรือแนวโน้มทางกายภาพที่เกี่ยวข้องกับสภาพภูมิอากาศ หรือผลกระทบทางกายภาพ

Disaster: A serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts.

ภัยพิบัติ: การแตกแยกอย่างร้ายแรงของชุมชนหรือสังคมที่เกี่ยวข้องกับการสูญเสียและผลกระทบต่อมนุษย์ วัตถุ เศรษฐกิจ หรือสิ่งแวดล้อมในวงกว้าง

Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected by climate-related events.

ความเสี่ยง: การมีอยู่ของผู้คน การดำรงชีวิต สายพันธุ์หรือระบบนิเวศ หน้าที่ด้านสิ่งแวดล้อม บริการ และทรัพยากร โครงสร้างพื้นฐาน หรือทรัพย์สินทางเศรษฐกิจ สังคม หรือวัฒนธรรมในสถานที่และสภาพแวดล้อมที่อาจได้รับผลกระทบในทางลบจากเหตุการณ์ที่เกี่ยวข้องกับสภาพภูมิอากาศ

Vulnerability: The propensity or predisposition to be adversely affected by climate-related events. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

ความเปราะบาง: แนวโน้มหรือแนวโน้มที่จะได้รับผลกระทบจากเหตุการณ์ที่เกี่ยวข้องกับสภาพภูมิอากาศ ความเปราะบางครอบคลุมแนวคิดและองค์ประกอบที่หลากหลาย รวมถึงความอ่อนไหวหรือความอ่อนแอต่ออันตรายและการขาดความสามารถในการรับมือและปรับตัว

Sensitivity: The degree to which a healthcare facility is affected by climate-related hazards.

ความอ่อนไหว: ระดับที่สถานพยาบาลได้รับผลกระทบจากอันตรายที่เกี่ยวข้องกับสภาพภูมิอากาศ

Resilience: The capacity of a healthcare facility to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function and structure, while also maintaining the capacity for adaptation, learning, and transformation.

ความยืดหยุ่น: ความสามารถของสถานพยาบาลในการรับมือกับเหตุการณ์อันตราย แนวโน้ม หรือการรบกวน การตอบสนองหรือการจัดระเบียบใหม่ในลักษณะที่คงหน้าที่และโครงสร้างที่สำคัญไว้ ขณะเดียวกันก็รักษาความสามารถในการปรับตัว การเรียนรู้ และการเปลี่ยนแปลง

Coping capacity: The ability of a healthcare facility to address, manage, and overcome adverse conditions in the short-medium terms.

ความสามารถในการรับมือ: ความสามารถของสถานพยาบาลในการจัดการ และเอาชนะสภาวะที่ไม่พึงประสงค์ในระยะสั้นและกลาง

Adaptive capacity: The ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events

ความสามารถในการปรับตัว: ความสามารถของสถานพยาบาลในการปรับตัวต่อความเสียหายที่อาจเกิดขึ้น เพื่อใช้ประโยชน์จากโอกาสและเพื่อตอบสนองต่อผลที่ตามมาของเหตุการณ์ที่เกี่ยวข้องกับสภาพภูมิอากาศ

Green viability: The ability of a healthcare facility to concomitantly minimize negative environmental impacts and eradicate diseases by providing eco-friendly services and by reducing waste

ความอยู่รอดด้านสิ่งแวดล้อม: ความสามารถของสถานพยาบาลในการลดผลกระทบต่อสิ่งแวดล้อมจากการรักษาพยาบาลด้วยการจัดบริการสุขภาพที่เป็นมิตรต่อสิ่งแวดล้อมและการลดปริมาณขยะ

Part 1: Healthcare Facility Profile

(ส่วนที่ 1: สิ่งอำนวยความสะดวกด้านบริการดูแลสุขภาพ)

1.1 Please specify the number of patients admitted to your healthcare facility in FY2022-FY2023.
โปรดระบุจำนวนผู้ป่วยที่เข้ารับการรักษาในสถานพยาบาลของคุณในปีงบประมาณ 2022-2023

(1) Number of emergency patients (persons/day) จำนวนผู้ป่วยฉุกเฉิน (คน/วัน)(คน/วัน)
(2) Number of patients (persons/day) จำนวนผู้ป่วย (คน/วัน)(คน/วัน)
(3) Number of outpatients (persons/day) จำนวนผู้ป่วยนอก (คน/วัน)(คน/วัน)
(4) Number of patients receiving out-of-office services (e.g., service unit) (persons/day) จำนวนผู้ป่วยที่รับบริการหน่วยบริการ (คน/วัน)(คน/วัน)
(5) Others (อื่น ๆ) (Please specify (โปรดระบุ).....)(คน/วัน)

Notes/Comments (If any) หมายเหตุ/ความเห็น (ถ้ามี)

1.2 Do you think your healthcare facility provides services according to the capacity to accommodate patients or the health service standards?

(คุณคิดว่าสถานพยาบาลของคุณมีความสามารถในการให้บริการและมีความสามารถในการรองรับผู้ป่วยหรือมาตรฐานการบริการด้านสุขภาพหรือไม่?)

Yes, the number of patients using our services is equal to the facility's capacity.

ใช่ จำนวนผู้ป่วยที่ใช้บริการของเราสอดคล้องกับสมรรถนะของสถานพยาบาล

No, the number of patients exceeded the facility's capacity.

ไม่ จำนวนผู้ป่วยเกินสมรรถนะของสถานพยาบาล

No, the number of patients using the service is less than the facility's capacity.

ไม่ จำนวนผู้ป่วยที่ใช้บริการน้อยกว่าสมรรถนะของสถานพยาบาล

Notes/Comments (If any) หมายเหตุ/ความเห็น (ถ้ามี)

1.3 Does your healthcare facility have the following types of vulnerable patients under your current care or area of care (FY2022-FY2023)?

สถานพยาบาลของคุณมีผู้ป่วยกลุ่มเปราะบางประเภทต่อไปนี้ภายใต้การดูแลปัจจุบันหรือพื้นที่ดูแลของคุณหรือไม่? (ปีงบประมาณ 2022-ปีงบประมาณ 2023)

Vulnerable Patients ผู้ป่วยกลุ่มเปราะบาง	No ไม่	Yes ใช่	If "Yes", please estimate the number of patients ถ้า "ใช่" โปรดระบุจำนวนผู้ป่วยโดยประมาณ
(1) Respiratory ventilator/oxygen-dependent or dialysis-dependent ผู้เครื่องช่วยหายใจ/ผู้ใช้ออกซิเจน หรือผู้ทำการฟอกไต	<input type="checkbox"/>	<input type="checkbox"/>	
(2) Disability and self-movement difficulty ผู้พิการและการเคลื่อนไหวตนเองลำบาก	<input type="checkbox"/>	<input type="checkbox"/>	
(3) Elderly ผู้สูงอายุ	<input type="checkbox"/>	<input type="checkbox"/>	
(4) Infants/toddlers (0-5 year-old) ทารก/เด็กเล็ก (อายุ 0-5 ปี)	<input type="checkbox"/>	<input type="checkbox"/>	
(5) Pregnancy women สตรีมีครรภ์	<input type="checkbox"/>	<input type="checkbox"/>	
(6) Continuity medication treatment dependency ผู้พึ่งยาในการรักษาอย่างต่อเนื่อง	<input type="checkbox"/>	<input type="checkbox"/>	
(7) Mentally ill patients ผู้ป่วยทางจิต	<input type="checkbox"/>	<input type="checkbox"/>	
(8) Others (อื่น ๆ) (Please specify (โปรดระบุ).....)	<input type="checkbox"/>	<input type="checkbox"/>	

Notes/Comments (If any)หมายเหตุ/ความเห็น (ถ้ามี)

1.4 Please indicate the number of personnel in your healthcare facility in FY2022-FY2023). โปรดระบุจำนวนบุคลากรในสถานพยาบาลของคุณในปีงบประมาณ 2022-2023)

<p>(1) Number of medical staff (physicians, dentists, nurses, nurse assistants, nursing staff, midwives, and other nursing services) จำนวนบุคลากรทางการแพทย์ (แพทย์ ทันตแพทย์ พยาบาล ผู้ช่วยพยาบาล เจ้าหน้าที่พยาบาล ผดุงครรภ์ และบริการพยาบาลอื่นๆ) โปรดระบุจำนวนบุคลากรในสถานพยาบาลของคุณในปีงบประมาณ 2565-2566)</p>	
<p>(2) Number of medical service staff (X-ray personnel, physical therapist, medical technicians, pharmacists, nutritionists, etc.) จำนวนเจ้าหน้าที่บริการทางการแพทย์ (บุคลากรเอกซเรย์ นักกายภาพบำบัด ช่างเทคนิคการแพทย์ เภสัชกร นักโภชนาการ ฯลฯ)</p>	
<p>(3) Number of hospital service staff (finance and accounting staff, procurement officer, driver, cleaning staff, security guards, etc.) จำนวนเจ้าหน้าที่บริการของโรงพยาบาล (เจ้าหน้าที่การเงินและบัญชี เจ้าหน้าที่จัดซื้อ พนักงานขับรถ พนักงานทำความสะอาด เจ้าหน้าที่รักษาความปลอดภัย ฯลฯ)</p>	

Notes/Comments (If any) หมายเหตุ/ความเห็น (ถ้ามี)

1.5 Please specify locations of the following essential working systems. โปรดระบุตำแหน่งของระบบการทำงานที่จำเป็นดังต่อไปนี้

Working System (s) (ระบบการทำงาน)	No/Not relevant ไม่/ไม่เกี่ยวข้อง	Location of Working System (สถานที่ของระบบการทำงาน)					
		Outdoor กลางแจ้ง	Indoor				Off-site นอกสถานที่
			Under-ground ชั้นใต้ดิน	1 st Floor ชั้น 1	2 nd Floor ชั้น 2	> 3 rd Floor ชั้น 3	
(1) Electricity power control แหล่งพลังงานไฟฟ้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Back-up power source (s) แหล่งพลังงานสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Computer/server control center ศูนย์ควบคุมคอมพิวเตอร์/เซิร์ฟเวอร์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Internet control center ศูนย์ควบคุมอินเทอร์เน็ต	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) Telephone/radio control center ศูนย์ควบคุมโทรศัพท์/สัญญาณ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) Document/medical record archive เอกสาร/เวชระเบียน	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(7) Drinking/potable water storage การสำรองน้ำดื่ม/น้ำดื่ม	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) Water filter or purification system ระบบกรองน้ำหรือระบบบำบัดน้ำให้บริสุทธิ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) Water supply (Tap water) ระบบจัดการน้ำเพื่ออุปโภคบริโภค (น้ำประปา)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) Pumping system ระบบสูบน้ำ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(11) Wastewater treatment system ระบบบำบัดน้ำเสีย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Solid waste storage การจัดเก็บขยะมูลฝอย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(13) Infectious waste storage/disposal การจัดเก็บ/กำจัดขยะติดเชื้อ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(14) Hazardous waste storage การจัดเก็บของเสียอันตราย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Working System (s) (ระบบการทำงาน)	No/Not relevant ไม่/ไม่เกี่ยวข้อง	Location of Working System (สถานที่ของระบบการทำงาน)					
		Outdoor กลางแจ้ง	Indoor				Off-site นอกสถานที่
			Under-ground ชั้นใต้ดิน	1 st Floor ชั้น 1	2 nd Floor ชั้น 2	> 3 rd Floor ชั้น 3	
(15) Medical radiology/imaging system ระบบรังสีวิทยา/ระบบประมวลผลภาพทางการแพทย์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(16) Morgue ห้องดับจิต	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(17) Food and nutrition storage การเก็บรักษาอาหารและโภชนาการ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(18) Medicine and pharmaceutical storage การเก็บรักษายาและเภสัชกรรม	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(19) Blood bank ธนาคารเลือด	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(20) Medical gases and liquid oxygen supply storage การจัดเก็บก๊าซและออกซิเจนเหลว	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(21) Disposable medical and clinical supply storage การจัดเก็บคลังยาและเวชภัณฑ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(22) Air conditioning and ventilation system ระบบปรับอากาศและระบายอากาศ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes/Comments (If any) หมายเหตุ/ความเห็น (ถ้ามี)

1.6 What was the longest downtime/disruption/shortage of the following systems in the past two (2) years (2021-2023)?

โปรดระบุช่วงระยะเวลาการหยุดทำงาน/การหยุดชะงัก/การขาดแคลนระบบต่อไปนี้ที่ยาวนานที่สุดในรอบ 2 ปีที่ผ่านมา

Working Systems	Not relevant ไม่เกี่ยวข้อง	Downtime/Disruption/Shortage ระยะเวลาการหยุดทำงาน/การหยุดชะงัก/การขาดแคลน					
		Never ไม่เคย	<1 hr. <1 ชม.	>1-12 hrs. >1-12 ชม.	>12-24 hrs. >12-24 ชม.	>1-2 days >1-2 วัน	>2 days >2 วัน
(1) Electricity power control แหล่งพลังงานไฟฟ้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Back-up power source (s) แหล่งพลังงานสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Computer/server control center ศูนย์ควบคุมคอมพิวเตอร์/เซิร์ฟเวอร์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Internet control center ศูนย์ควบคุมอินเทอร์เน็ต	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) Telephone/radio control center ศูนย์ควบคุมโทรศัพท์/สัญญาณ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) Document/medical record archive เอกสาร/เวชระเบียน	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(7) Drinking/potable water storage การสำรองน้ำดื่ม/น้ำดื่ม	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) Water filter or purification system ระบบกรองน้ำหรือระบบบำบัดน้ำให้บริสุทธิ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) Water supply (Tap water) ระบบจัดการน้ำเพื่ออุปโภคบริโภค (น้ำประปา)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) Pumping system ระบบสูบน้ำ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(11) Wastewater treatment system ระบบบำบัดน้ำเสีย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Solid waste storage การจัดเก็บขยะมูลฝอย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Working Systems	Not relevant ไม่เกี่ยวข้อง	Downtime/Disruption/Shortage ระยะเวลาการหยุดทำงาน/การหยุดชะงัก/การขาดแคลน					
		Never ไม่เคย	<1 hr. <1 ชม.	>1-12 hrs. >1-12 ชม.	>12-24 hrs. >12-24 ชม.	>1-2 days >1-2 วัน	>2 days >2 วัน
(13) Infectious waste storage/disposal การจัดเก็บ/กำจัดขยะติดเชื้อ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(14) Hazardous waste storage การจัดเก็บของเสียอันตราย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(15) Medical radiology/imaging system ระบบรังสีวิทยา/ระบบประมวลผลภาพทางการแพทย์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(16) Morgue ห้องดับจิต	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(17) Food and nutrition storage การเก็บรักษาอาหารและโภชนาการ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(18) Medicine and pharmaceutical storage การเก็บรักษายาและเภสัชกรรม	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(19) Blood bank ธนาคารเลือด	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(20) Medical gases and liquid oxygen supply storage การจัดเก็บก๊าซและออกซิเจนเหลว	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(21) Disposable medical and clinical supply storage การจัดเก็บคลังยาและเวชภัณฑ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(22) Air conditioning and ventilation system ระบบปรับอากาศและระบายอากาศ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes/Comments (If any)หมายเหตุ/ความเห็น (ถ้ามี)

1.7 Has your healthcare facility ever experienced an emergency or disaster the past two (2) years (2021-2023)? If yes, how has it affected the work systems and operations of your healthcare facility? สถานพยาบาลของคุณเคยประสบเหตุฉุกเฉินหรือภัยพิบัติในช่วง 2 ปีที่ผ่านมา (2021-2023) หรือไม่ หากใช่ จะส่งผลกระทบต่อระบบงานและการดำเนินงานของสถานพยาบาลของคุณอย่างไร

Never ไม่เคย

Yes, but all systems can still work/perform continuously without significant impact.

ใช่ แต่ทุกระบบยังคงสามารถทำงานได้ / ทำงานอย่างต่อเนื่องโดยไม่มีผลกระทบอย่างมีนัยสำคัญ

Yes, the hospital had to temporarily reduce/suspend some services for.....day (s).

ใช่ โรงพยาบาลต้องลด / ระงับบริการบางอย่างชั่วคราวเป็นระยะเวลา..... วัน

Yes, the hospital can only open critical service sections and announce partial evacuation of patients/staff or relocation of essential working systems to a safer location for.....day (s).

ใช่ โรงพยาบาลสามารถเปิดส่วนบริการที่สำคัญและประกาศการอพยพผู้ป่วย/เจ้าหน้าที่บางส่วนหรือย้ายระบบการทำงานที่จำเป็นไปยังสถานที่ที่ปลอดภัยกว่าเป็นระยะเวลา..... วัน

Yes, the hospital had shut down all work systems, announced full evacuation and relocation of essential working systems to a safer location for..... day (s).

ใช่ โรงพยาบาลได้ปิดระบบการทำงานทั้งหมดประกาศอพยพเต็มรูปแบบและย้ายระบบการทำงานที่จำเป็นไปยังสถานที่ที่ปลอดภัยเป็นระยะเวลา..... วัน

If "Yes", please briefly describe the incident (s). หาก "ใช่" โปรดอธิบายเหตุการณ์โดยสังเขป

1.8 Does your healthcare facility have an energy efficiency and conservation program/plan that includes energy conservation measures, target savings, and renewable energy use? สถานพยาบาลของคุณมีโปรแกรม/แผนอนุรักษ์และประหยัดพลังงานซึ่งรวมถึงมาตรการอนุรักษ์พลังงานการประหยัดเป้าหมายและการใช้พลังงานหมุนเวียนหรือไม่?

- None.
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังกำหนดแผนดังกล่าว
- Yes, our facility has a plan with no regular review or drills. ใช่ หน่วยบริการของเรามีแผนโดยไม่มีทบทวนหรือฝึกซ้อมเป็นประจำ
- Yes, our facility has a plan with regular review and drills, but without sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนพร้อมการตรวจสอบและฝึกซ้อมเป็นประจำ แต่ไม่มีทรัพยากรเพียงพอสำหรับการดำเนินการ
- Yes, our facility has a plan with regular review and drills, and with sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนพร้อมการตรวจสอบและการฝึกซ้อมเป็นประจำและมีทรัพยากรเพียงพอสำหรับการดำเนินการ

1.9 Does your healthcare facility have the following systems in place? สถานพยาบาลของคุณมีระบบต่อไปนี้หรือไม่

Systems ระบบ	Check List รายการ
(1) Water quality audit and monitoring การตรวจสอบและติดตามคุณภาพน้ำ	<input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
(2) Water supply แหล่งจัดเก็บน้ำสำหรับอุปโภคบริโภค	<input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง

Systems ระบบ	Check List รายการ
<p>(3) Water safety plan to ensure drinking water safety แผนประกันความปลอดภัยของน้ำดื่ม</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
<p>(4) Healthcare/infectious waste treatment การบำบัดขยะติดเชื้อ</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
<p>(5) Hazardous waste treatment การบำบัดขยะอันตราย</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
<p>(6) General waste management การจัดการขยะทั่วไป</p>	<ul style="list-style-type: none"> <input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด

Systems ระบบ	Check List รายการ
	<input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
(7) Wastewater treatment การบำบัดน้ำเสีย	<input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
(8) Air conditioning and ventilation เครื่องปรับอากาศและการระบายอากาศ	<input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง
(9) Protective environment room (with positive or negative pressure) ห้องความดันบวก/ความดันลบ	<input type="checkbox"/> A - Functioning with extensive coverage and regular reviews and/or maintenance การทำงานที่ครอบคลุมและการตรวจสอบและ/หรือการบำรุงรักษาเป็นประจำ <input type="checkbox"/> B - Currently implemented, but the implementation is limited ดำเนินการอยู่ในปัจจุบัน แต่การดำเนินการมีจำกัด <input type="checkbox"/> C - Not in place, but the facility has a plan to install/adopt/use ไม่มีการดำเนินการ แต่หน่วยบริการของเรามีแผนที่จะติดตั้ง/นำมาใช้งาน <input type="checkbox"/> D - Not in place/not relevant ไม่มี/ไม่มีแผนดำเนินการ/ไม่เกี่ยวข้อง

Notes/Comments (If any) หมายเหตุ/ข้อคิดเห็น (ถ้ามี)

Part 2: Sensitivity and Exposure Analysis

(ส่วนที่ 2: การวิเคราะห์ความอ่อนไหวและความเสี่ยง)

2.1 Possibility of your healthcare facility to experience fluvial flood over the past two (2) years (2021-2023) (Fluvial flood occurs when rivers and streams break their banks and water flows out onto the adjacent low-lying areas) (Note: the main investigator uses GIS data to assess this type of exposure)

ความเป็นไปได้ที่สถานพยาบาลของคุณจะประสบภัยน้ำท่วมซ้ำซากในช่วง 2 ปีที่ผ่านมา (หมายเหตุ: ผู้วิจัยเป็นผู้ประเมิน)

- Regularly flooded or flooding is possible. เคยท่วมหรืออยู่ในพื้นที่เสี่ยง
- Not flooded, but flooding is possible. ยังไม่เคยท่วม แต่มีโอกาสที่จะท่วม
- Neither flooded nor likely to be flooded. ไม่ท่วมหรือมีแนวโน้มที่จะถูกน้ำท่วม

2.2 Possibility of your healthcare facility to experience pluvial flood over the past two (2) years (2021-2023) (Pluvial flood is caused by extreme rainfall or storm) (Note: the main investigator uses GIS data to assess this type of exposure)

ความเป็นไปได้ที่สถานพยาบาลของคุณจะประสบกับภัยน้ำท่วมฉับพลันในช่วง 2 ปีที่ผ่านมา (หมายเหตุ: ผู้วิจัยเป็นผู้ประเมิน)

- Regularly flooded or flooding is possible. เคยท่วมหรืออยู่ในพื้นที่เสี่ยง
- Not flooded, but flooding is possible. ยังไม่เคยท่วม แต่มีโอกาสที่จะท่วม
- Neither flooded nor likely to be flooded. ไม่ท่วมหรือมีแนวโน้มที่จะถูกน้ำท่วม

2.3 Possibility of your healthcare facility to experience water scarcity over the past two (2) years (2021-2023)

ความเป็นไปได้ที่สถานพยาบาลของคุณจะประสบปัญหาการขาดแคลนน้ำในช่วง 2 ปีที่ผ่านมา (โปรดใส่เครื่องหมายถูกในช่องที่อธิบายสถานการณ์ของคุณได้ดีที่สุด)

- Regularly experience water scarcity. ประสบปัญหาการขาดแคลนน้ำเป็นประจำ
- Never experience water scarcity, but water scarcity is possible. ไม่เคยประสบปัญหาการขาดแคลนน้ำ แต่อาจขาดแคลนน้ำได้ในอนาคต
- No possibility of water scarcity. ไม่มีความเป็นไปได้ของการขาดแคลนน้ำ

2.4 Possibility of your healthcare facility to experience air pollution over the past two (2) years (2021-2023)

ความเป็นไปได้ที่สถานพยาบาลของคุณจะประสบกับมลพิษทางอากาศในช่วง 2 ปีที่ผ่านมา (โปรดใส่เครื่องหมายถูกในช่องที่อธิบายสถานการณ์ของคุณได้ดีที่สุด)

- Regularly experience air pollution. พบมลพิษทางอากาศเป็นประจำ
- Never experience air pollution in the area in which our healthcare facility is located, but air pollution is still possible.
ไม่เคยสัมผัสกับมลพิษทางอากาศในพื้นที่สถานพยาบาลของเรา แต่มลพิษทางอากาศยังคงเป็นไปได้
- No possibility of air pollution. ไม่มีความเป็นไปได้ของมลพิษทางอากาศ

2.5 Please appraise the level of impact on working systems in your healthcare facility if confronted with the following situations without external help or support in according with the given potential downtime

โปรดประเมินระดับผลกระทบต่อระบบการทำงานในสถานพยาบาลของคุณหากต้องเผชิญกับสถานการณ์ต่อไปนี้โดยไม่ได้รับความช่วยเหลือหรือการสนับสนุนจากภายนอก

Description of the level of impact on working systems in a healthcare facility คำอธิบายระดับผลกระทบต่อระบบการทำงานในสถานพยาบาล

Level of impact (ระดับผลกระทบ)	Description คำอธิบาย
Very low ต่ำมาก	All services can continue without any discernible impact or change. บริการทั้งหมดสามารถดำเนินต่อไปได้โดยไม่มีผลกระทบหรือการเปลี่ยนแปลงที่มองเห็นได้
Low ต่ำ	<ul style="list-style-type: none"> Some services may be reduced or suspended. บริการบางอย่างอาจลดลงหรือถูกระงับ Some advanced or special services may be cancelled. บริการขั้นสูงหรือบริการพิเศษบางอย่างอาจถูกยกเลิก Services for non-priority client/section may be temporarily suspended. บริการสำหรับลูกค้า/ส่วนที่ไม่มีความสำคัญอาจถูกระงับชั่วคราว
Medium ปานกลาง	<ul style="list-style-type: none"> Auxiliary sections may be shut down, but most critical services may continue. บริการพิเศษอาจถูกปิดลง แต่บริการสำคัญอาจดำเนินต่อไป External resources and support are needed. จำเป็นต้องมีทรัพยากรและการสนับสนุนจากภายนอก Full implementation of conservation measures to sustain essential services. การดำเนินมาตรการประหยัดทรัพยากรอย่างเต็มรูปแบบเพื่อรักษาบริการที่จำเป็น Limit new inflow patients and maximize patient discharge. จำกัดผู้ป่วยรายใหม่และให้ผู้ป่วยกลับบ้านให้มากที่สุด Declare partial or total evacuation. ประกาศอพยพบางส่วนหรือทั้งหมด
High มาก	<ul style="list-style-type: none"> Discontinued services, including critical services. บริการที่เลิกให้บริการ รวมถึงบริการที่สำคัญ No new patients admitted. ไม่มีผู้ป่วยรายใหม่เข้ารับการรักษา All patients are transferred to other/nearby facilities. ผู้ป่วยทั้งหมดจะถูกย้ายไปยังสถานที่อื่น / ใกล้เคียง Declare total evacuation. ประกาศอพยพทั้งหมด

(1) Power outage or failure, including back-up power ไฟฟ้าดับหรือล้มเหลวรวมถึงไฟสำรอง

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(2) Water supply shortage การขาดแคลนน้ำประปา

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	Very Low	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(3) Shortage of gasoline/liquid fuel การขาดแคลนน้ำมันเชื้อเพลิง/เชื้อเพลิงเหลว

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	Very Low	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(4) Disruption or failure of computer and server system การหยุดชะงักหรือความล้มเหลวของระบบคอมพิวเตอร์และเซิร์ฟเวอร์

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(5) Disruption or failure of internet system การหยุดชะงักหรือความล้มเหลวของระบบอินเทอร์เน็ต

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(6) Disruption or failure of telephone/radio system การหยุดชะงักหรือความล้มเหลวของระบบโทรศัพท์ / วิทยุ

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(7) Disruption or failure of waste management system การหยุดชะงักหรือความล้มเหลวของระบบการจัดการของเสีย

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(8) Disruption or failure of wastewater treatment system การหยุดชะงักหรือความล้มเหลวของระบบบำบัดน้ำเสีย

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(9) Shortage of food supply and drinking water การขาดแคลนอาหารและน้ำดื่ม

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(10) Shortage of medicine and medical supplies ขาดแคลนยาและเวชภัณฑ์

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(11) Shortage of staff การขาดแคลนพนักงาน

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(12) No vehicles and safe accessible routes ไม่มียานพาหนะและเส้นทางที่ปลอดภัย

Potential Downtime ระยะเวลาที่หยุดทำงาน	Level of Impact (See Description) ระดับผลกระทบ (ดูคำอธิบาย)				Not Relevant ไม่เกี่ยวข้อง
	Very Low	Low	Medium	High	
<1 hr.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
>1-12 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 12-24 hrs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 1-2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
> 2 days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes/Comments (If any) หมายเหตุ/ข้อคิดเห็น (ถ้ามี)

Part 3: Coping Capacity

(ส่วนที่ 3: ความสามารถในการรับมือ)

3.1 Please indicate where back-up systems/resources are located โปรดระบุตำแหน่งที่ระบบ/ทรัพยากรสำรองตั้งอยู่

Back-up Systems/Resources ระบบสำรอง/ทรัพยากร	No/Not relevant ไม่มี/ ไม่เกี่ยวข้อง	Outdoor กลางแจ้ง	Indoor ในร่ม				Off-site นอกสถานที่
			Underground ชั้นใต้ดิน	1 st Floor ชั้น 1	2 nd Floor ชั้น 2	> 2 nd Floor ชั้น 2 ขึ้นไป	
(1) Back-up power sources แหล่งพลังงานสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Back-up liquid fuel เชื้อเพลิงสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Back-up computer/server คอมพิวเตอร์/เซิร์ฟเวอร์สำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Back-up telephone/radio โทรศัพท์สำรอง/วิทยุสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) Back-up water supply ระบบน้ำประปาสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) Back-up water filter/purification เครื่องกรองน้ำสำรอง/การทำให้บริสุทธิ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Back-up Systems/Resources ระบบสำรอง/ทรัพยากร	No/Not relevant ไม่มี/ ไม่เกี่ยวข้อง	Outdoor กลางแจ้ง	Indoor ในร่ม				Off-site นอกสถานที่
			Underground ชั้นใต้ดิน	1 st Floor ชั้น 1	2 nd Floor ชั้น 2	> 2 nd Floor ชั้น 2 ขึ้นไป	
(7) Back-up wastewater treatment system ระบบบำบัดน้ำเสียสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) Back-up waste management system ระบบการจัดการขยะสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) Back-up pumping system ระบบสูบน้ำสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) Back-up medical/clinical supply ยาและเวชภัณฑ์สำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(11) Back-up food supply แหล่งอาหารสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Back-up medical record ระบบเวชระเบียนสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes/Comments (If any) หมายเหตุ/ข้อคิดเห็น (ถ้ามี)

3.2 Procurement of special vehicle type (e.g., boat, amphibian, helicopter, drone) for carrying goods and passengers during emergencies or hazards

จัดซื้อยานพาหนะประเภทพิเศษ (เช่น เรือ โดรน) สำหรับบรรทุกสินค้าและผู้โดยสารในกรณีฉุกเฉินหรืออันตราย

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่มี แต่หน่วยบริการของเรากำลังวางแผนจัดซื้อยานพาหนะประเภทพิเศษ
- Yes, our facility has purchased or contracted service providers, but lacks regular technical check-ups.
ใช่ หน่วยบริการมียานพาหนะประเภทพิเศษ แต่ยังขาดการซ่อมบำรุงเป็นประจำ
- Yes, our facility has purchased or contracted service providers with regular technical check-ups.
ใช่ หน่วยบริการมียานพาหนะประเภทพิเศษ และซ่อมบำรุงเป็นประจำ

3.3 Alternate safe accessible route (s) เส้นทางที่ปลอดภัยในการเข้าสู่หน่วยบริการ

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่มี แต่หน่วยบริการกำลังวางแผน
- Yes, our facility has surveyed and designed alternate safe accessible route (s), but lacks regular maintenance
ใช่ หน่วยบริการมีเส้นทางที่ปลอดภัย แต่ขาดการซ่อมบำรุง
- Yes, our facility has surveyed and designed alternate safe accessible route (s) and conducted regular maintenance.
ใช่ หน่วยบริการมีเส้นทางที่ปลอดภัยและดำเนินการบำรุงรักษาเป็นประจำ

3.4 Implementation of resource conservation plan แผนประหยัดทรัพยากรและพลังงาน

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่มี แต่หน่วยบริการกำลังวางแผน
- Yes, our facility has a plan, but without regular review or drills. ใช่ หน่วยบริการมีแผน แต่ไม่มีการทบทวนหรือฝึกซ้อมเป็นประจำ
- Yes, our facility has a plan with regular review and drills, but without sufficient resources for implementation.
ใช่ หน่วยบริการมีแผนพร้อมมีการตรวจสอบและฝึกซ้อมเป็นประจำ แต่ไม่มีทรัพยากรเพียงพอสำหรับการดำเนินการ
- Yes, our facility has a plan with regular review and drills, and with sufficient resources for implementation. ใช่ หน่วยบริการมีแผนพร้อมมีการตรวจสอบและการฝึกซ้อมเป็นประจำและมีทรัพยากรเพียงพอสำหรับการดำเนินการ

3.5 Support system (e.g., shelter, financial support, psychological counselling) for staff and family in the case of climate-related disasters or hazards
 ระบบสนับสนุนบุคลากรและครอบครัวในกรณีที่เกิดภัยพิบัติหรืออันตรายที่เกี่ยวข้องกับสภาพภูมิอากาศ ได้แก่ สถานที่หลบภัย เงินสนับสนุน และการให้บริการด้านสุขภาพจิต

- No. ไม่มี
- No, but our facility is developing such support system. ไม่มี แต่หน่วยบริการของเรา กำลังพัฒนาระบบสนับสนุนนั้น
- Yes, but the support system is still incomplete. มี แต่ยังไม่สมบูรณ์แบบ
- Yes, the support system is in place in advance. มี ระบบสนับสนุนทุกอย่างมีไว้พร้อมสรรพ

3.6 Agreement and exercise on partial or full patient evacuation to other hospitals/facilities in the case of climate-related events or hazards
 ข้อตกลงและการดำเนินการอพยพผู้ป่วยบางส่วนหรือทั้งหมดไปยังโรงพยาบาล/สถานที่อื่น ๆ ในกรณีที่มีเหตุการณ์หรืออันตรายที่เกี่ยวข้องกับสภาพภูมิอากาศ

- No ไม่ใช่
- No, but our healthcare facility is drafting an evacuation plan and discussing with other hospitals and facilities. ไม่ แต่สถานพยาบาลของเรา กำลังร่างแผนการอพยพและหารือกับโรงพยาบาลและสถานพยาบาลอื่นๆ
- Yes, our healthcare facility has an evacuation plan, but has no designated referral hospital (s) and insufficient resources for implementation. ใช่ สถานพยาบาลของเรามีแผนอพยพ แต่ไม่มีโรงพยาบาลรับส่งต่อที่กำหนดและมีทรัพยากรไม่เพียงพอเพื่อนำไปปฏิบัติ
- Yes, our healthcare facility has an evacuation plan with sufficient resources and has designated referral hospital (s) as follows: ใช่ สถานพยาบาลของเรามีแผนอพยพด้วยทรัพยากรที่เพียงพอ และได้กำหนดโรงพยาบาลรับส่งต่อดังนี้
 - 1).....
 - 2).....
 - 3).....

3.7 Standard operating procedure for recording a patient medical data in the case of no computer or internet service
 ขั้นตอนการปฏิบัติงานที่มาตรฐานในการบันทึกข้อมูลทางการแพทย์ของผู้ป่วย กรณีไม่มีบริการคอมพิวเตอร์หรืออินเทอร์เน็ต

- No ไม่มี
- Yes มี

3.8 A back-up plan for getting help from outside during communication system failures แผนสำรองในการขอความช่วยเหลือจากภายนอกในระหว่างที่ระบบสื่อสารขัดข้อง

- No ไม่มี
- Yes มี

3.9 Responsive plan for natural disasters แผนการตอบสนองต่อภัยพิบัติทางธรรมชาติ

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรา กำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but without regular review or drills. ใช่ หน่วยบริการของเรามีแผน แต่ไม่มีการตรวจสอบหรือฝึกซ้อมเป็นประจำ
- Yes, our facility has a plan with regular review and drills, but without sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนที่มีการทบทวนและฝึกซ้อมเป็นประจำ แต่ไม่มีทรัพยากรเพียงพอสำหรับการดำเนินการ
- Yes, our facility has a plan with regular review and drills, and with sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนที่มีการทบทวนและฝึกซ้อมอย่างสม่ำเสมอ และมีทรัพยากรเพียงพอสำหรับการดำเนินการ

3.10 Self-help plan for natural disasters แผนการช่วยเหลือตนเองเมื่อเกิดภัยพิบัติทางธรรมชาติ

- No, our facility has no plan, personnel, budget, or resources for self-help. ไม่ หน่วยบริการของเราไม่มีแผน บุคลากร งบประมาณ หรือทรัพยากรสำหรับการช่วยเหลือตนเอง
- Yes, our facility has a plan, personnel, budget, and resources for initial self-help, while awaiting external support. ใช่ หน่วยบริการของเรามีแผน บุคลากร งบประมาณ และทรัพยากรสำหรับการช่วยเหลือตนเองเบื้องต้นในขณะที่รอการสนับสนุนจากภายนอก
- Yes, our facility has a plan, personnel, budget, and resources for self-help with little need for external support. ใช่ หน่วยบริการของเรามีแผน บุคลากร งบประมาณ และทรัพยากรสำหรับการช่วยเหลือตนเองโดยแทบไม่ต้องการความช่วยเหลือจากภายนอก
- Yes, our facility has a plan, personnel, budget, and resources for self-help with no external support needed. ใช่ หน่วยบริการของเรามีแผน บุคลากร งบประมาณ และทรัพยากรสำหรับการช่วยเหลือตนเองโดยไม่จำเป็นต้องได้รับการสนับสนุนจากภายนอก

3.11 Availability and accessibility of financial resources for business-as-usual operations

ความพร้อมใช้งานและการเข้าถึงทรัพยากรทางการเงินสำหรับการดำเนินงานตามปกติ

- No or insufficient financial resources for business-as-usual operations (deficit) ไม่มีหรือทรัพยากรทางการเงินไม่เพียงพอสำหรับการดำเนินงานตามปกติ (ขาดดุล)
- Sufficient financial resources for business-as-usual operations, but no surplus ทรัพยากรทางการเงินที่เพียงพอสำหรับการดำเนินงานตามปกติ แต่ไม่มีส่วนเกิน
- Surplus financial resources for business-as-usual operations ทรัพยากรทางการเงินส่วนเกินสำหรับการดำเนินงานตามปกติ

3.12 Does your healthcare facility have a plan for coordinating and collaborating with surrounding communities and stakeholders in the case of emergencies or natural hazards? สถานพยาบาลของคุณมีแผนในการประสานงานและร่วมมือกับชุมชนโดยรอบและผู้มีส่วนได้ส่วนเสียในกรณีฉุกเฉินหรือภัยธรรมชาติหรือไม่

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but without regular review or drills. ใช่ หน่วยบริการของเรามีแผน แต่ไม่มีการตรวจสอบหรือฝึกซ้อมเป็นประจำ
- Yes, our facility has a plan with regular review and drills, but without sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนที่มีการทบทวนและฝึกซ้อมเป็นประจำ แต่ไม่มีทรัพยากรเพียงพอสำหรับการดำเนินการ
- Yes, our facility has a plan with regular review and drills, and with sufficient resources for implementation. ใช่ หน่วยบริการของเรามีแผนที่มีการทบทวนและฝึกซ้อมอย่างสม่ำเสมอ และมีทรัพยากรเพียงพอสำหรับการดำเนินการ

Notes/Comments (If any)

Part 4: Adaptive Capacity

(ส่วนที่ 4: ความสามารถในการปรับตัว)

4.1 Please appraise the level of flexibility and adjustability of essential working systems of a healthcare facility if confronted with climate-related events

โปรดประเมินระดับความยืดหยุ่นและความสามารถในการปรับเปลี่ยนระบบการทำงานที่จำเป็นของสถานพยาบาล

หากต้องเผชิญกับเหตุการณ์ที่เกี่ยวข้องกับสภาพภูมิอากาศ

Description of the level of flexibility and adjustability of essential working systems

ระดับความยืดหยุ่นและการปรับตัวของระบบการทำงานที่สำคัญ

Level of flexibility/adjustability ระดับความยืดหยุ่นและการปรับตัว	Description คำอธิบาย
Low ต่ำ	<ul style="list-style-type: none"> All essential working systems can NOT be moved or adjusted. ระบบการทำงานที่จำเป็นทั้งหมดไม่สามารถเคลื่อนย้ายหรือปรับเปลี่ยนได้
Medium ปานกลาง	<ul style="list-style-type: none"> Essential working systems can be moved or adjusted by using special equipment/devices and/or by specialist supervision or specialist supervision. ระบบการทำงานที่จำเป็นสามารถเคลื่อนย้ายหรือปรับเปลี่ยนได้โดยใช้อุปกรณ์/อุปกรณ์พิเศษ และ/หรือ โดยการควบคุมดูแลโดยผู้เชี่ยวชาญหรือการควบคุมดูแลโดยผู้เชี่ยวชาญ Essential working systems may have LOWER efficiency or productivity after moving or adjusting. ระบบการทำงานที่สำคัญอาจมีประสิทธิภาพหรือประสิทธิผลที่ต่ำกว่าหลังจากการเคลื่อนย้ายหรือปรับเปลี่ยน
High สูง	<ul style="list-style-type: none"> Essential working systems can be moved or adjusted by specialist supervision or specialist supervision and/or by using special equipment/devices. ระบบการทำงานที่จำเป็นสามารถเคลื่อนย้ายหรือปรับเปลี่ยนได้โดยการควบคุมดูแลโดยผู้เชี่ยวชาญหรือการควบคุมดูแลโดยผู้เชี่ยวชาญ และ/หรือโดยใช้อุปกรณ์/อุปกรณ์พิเศษ Essential working systems have THE SAME level of efficiency or productivity after moving or adjusting. ระบบการทำงานที่สำคัญมีประสิทธิภาพหรือประสิทธิผลในระดับเดียวกันหลังจากการเคลื่อนย้ายหรือปรับเปลี่ยน

Working Systems	Not relevant (No system in place) ไม่เกี่ยวข้อง	Level of flexibility and adjustability ระดับความยืดหยุ่นและการปรับตัว		
		Low	Medium	High
(1) Grid (electricity) power system ระบบไฟฟ้า	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Back-up power source ระบบพลังงานไฟฟ้าสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Computer/server/internet system ระบบคอมพิวเตอร์/เซิร์ฟเวอร์/อินเทอร์เน็ต	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Medical and patient record system ระบบเวชระเบียนและสต็อกยา	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) Telephone/radio system ระบบโทรศัพท์และวิทยุ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) Water filter and purification ระบบกรองน้ำและผลิตน้ำดื่มบริสุทธิ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(7) Water supply (Tap water) ระบบน้ำสำรอง	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) Pumping system ระบบสูบน้ำ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) Wastewater treatment system ระบบบำบัดน้ำเสีย	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) Waste management system ระบบจัดการขยะ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(11) Medical and clinical supply ระบบจัดเก็บยาและเวชภัณฑ์	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Food supply ที่จัดเก็บอาหาร	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(13) Personnel (including workforce management, commuting) กำลังคน (การจัดการกำลังคนและการเดินทางของบุคลากร)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(14) Access route เส้นทางเข้าถึงสถานพยาบาล	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2 Availability and accessibility of information on local future climate-related disaster risks (floods and water supply scarcity) in your area, as well as local hazard map and climate-related disaster risk database ความพร้อมใช้งานและการเข้าถึงข้อมูลเกี่ยวกับความเสี่ยงจากภัยพิบัติที่เกี่ยวข้องกับสภาพภูมิอากาศในอนาคตในท้องถิ่น (น้ำท่วมและการขาดแคลนน้ำ) ในพื้นที่ของคุณ ตลอดจนแผนที่อันตรายในท้องถิ่นและฐานข้อมูลความเสี่ยงจากภัยพิบัติที่เกี่ยวข้องกับสภาพภูมิอากาศ

- None. ไม่มี
- Aware of the information, but has limited access to the information. มีข้อมูล แต่มีข้อจำกัดในการเข้าถึงข้อมูล
- Aware of the information and has access to the information, but does not use it for risk management planning
ทราบข้อมูลและเข้าถึงข้อมูลได้แต่ไม่ได้นำไปใช้ในการวางแผนบริหารความเสี่ยง
- Aware of the information, has access to the information, and uses it for risk management planning
ทราบข้อมูลสามารถเข้าถึงข้อมูล และนำไปใช้ในการวางแผนบริหารความเสี่ยง

4.3 Availability and accessibility of financial resources for disaster risk preparation

ความพร้อมและการเข้าถึงทรัพยากรทางการเงินเพื่อเตรียมพร้อมรับความเสี่ยงจากภัยพิบัติ

- No/Insufficient and difficult to acquire the resources from external sources or donation
ไม่มี/ไม่เพียงพอและยากต่อการรับทรัพยากรจากแหล่งภายนอกหรือการบริจาค
- Insufficient but not difficult to acquire the resources from external sources or donation ไม่เพียงพอแต่ก็ไม่ยากที่จะได้รับทรัพยากรจากแหล่งภายนอกหรือการบริจาค
- Sufficient and no need to acquire the resources from external sources or donation เพียงพอและไม่จำเป็นต้องได้รับทรัพยากรจากแหล่งภายนอกหรือการบริจาค

4.4 In-house capacity building and awareness raising among healthcare workers on the importance of future climate-related disaster risk and resilience

การสร้างขีดความสามารถภายในองค์กรและการสร้างความตระหนักรู้ในหมู่บุคลากรทางการแพทย์เกี่ยวกับความสำคัญของความเสี่ยงจากภัยพิบัติที่เกี่ยวข้องกับสภาพภูมิอากาศในอนาคตและการฟื้นตัว

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but does not implement it. มี หน่วยบริการของเรามีแผนแต่ไม่ได้ดำเนินการ
- Yes, our facility has a plan, but has no/insufficient resources and coordination for implementation.
มี หน่วยบริการของเรามีแผน แต่ไม่มีทรัพยากรและการประสานงานไม่เพียงพอในการดำเนินการ
- Yes, our facility has a plan, sufficient resources, and coordination for implementation.
มี หน่วยบริการของเรามีแผน ทรัพยากรเพียงพอ และการประสานงานในการดำเนินการ

4.5 Business continuity plan implementation แผนความต่อเนื่องทางธุรกิจ

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but does not implement it. มี หน่วยบริการของเรามีแผนแต่ไม่ได้ดำเนินการ
- Yes, our facility has a plan, but has no/insufficient resources and coordination for implementation. มี หน่วยบริการของเรามีแผน แต่ไม่มีทรัพยากรและการประสานงานไม่เพียงพอในการดำเนินการ
- Yes, our facility has a plan, sufficient resources, and coordination for implementation. มี หน่วยบริการของเรามีแผน ทรัพยากรเพียงพอ และการประสานงานในการดำเนินการ

4.6 Contingency plan implementation แผนบริหารสถานการณ์ฉุกเฉิน

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but does not implement it. มี หน่วยบริการของเรามีแผนแต่ไม่ได้ดำเนินการ
- Yes, our facility has a plan, but has no/insufficient resources and coordination for implementation. มี หน่วยบริการของเรามีแผน แต่ไม่มี ทรัพยากรและการประสานงานไม่เพียงพอในการดำเนินการ
- Yes, our facility has a plan, sufficient resources, and coordination for implementation. มี หน่วยบริการของเรามีแผน ทรัพยากรเพียงพอ และการประสานงานในการดำเนินการ

4.7 Existence and efficiency of internal board of committee/working group on safe and clean facility, climate change, and disaster risk management คณะกรรมการภายใน/คณะทำงานด้านสถานที่ปลอดภัยและสะอาด การเปลี่ยนแปลงสภาพภูมิอากาศ และการบริหารความเสี่ยงจากภัยพิบัติ

- None. ไม่มี
- No, but our facility is forming such committee/working group. ไม่มี กำลังอยู่ในระหว่างการแต่งตั้ง
- Yes, but the committee/working group never convenes. มี แต่ไม่เคยประชุม
- Yes, our facility has regular meetings, but lack resources and efficient coordination. มี มีการประชุมเป็นประจำ แต่ไม่มีทรัพยากรและการประสานงานที่มีประสิทธิภาพ
- Yes, our facility has regular meetings with sufficient resources and efficient coordination. มี มีการประชุมเป็นประจำ มีทรัพยากรเพียงพอ และมีการประสานงานที่มีประสิทธิภาพ

4.8 Specific coordinator on disaster risk management ผู้ประสานงานเฉพาะด้านการจัดการความเสี่ยงจากภัยพิบัติ

- None. ไม่มี
- No, but our facility is considering a suitable candidate for this role. ไม่มี แต่กำลังพิจารณาแต่งตั้ง
- Yes, our facility has a designated coordinator, but disaster risk management is not his/her main responsibility. มี ผู้ประสานงานเฉพาะด้าน แต่ไม่มีหน้าที่รับผิดชอบหลัก
- Yes, have a clear designed coordinator (s) who disaster risk management is his/her main task. มี ผู้ประสานงานเฉพาะด้านที่มีหน้าที่หลักด้านการจัดการความเสี่ยงจากภัยพิบัติ

4.9 Workforce contingency plan and implementation แผนฉุกเฉินและการดำเนินการด้านกำลังคน

- None. ไม่มี
- No, but our facility is formulating such plan. ไม่ แต่หน่วยบริการของเรากำลังจัดทำแผนดังกล่าว
- Yes, our facility has a plan, but does not implement it. มี หน่วยบริการของเรามีแผนแต่ไม่ได้ดำเนินการ
- Yes, our facility has a plan with regular review/drill(s), but has no/insufficient resources for implementation. มี หน่วยบริการของเรามีแผน ซึ่งมีการซักซ้อมและทบทวนเป็นประจำ แต่ไม่มีทรัพยากรเพียงพอในการดำเนินการ
- Yes, our facility has a plan, regular review/drill(s), and sufficient resources for implementation. มี หน่วยบริการของเรามีแผนซึ่งมีการซักซ้อมและทบทวนเป็นประจำ และมีทรัพยากรเพียงพอในการดำเนินการ

4.10 Training on working with no electricity or limited resources การฝึกอบรมให้แก่บุคลากรให้สามารถทำงานในสถานการณ์ที่ไม่มีพลังงานไฟฟ้าและมีทรัพยากรจำกัด

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี แต่หน่วยบริการของเรากำลังวางแผน
- Yes, < 1 time/year มีแผน แต่ไม่เคยดำเนินการ
- Yes, at least 1 time/year, but our facility has insufficient resources and coordination. มีแผน และมีการฝึกอบรมอย่างน้อย 1 ครั้ง/ปี เนื่องจากไม่มีทรัพยากรเพียงพอ
- Yes, at least 1 time/year, and our facility has sufficient resources and coordination. มีแผน และมีการฝึกอบรมอย่างน้อย 1 ครั้ง/ปีและมีทรัพยากรเพียงพอ

4.11 One-stop service area with the highest protective level, in the case of hazards or high level of emergency

พื้นที่ให้บริการแบบเบ็ดเสร็จในกรณีเกิดเหตุภัยพิบัติฉุกเฉิน

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี แต่กำลังวางแผนดำเนินการ
- Yes, our facility has a plan, but with no regular review and drills. มีแผนดำเนินการ แต่ไม่เคยทบทวนหรือซักซ้อม
- Yes, our facility has a plan with regular review/drill(s), but has no/insufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ
- Yes, our facility has a plan, regular review/drill(s), and sufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ และมีทรัพยากรเพียงพอในการดำเนินการ

4.12 Evacuation plan implementation (both partial and full evacuation) การดำเนินการตามแผนการอพยพ (ทั้งการอพยพบางส่วนและทั้งหมด)

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี แต่กำลังวางแผนดำเนินการ
- Yes, our facility has a plan, but with no regular review and drills. มีแผนดำเนินการ แต่ไม่เคยทบทวนหรือซักซ้อม
- Yes, our facility has a plan with regular review/drill(s), but has no/insufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ
- Yes, our facility has a plan, regular review/drill(s), and sufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ และมีทรัพยากรเพียงพอในการดำเนินการ

4.13 Volunteer and external help management plan implementation การดำเนินการตามแผนการจัดการอาสาสมัครและความช่วยเหลือภายนอก

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี แต่กำลังวางแผนดำเนินการ
- Yes, our facility has a plan, but with no regular review and drills. มีแผนดำเนินการ แต่ไม่เคยทบทวนหรือซักซ้อม
- Yes, our facility has a plan with regular review/drill(s), but has no/insufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ

- Yes, our facility has a plan, regular review/drill(s), and sufficient resources for implementation. มีแผนดำเนินการที่ผ่านการซักซ้อมและทบทวนเป็นประจำ แต่มีทรัพยากรที่ไม่เพียงพอในการดำเนินการ และมีทรัพยากรเพียงพอในการดำเนินการ

4.14 Stakeholder participation in disaster risk management planning การมีส่วนร่วมของผู้มีส่วนได้ส่วนเสียในการวางแผนการจัดการความเสี่ยงจากภัยพิบัติ

- No, disaster risk management planning is an internal process and does not involve stakeholders in planning and exercise process. ไม่ การวางแผนการจัดการความเสี่ยงจากภัยพิบัติเป็นกระบวนการภายในและไม่เกี่ยวข้องกับผู้มีส่วนได้ส่วนเสียภายนอก
- The healthcare facility involves stakeholders in the planning process, but does not implement the plan or implements the plan without their involvement. สถานพยาบาลเปิดโอกาสให้ผู้มีส่วนได้เสียมีส่วนร่วมในกระบวนการวางแผน แต่ไม่ได้นำแผนหรือนำไปปฏิบัติอย่างมีส่วนร่วม
- The healthcare facility involves stakeholders in the planning process and implements the plan with them (but not on a regular basis). สถานพยาบาลเปิดโอกาสให้ผู้มีส่วนได้เสียมีส่วนร่วมในกระบวนการวางแผน แต่มีแผนให้ผู้มีส่วนได้ส่วนเสียมีส่วนร่วมในการขับเคลื่อนในบางครั้ง
- The healthcare facility involves stakeholders in the planning process and implements the plan with them regularly. สถานพยาบาลเปิดโอกาสให้ผู้มีส่วนได้ส่วนเสียมีส่วนร่วมในการวางแผนและขับเคลื่อนแผนไปสู่การปฏิบัติ

4.15 Mainstreaming disaster risk management in an action plan or budget plan

สถานพยาบาลนำแผนจัดการความเสี่ยงภัยพิบัติบรรจุไว้ในแผนหรืองบประมาณของสถานพยาบาล

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี แต่กำลังวางแผน
- Yes, our facility has a plan, but does not implement it. มีแผน แต่ไม่สามารถดำเนินการได้
- Yes, our facility has a plan, but has no/insufficient resources for coordination and implementation. มีแผน แต่ไม่มีงบประมาณเพียงพอในการประสานและขับเคลื่อน
- Yes, our facility has a plan and sufficient resources for coordination and implementation. มีแผนและมีทรัพยากรเพียงพอในการประสานและขับเคลื่อน

4.16 Climate-related hazards risk insurance ประกันภัยจากภัยพิบัติ

- None. ไม่มี
- No, but our facility is currently planning on it. ไม่มี กำลังวางแผนดำเนินการ
- Yes, but not cover all types of climate-related hazards. มี แต่ไม่ครอบคลุมภัยพิบัติทุกประเภท
- Yes, cover all types of climate-related hazards. มี และครอบคลุมภัยพิบัติทุกประเภท

4.17 Has your healthcare facility adopted or used renewable energy as back-up or secondary line for power?

หน่วยบริการมีแผนใช้พลังงานหมุนเวียนเป็นพลังงานสำรองหรือแหล่งพลังงานทางเลือกหรือไม่

- None. ไม่มี
- No, but our facility is formulating a plan to use renewable energy. ไม่มี แต่กำลังทำแผนดำเนินการ
- Yes, but the use of renewable energy as back-up or secondary line for power is limited. มี แต่การใช้พลังงานหมุนเวียนยังมีข้อจำกัด
- Yes, our facility has renewable energy as back-up or secondary line for power. มี พลังงานสะอาดเป็นแหล่งพลังงานหมุนเวียนและพลังงานทางเลือกที่สำคัญ

4.18 Is there a proper waste recycling program in your healthcare facility that reduces the demand for new resources, and cuts down the effort of transportation and production? หน่วยบริการมีแผนนำขยะกลับมาใช้ซ้ำเพื่อลดปริมาณความต้องการทรัพยากรใหม่และเพื่อลดค่าใช้จ่ายในการขนส่งและผลิตทรัพยากรใหม่

- None. ไม่มี
- No, but our facility is formulating a waste recycling program. ไม่มี แต่กำลังทำแผนดำเนินการ
- Yes, but a waste recycling program is limited. มี แต่การนำขยะกลับมาใช้ซ้ำยังมีข้อจำกัด
- Yes, our facility has a proper waste recycling program. มี หน่วยบริการมีแผนนำขยะกลับมาใช้ซ้ำอย่างเหมาะสม

4.19 Does your healthcare facility systematically avoid using building materials/products that contain toxic chemicals, some of which emit volatile organic compounds (VOCs)? หน่วยบริการพยายามลดการใช้ผลิตภัณฑ์ที่มีส่วนประกอบเป็นสารเคมีอันตรายอย่างเป็นระบบ โดยเฉพาะสารอินทรีย์ระเหยง่าย (VOCs) ซึ่งเป็นอันตรายต่อระบบทางเดินหายใจและระบบอื่นของสุขภาพผู้ป่วย

- No. ไม่ได้ดำเนินการใด ๆ ทั้งสิ้น
- No, but our facility is planning to eliminate the use of materials/products that contain toxic chemicals
ไม่ แต่หน่วยบริการกำลังวางแผนยกเลิกการใช้ผลิตภัณฑ์ที่มีส่วนประกอบเป็นสารเคมีอันตราย
- Yes, but not systematic. มีความพยายามหลีกเลี่ยงผลิตภัณฑ์ที่มีส่วนประกอบเป็นสารเคมีอันตราย แต่ไม่ได้ดำเนินการทุกครั้งในทุกสถานการณ์
- Yes, our facility systematically avoid using materials/products with toxic chemicals.
หน่วยบริการมีแนวทางดำเนินการหลีกเลี่ยงผลิตภัณฑ์ที่มีส่วนประกอบเป็นสารเคมีอันตรายอย่างเป็นระบบ

4.20 Has your healthcare facility promoted the use of public transportation available for staff, patients, relatives, and visitors?

หน่วยบริการของท่านได้สนับสนุนและส่งเสริมการใช้บุคลากร ผู้ป่วยญาติ และผู้มาเยี่ยมเยียนใช้ระบบขนส่งมวลชนสาธารณะหรือไม่

- No. ไม่ได้ดำเนินการใด ๆ ทั้งสิ้น
- Yes, but not seriously. มีการสนับสนุนส่งเสริม แต่ไม่จริงจัง
- Yes, our facility has promoted the use of public transportation all the time. หน่วยบริการส่งเสริมการใช้ระบบขนส่งมวลชนสาธารณะเป็นประจำ

4.21 To what extent has your healthcare facility followed the government's green procurement policy?

หน่วยบริการดำเนินการจัดซื้อจัดจ้างตามแนวทางการจัดซื้อจัดจ้างสีเขียวของรัฐบาลมากน้อยเพียงใด

- None. ไม่มีการดำเนินการตามแนวทางการจัดซื้อจัดจ้างสีเขียว
- No, but our facility is planning to follow the green procurement policy. ไม่มี แต่มีแผนที่จะดำเนินการตามแนวทางการจัดซื้อจัดจ้างสีเขียวในอนาคต
- Yes, but to a limited extent. มี แต่ในปัจจุบันสามารถดำเนินการตามแนวทางการจัดซื้อจัดจ้างสีเขียวได้อย่างจำกัด
- Yes, our facility follows the government's green procurement policy on a regular basis. มี หน่วยบริการดำเนินการตามแนวทางการจัดซื้อจัดจ้างสีเขียวเป็นประจำ

4.22 Has your healthcare facility developed a healthy and sustainable food policy/plan?

หน่วยบริการของท่านมีแผนหรือนโยบายส่งเสริมการบริโภคอาหารที่ดีต่อสุขภาพและมีความยั่งยืนทางสิ่งแวดล้อมหรือไม่ (ยกตัวอย่างเช่น การรับประทานอาหารที่ถูกต้องตามหลักโภชนาการและประกอบขึ้นจากวัตถุดิบและผลิตภัณฑ์จากกระบวนการผลิตที่ไม่ก่อให้เกิดผลกระทบต่อสิ่งแวดล้อม ได้แก่ การหลีกเลี่ยงการบริโภคเนื้อแดง)

- None. ไม่มี
- No, but our facility is formulating a healthy and sustainable food policy/plan. ไม่มี แต่กำลังทำแผนดำเนินการ
- Yes, but a healthy and sustainable food policy/plan is limited. มี แต่การขับเคลื่อนนโยบายและแผนส่งเสริมการบริโภคอาหารที่ดีต่อสุขภาพและมีความยั่งยืนทางสิ่งแวดล้อมยังมีจำกัด
- Yes, our facility has a healthy and sustainable food policy/plan. มี หน่วยบริการมีแผนส่งเสริมการบริโภคอาหารที่ดีต่อสุขภาพและมีความยั่งยืนทางสิ่งแวดล้อม

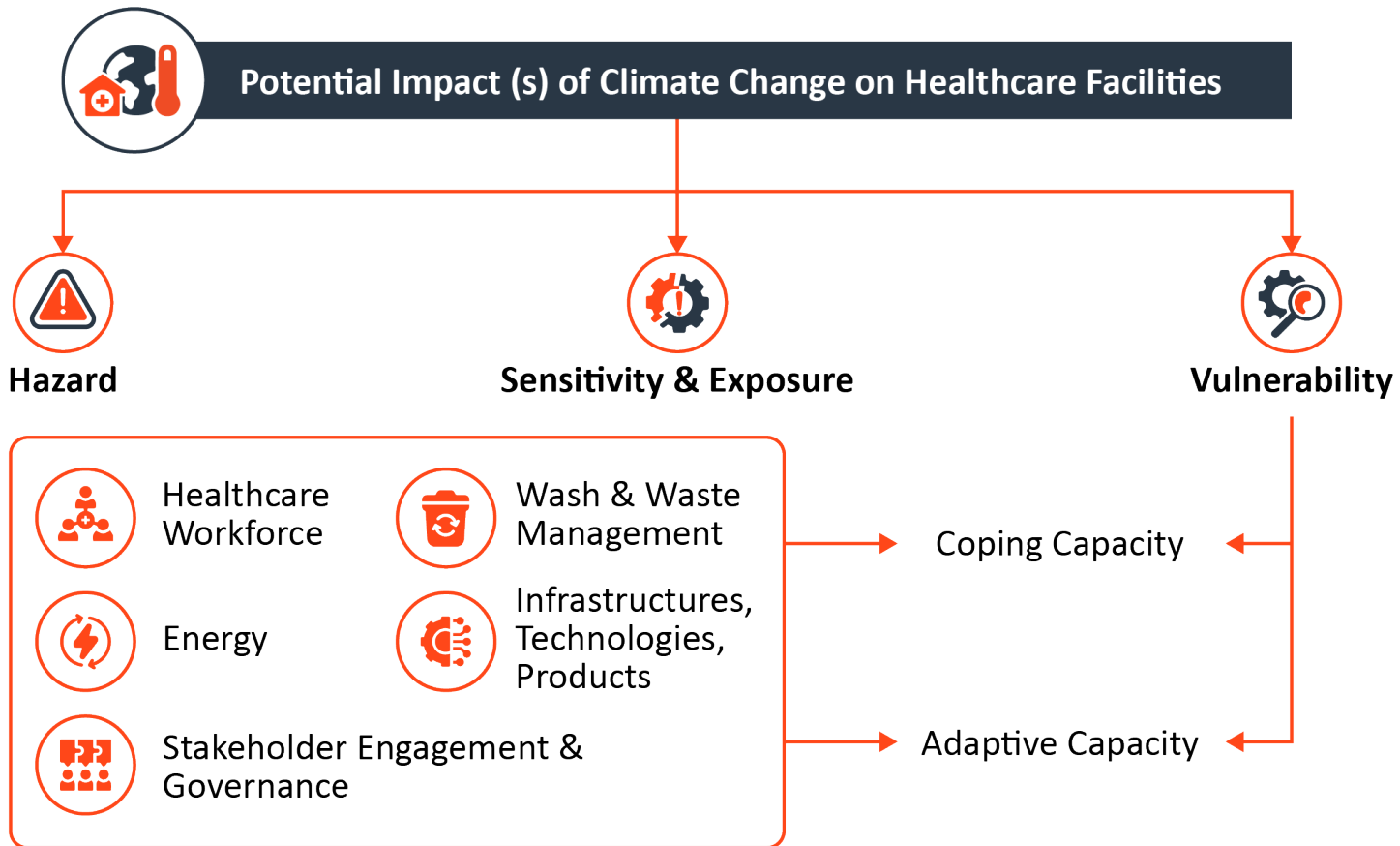
APPENDIX 3

Conceptual Framework

Data Collection and Analysis Manual (For Assessor's Use Only)

Conventional local public health planning and monitoring insufficiently address the conjugated impacts of demographic transition and climate change. Climate resilient and environmentally sustainable healthcare facilities contribute to a high quality of care and accessibility of services, particularly in the extreme weather situations. Donor agencies, research institutes, and intergovernmental panels have developed a variety of assessment and capacity-building toolkits to enhance the capacity of hospitals and healthcare facilities to address the consequences of climate-induced events. This proposed GV-CV assessment tool is based on a combination of *the WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities*, the IPCC Fifth Assessment Report (AR5), and the U.S. Department of Health and Human Services' Sustainable and Climate Resilient Health Care Facilities Initiative (SCRHCFI). The SCRHCFI framework was adopted by the Thai Department of Health to assess the hospitals' preparedness for climate-related extreme weather patterns. By incorporating the SCRHCFI framework into this proposed GV-CV assessment tool, UNFPA and FHI 360 will have a better opportunity to engage in dialogue with the Thai government authority in order to collaborate on preparatory measures for hospitals and healthcare facilities in Thailand.

Based on the IPCC Fifth Assessment Report (AR5), the potential impact is a multiplication of three (3) dimensions: hazard, sensitivity and exposure, and vulnerability. For hazard and sensitivity and exposure, the main indicators used in this study come from the SCRHCFI framework (i.e., the climate risks and community vulnerability dimension and the land use, building design, and regulatory context dimension). Meanwhile, vulnerability is divided into two sub-dimensions: coping capacity and adaptive capacity. Coping capacity denotes the ability of a healthcare facility to address, manage, and overcome adverse conditions in the short-medium terms. Adaptive capacity means the ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events. The two sub-dimensions are operationalized using the *WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities*, which classifies vulnerability into four (4) sub-dimensions: (1) healthcare workforce, (2) WASH and waste management, (3) energy, and (4) infrastructures, technologies, and products. The fifth dimension – stakeholder engagement and governance – has been added to highlight the importance of governance mechanisms (policy and planning, sufficient resources) and an open communication process that emphasizes “the optimization of an entire community health system” instead of “the optimization of a healthcare facility in isolation.”



Key Terminology

Hazard: The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. In this study, the term hazard usually refers to climate-related physical events or trends or their physical impacts.

Disaster: A serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts.

Exposure: The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected by climate-related events.

Vulnerability: The propensity or predisposition to be adversely affected by climate-related events. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

Sensitivity: The degree to which a healthcare facility is affected, either adversely or beneficially, by climate-related hazards.

Resilience: The capacity of a healthcare facility to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function and structure, while also maintaining the capacity for adaptation, learning, and transformation.

Coping capacity: The ability of a healthcare facility to address, manage, and overcome adverse conditions in the short-medium terms.

Adaptive capacity: The ability of a healthcare facility to adjust to potential damage, to take advantage of opportunities, and to respond to consequences of climate-related events.

Summary of Dimension (s) and Indicators

Dimension (s)	Number of indicator (s)	Maximum aggregated score
Dimension I: Hazard	4	16
Dimension II: Sensitivity and Exposure	4	16
Dimension III: Vulnerability		
Sub-dimension 3.1 Coping Capacity	18	72
(1) Healthcare workforce	2	8
(2) Energy	4	16
(3) WASH and waste management	2	8
(4) Infrastructures, technologies, and processes	6	24
(5) Stakeholder engagement and governance	4	16
Sub-dimension 3.2 Adaptive Capacity	24	96
(1) Healthcare workforce	5	20
(2) Energy	2	8
(3) WASH and waste management	3	12
(4) Infrastructures, technologies, and processes	6	24
(5) Stakeholder engagement and governance	8	32

Dimension (s), Indicator (s), and Data Source (s)

DIMENSION I: HAZARD

Indicator (s)	Data Source (s)	Rating Score
(1) Possibility of hospital and healthcare facility buildings to experience <i>fluvial flood</i>	<ul style="list-style-type: none"> • GIS analysis • Survey Q2.1 	<p>●●●● 4 Regularly flooded or flooding is possible</p> <p>●● 2 Not flooded, but flooding is possible</p> <p>0 - Neither flooded nor likely to be flooded</p>
(2) Possibility of hospital and healthcare facility buildings to experience <i>pluvial flood</i>	<ul style="list-style-type: none"> • GIS analysis • Survey Q2.2 	<p>●●●● 4 Regularly flooded or flooding is possible</p> <p>●● 2 Not flooded, but flooding is possible</p> <p>0 - Neither flooded nor likely to be flooded</p>
(3) Possibility of hospital and healthcare facility buildings to experience <i>water scarcity</i>	<ul style="list-style-type: none"> • Survey Q2.3 	<p>●●●● 4 Regularly experience water scarcity</p> <p>●● 2 Never experience water scarcity, but water scarcity is possible</p> <p>0 No possibility of water scarcity</p>
(4) Possibility of hospital and healthcare facility buildings to experience <i>air pollution</i>	<ul style="list-style-type: none"> • Survey Q2.4 	<p>●●●● 4 Regularly experience air pollution</p> <p>●● 2</p>

Indicator (s)	Data Source (s)	Rating Score
		Never experience air pollution in the area in which our healthcare facility is located, but air pollution is still possible 0 No possibility of air pollution

Scoring Rubrics

Severity of Hazard	Aggregated Score (s)	Percentage (s)	Note (s)
High	12-16	75% - 100%	
Medium	4-10	25% - 62.5%	A facility must have <i>at least</i> one hazard indicator with a score of “4”
Low	2-8	12.5% - 50%	A facility must <i>not</i> have a score of “4” for any of the hazard indicators
No Hazard	0	0%	

DIMENSION II: SENSITIVITY AND EXPOSURE

Indicator (s)	Data Source (s)	Rating Score
(1) Exposure of 23 essential working systems	<ul style="list-style-type: none"> Survey Q1.5 Tour of facilities 	<p>●●●● 4 A healthcare facility has all essential working systems located at <3 m from the ground level or lower</p> <p>●● 2 At least one (1) essential working system is located at <3 m from the ground level or lower</p> <p>0 None of the essential working systems of a healthcare facility is located at >= 3m from the ground level (2nd floor) or higher</p>
(2) Exposure of 12 back-up systems/ resources	<ul style="list-style-type: none"> Survey Q3.1 Tour of facilities 	<p>●●●● 4 A Healthcare facility has all back-up systems/resources located at <3 m from the ground level or lower</p> <p>●● 2 At least one (1) back-up system/resource is located at <3 m from the ground level or lower</p> <p>0 None of the back-up systems/resources of a healthcare facility is located at >= 3m from the ground level (2nd floor) or higher</p>
(3) Sensitivity of selected essential working systems to downtime/disruption/shortage	<ul style="list-style-type: none"> Survey Q2.5 	<p>●●●● 4 "Medium" to "high" impacts on the majority of essential systems</p> <p>●● 2 "Low" and "Very low" impacts on the majority of essential systems</p> <p>0 "Very low" impacts on the majority of essential systems</p>

Indicator (s)	Data Source (s)	Rating Score
(4) Variety of vulnerable patients	<ul style="list-style-type: none"> Survey Q1.3 	<p>●●●● 4 6 types or more</p> <p>●● 2 1 to 5 types</p> <p>0 No vulnerable patients – 1 type</p>

Scoring Rubrics

Level of Exposure and Sensitivity	Aggregated Score (s)	Percentage (s)
High	14-16	88% - 100%
Medium	8-12	50% - 75%
Low	2-6	13% - 38%
No exposure and sensitivity	0	0%

DIMENSION III: VULNERABILITY

COPING CAPACITY

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
(1) Healthcare workforce <i>2 indicators</i>	(1.1) Balance between service capacity and service demand	<ul style="list-style-type: none"> Survey Q1.2 	<p>●●●● 4 No, having service demand more than service capacity</p> <p>●● 2 Yes, having service demand equal to service capacity</p> <p>0 Yes, having service demand lower than service capacity</p>
	(1.2) Shelter (s) for staff and family in the case of climate-related disasters or hazards	<ul style="list-style-type: none"> Survey Q3.5 	<p>●●●● 4 A healthcare facility has no designated places and facilities for staff and family in the case of climate-related disasters or hazards</p> <p>●● 2 A healthcare facility has no designated shelters for staff and families, but is planning on finding places and facilities in the future</p> <p>0 A healthcare facility has designated shelters for staff and family</p>
(2) WASH and waste management <i>4 indicators</i>	(2.1) Water-related systems Two (2) systems: <ul style="list-style-type: none"> Water quality audit and monitoring water safety plan 	<ul style="list-style-type: none"> Survey Q1.9 Internal policy document Audit report 	<p>●●●● 4 A healthcare facility has no water quality audit/monitoring and water safety plan (Grade of “D” for both systems)</p> <p>●● 2 Not all water-related systems of a healthcare facility is functioning (Grade of “B”, “C”, or “D” for one of the two water-related systems)</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>0</p> <p>A healthcare facility has functioning water-related systems with extensive coverage and regular review and/or maintenance (Grade of “A” for both systems)</p>
(2.2)	<p>Waste management systems</p> <p>Three (3) systems:</p> <ul style="list-style-type: none"> Healthcare/infectious waste treatment Hazardous waste treatment Wastewater treatment 	<ul style="list-style-type: none"> Survey Q1.9 Internal policy document Audit report 	<p>●●●● 4</p> <p>A healthcare facility has no waste management systems (Grade of “D” for all three waste management systems)</p> <p>●● 2</p> <p>Not all waste management systems of a healthcare facility is functioning (Grade of “B”, “C”, or “D” for one of the three water-related systems)</p> <p>0</p> <p>A healthcare facility has functioning waste management systems with extensive coverage and regular review and/or maintenance (Grade of “A” for all three waste management systems)</p>
(2.3)	Air conditioning and ventilation	<ul style="list-style-type: none"> Survey Q1.10 Internal policy document Audit report 	<p>●●●● 4</p> <p>A healthcare facility has no air conditioning and ventilation system (Grade of “D”)</p> <p>●● 2</p> <p>Air conditioning and ventilation system of a healthcare facility is limited or the facility only has a plan to use/install/adopt (Grade of “B” or “C”)</p> <p>0</p> <p>A healthcare facility has functioning air conditioning and ventilation system with extensive coverage and regular review and/or maintenance (Grade of “A”)</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
	(2.4) Protective environment room (with positive or negative pressure)	<ul style="list-style-type: none"> • Survey Q1.10 • Internal policy document • Audit report 	<p>●●●● 4 A healthcare facility has no protective environment room (Grade of “D”)</p> <p>●● 2 Protective environment room of a healthcare facility is limited or the facility only has a plan to use/install/adopt (Grade of “B” or “C”)</p> <p>0 A healthcare facility has functioning protective environment room with regular review and/or maintenance (Grade of “A”)</p>
(3) Energy <i>2 indicators</i>	(3.1) Adoption of an energy efficiency and conservation program/plan	<ul style="list-style-type: none"> • Survey Q1.8 • Internal policy document • Audit report 	<p>●●●● 4 A healthcare facility <i>does not have a plan</i></p> <p>●● 2 A healthcare facility <i>is formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i></p> <p>0 A healthcare facility <i>has a plan with regular review and drills, and with sufficient resources for implementation</i></p>
	(3.2) Implementation of resource conservation plan	<ul style="list-style-type: none"> • Survey Q3.4 • Internal policy document 	<p>●●●● 4 A healthcare facility has no resource conservation plan</p> <p>●● 2 A healthcare facility <i>is formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i></p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>0</p> <p>A healthcare facility has a plan with regular review and drills, and with sufficient resources for implementation</p>
(4) Infrastructures, technologies, and processes <i>6 indicators</i>	(4.1) Downtime/disruption/shortage of the 22 essential working systems	<ul style="list-style-type: none"> Survey Q1.6 	<p>●●●● 4</p> <p>Average downtime/disruption/shortage of the 22 essential working systems > 2 days</p> <p>●● 2</p> <p>Average downtime/disruption/shortage of the 22 essential working systems between <1 hr and 2 days</p> <p>0</p> <p>No downtime/disruption/shortage of the 22 essential working system</p>
	(4.2) Procurement of special vehicle type for carrying goods and passengers during emergencies or hazards	<ul style="list-style-type: none"> Survey Q3.2 	<p>●●●● 4</p> <p>None</p> <p>●● 2</p> <p>A healthcare facility has a plan to purchase/contract special vehicle, or has purchased/contracted special vehicle, but without regular technical check-ups</p> <p>0</p> <p>A healthcare facility has purchased or contracted service providers with regular technical check-ups.</p>
	(4.3) Alternate safe accessible route	<ul style="list-style-type: none"> Survey Q3.3 	<p>●●●● 4</p> <p>None</p> <p>●● 2</p> <p>A healthcare facility is formulating such plan or has surveyed/designed alternate safe accessible route (s), but lacks regular maintenance</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>0</p> <p>A healthcare facility has surveyed/designed alternate safe accessible route (s) and conducted regular maintenance</p>
	(4.4) Assignment of alternate care site (s)	<ul style="list-style-type: none"> Survey Q3.6 	<p>●●●● 4</p> <p>A healthcare facility does not have an evacuation plan</p> <p>●● 2</p> <p><i>A healthcare facility is drafting an evacuation plan, or has an evacuation plan, but has no designated referral hospital (s) and insufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility has an evacuation plan with sufficient resources and has designated referral hospital (s)</p>
	(4.5) SOPs for recording a patient medical data	<ul style="list-style-type: none"> Survey Q3.7 Internal policy document 	<p>●●●● 4</p> <p>No</p> <p>0</p> <p>Yes</p>
	(4.6) A back-up plan for getting help from outside during communication system failures	<ul style="list-style-type: none"> Survey Q3.8 Internal policy document 	<p>●●●● 4</p> <p>No</p> <p>0</p> <p>Yes</p>
(5) Stakeholder engagement and Governance	(5.1) Responsive plan for natural disasters	<ul style="list-style-type: none"> Survey Q3.9 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has no responsive plan for natural disasters</p> <p>●● 2</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
	4 indicators		<p>A healthcare facility <i>is formulating a plan, or has a plan, but without regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility has a plan with regular review/drills with sufficient resources for implementation</p>
(5.2)	Self-help plan for natural disasters	<ul style="list-style-type: none"> Survey Q3.10 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has no self-help plan for natural disasters</p> <p>●● 2</p> <p>A healthcare facility has <i>a plan, personnel, budget, and resources for initial self-help, while awaiting external support, or has a plan, personnel, budget, and resources for self-help with little need for external support</i></p> <p>0</p> <p>A healthcare facility has a plan, personnel, budget, and resources for self-help with no external support needed</p>
(5.3)	Availability and accessibility of financial resources for business-as-usual operations	<ul style="list-style-type: none"> Survey Q3.11 	<p>●●●● 4</p> <p>A healthcare facility has no or insufficient financial resources for business-as-usual operations (deficit)</p> <p>●● 2</p> <p>A healthcare facility has sufficient financial resources for business-as-usual operations, but no surplus</p> <p>0</p> <p>A healthcare facility has surplus financial resources for business-as-usual operations</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
	(5.4) A plan for coordinating and collaborating with surrounding communities and stakeholders in the case of emergencies or natural hazards	<ul style="list-style-type: none"> Survey Q3.12 Internal policy document 	<p>●●●● 4 A healthcare facility has no coordination and collaboration plan</p> <p>●● 2 A healthcare facility is <i>formulating such plan</i>, or <i>has a plan with no regular review/drills</i>, or <i>has a plan with regular review/drills, but without sufficient resources for implementation</i></p> <p>0 A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i></p>

Scoring Rubrics

Level of Vulnerability	Aggregated Score (s)	Percentage (s)
High	60-72	83% - 100%
Medium	40-58	56% - 81%
Low	2-38	3% - 53%
Not Vulnerable	0	0%

ADAPTIVE CAPACITY

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
(1) Healthcare workforce <i>5 indicators</i>	(1.1) In-house capacity building and awareness raising among healthcare workers	• Survey Q4.4	<p>●●●● 4 A healthcare facility has no plan</p> <p>●● 2 A healthcare facility has <i>a plan, but does not implement it, or has a plan, but has no/insufficient resources and coordination for implementation</i></p> <p>0 A healthcare facility a plan, sufficient resources, and coordination for implementation</p>
	(1.2) Workforce contingency plan and implementation	• Survey Q4.9	<p>●●●● 4 A healthcare facility has no workforce contingency plan and implementation</p> <p>●● 2 A healthcare facility <i>is formulating such plan, or has a plan with no regular review/drill, or has a plan with regular review/drill but with no/insufficient resources for implementation</i></p> <p>0 A healthcare facility has plan with regular review/drill, and sufficient resources for implementation</p>
	(1.3) Training on working with no electricity or limited resources	• Survey Q4.10	<p>●●●● 4 None</p> <p>●● 2</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>A healthcare facility <i>is drafting a plan, or organizes training at least 1 time/year with insufficient resources and coordination, or organizes training <1 time/year</i></p> <p>0</p> <p>A healthcare facility organizes training at least 1 time/year, and our facility has sufficient resources and coordination</p>
(1.4)	Evacuation plan implementation (both partial and full evacuation)	<ul style="list-style-type: none"> Survey Q4.12 	<p>●●●● 4</p> <p>A healthcare facility has no plan</p> <p>●● 2</p> <p>A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility a plan with regular review/drill, and sufficient resources for implementation</p>
(1.5)	Volunteer and external help management plan implementation	<ul style="list-style-type: none"> Survey Q4.13 	<p>●●●● 4</p> <p>A healthcare facility has no plan</p> <p>●● 2</p> <p>A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility a plan with regular review/drill, and sufficient resources for implementation</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
(2) WASH & waste management 3 indicators	(2.1) Flexibility and adjustability of water-related systems - Water filter and purification - Water supply (tap water) - Water pumping system	• Survey Q4.1, only items (6), (7), (8)	<p>●●●● 4 All working systems or the majority of working systems have “low” level of flexibility and adjustability</p> <p>●● 2 The majority of working systems have “medium” level of flexibility and adjustability</p> <p>0 All working systems have “high” level of flexibility and adjustability</p>
	(2.2) Flexibility and adjustability of waste management systems - Wastewater treatment system - Waste management system	• Survey Q4.1, only items (9) and (10)	<p>●●●● 4 Both waste management systems have “low” level of flexibility and adjustability, <i>or</i> one of the systems has “medium” level of flexibility and adjustability, and the other has “low” level of flexibility and adjustability</p> <p>●● 2 Both waste management systems have “medium” level of flexibility and adjustability, <i>or</i> one of the systems has “medium” level of flexibility and adjustability, and the other has “high” level of flexibility and adjustability, <i>or</i> one of the systems has “low” level of flexibility and adjustability, and the other has “high” level of flexibility and adjustability</p> <p>0 Both wastewater treatment and waste management systems have “high” level of flexibility and adjustability</p>
	(2.3) Waste recycling plan	• Survey Q4.18	<p>●●●● 4 A healthcare facility <i>does not have a plan</i></p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
		<ul style="list-style-type: none"> Internal policy document 	<p>●● 2</p> <p>A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i></p>
(3) Energy <i>2 indicators</i>	(3.1) Use of renewable energy as back-up or secondary line for power	<ul style="list-style-type: none"> Survey Q4.10 Internal policy document Audit report 	<p>●●●● 4</p> <p>A healthcare facility <i>does not have a plan</i></p> <p>●● 2</p> <p>A healthcare facility is <i>formulating such plan, or has a plan with no regular review/drills, or has a plan with regular review/drills, but without sufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility has <i>a plan with regular review and drills, and with sufficient resources for implementation</i></p>
	(3.2) Promoting and encouraging the use of public transportation by staff, patients, relatives, and visitors	<ul style="list-style-type: none"> Survey Q4.20 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has <i>no plan</i></p> <p>●● 2</p> <p>A healthcare facility has a clear policy to promote and encourage public transportation, but has <i>not fully implemented it</i></p> <p>0</p> <p>A healthcare facility has a clear plan and has <i>seriously implemented it</i></p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
(4) Infrastructures, technologies & processes <i>6 indicators</i>	(4.1) Flexibility and adjustability of essential working systems, except (6), (7), (8), (9), (10)	<ul style="list-style-type: none"> Survey Q4.1, except items (6), (7), (8), (9), (10) 	<p>●●●● 4 All working systems or the majority of working systems have “low” level of flexibility and adjustability</p> <p>●● 2 All working systems or the majority of working systems have “medium” level of flexibility and adjustability</p> <p>0 All working systems have “high” level of flexibility and adjustability</p>
	(4.2) Availability and accessibility of information on local future climate-related disaster risks	<ul style="list-style-type: none"> Survey Q4.2 	<p>●●●● 4 A healthcare facility has no information on local future climate-related disaster risks</p> <p>●● 2 A healthcare facility <i>is aware of the information, but has limited access, or is aware of and has access to the information, but does not use it for risk management planning</i></p> <p>0 A healthcare facility has access to the information and uses it for risk management planning</p>
	(4.3) One-stop service area with the highest protective level, in the case of hazards or high level of emergency	<ul style="list-style-type: none"> Survey Q4.11 	<p>●●●● 4 A healthcare facility has no plan</p> <p>●● 2 A healthcare facility <i>is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i></p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>0</p> <p>A healthcare facility a plan with regular review/drill, and sufficient resources for implementation</p>
(4.4)	Avoidance of products/materials that contain toxic chemicals	<ul style="list-style-type: none"> Survey Q4.5 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has no plan</p> <p>●● 2</p> <p><i>A healthcare facility is formulating such plan, or has a plan, but no/insufficient resources for implementation</i></p> <p>0</p> <p>A healthcare facility a plan and sufficient resources for implementation</p>
(4.5)	Green procurement policy	<ul style="list-style-type: none"> Survey Q4.5 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has no green procurement policy</p> <p>●● 2</p> <p>A healthcare facility has a clear policy to promote green procurement, but has not fully implemented it</p> <p>0</p> <p>A healthcare facility has a clear green procurement policy and has seriously implemented it</p>
(4.6)	Healthy and sustainable food policy/plan	<ul style="list-style-type: none"> Survey Q4.5 Internal policy document 	<p>●●●● 4</p> <p>A healthcare facility has no healthy and sustainable food policy</p> <p>●● 2</p> <p>A healthcare facility has a clear policy to promote healthy and sustainable food policy, but has not fully implemented it</p> <p>0</p> <p>A healthcare facility has a clear healthy and sustainable food policy and has seriously implemented it</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
(5) Stakeholder engagement & governance 8 indicators	(5.1) Availability and accessibility of financial resources for disaster risk preparation	<ul style="list-style-type: none"> Survey Q4.3 	<p>●●●● 4 No/Insufficient and difficult to acquire the resources from external sources or donation</p> <p>●● 2 Insufficient but not difficult to acquire the resources from external sources or donation</p> <p>0 Sufficient and no need to acquire the resources from external sources or donation</p>
	(5.2) Business continuity plan implementation	<ul style="list-style-type: none"> Survey Q4.5 Internal policy document 	<p>●●●● 4 A healthcare facility has no plan</p> <p>●● 2 <i>A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i></p> <p>0 A healthcare facility a plan with regular review/drill, and sufficient resources for implementation</p>
	(5.3) Contingency plan implementation	<ul style="list-style-type: none"> Survey Q4.6 Internal policy document 	<p>●●●● 4 A healthcare facility has no plan</p> <p>●● 2 <i>A healthcare facility is formulating such plan, or has a plan but without review/drill, or has a plan with regular review/drill, but no/insufficient resources for implementation</i></p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>0</p> <p>A healthcare facility a plan with regular review/drill, and sufficient resources for implementation</p>
(5.4)	Existence and efficiency of internal board of committee/working group on safe and clean facility, climate change, and disaster risk management	<ul style="list-style-type: none"> Survey Q4.7 Internal policy document 	<p>●●●● 4</p> <p>None</p> <p>●● 2</p> <p><i>A healthcare facility is forming such committee/working group, or has such committee/working group, but never convenes, or has regular meetings, but lack resources and efficient coordination</i></p> <p>0</p> <p>A healthcare facility has regular meetings with sufficient resources and efficient coordination.</p>
(5.5)	Specific coordinator on disaster risk management	<ul style="list-style-type: none"> Survey Q4.8 	<p>●●●● 4</p> <p>None</p> <p>●● 2</p> <p><i>A healthcare facility is considering a suitable candidate for this role, or has a designated coordinator, but disaster risk management is not his/her main responsibility</i></p> <p>0</p> <p>A healthcare facility has a clear designed coordinator (s) who disaster risk management is his/her main task.</p>
(5.6)	Stakeholder participation in disaster risk management planning	<ul style="list-style-type: none"> Survey Q4.14 	<p>●●●● 4</p> <p>The disaster risk management planning is an internal process and does not involve stakeholders in planning and exercise process.</p> <p>●● 2</p>

Sub-dimension (s)	Indicator (s)	Data Source (s)	Rating Score
			<p>A healthcare facility <i>involves stakeholders in the planning process, but does not implement the plan or implements the plan without their involvement, or involves stakeholders in the planning process and implements the plan with them (but not on a regular basis).</i></p> <p>0</p> <p>A healthcare facility involves stakeholders in the planning process and implements the plan with them regularly.</p>
(5.7)	Mainstreaming disaster risk management in an action plan or budget plan	<ul style="list-style-type: none"> Survey Q4.15 	<p>●●●● 4</p> <p>A healthcare facility has no plan</p> <p>●● 2</p> <p>A healthcare facility <i>is formulating such plan, or has a plan but does not implement it, or has a plan but has no/insufficient resources for coordination and implementation</i></p> <p>0</p> <p>A healthcare facility a plan with sufficient resources for coordination implementation</p>
(5.8)	Climate-related hazards risk insurance	<ul style="list-style-type: none"> Survey Q4.16 	<p>●●●● 4</p> <p>None</p> <p>●● 2</p> <p>A healthcare facility is planning on it, or <i>has an insurance, but does not cover all types of climate-related hazards</i></p> <p>0</p> <p>A healthcare facility has an insurance that covers all types of climate-related hazards.</p>

Scoring Rubrics

Level of Vulnerability	Aggregated Score (s)	Percentage (s)
High	72-96	75% - 100%
Medium	48-70	50% - 73%
Low	2-46	2% - 48%
Not Vulnerable	0	0%

Analysis Guideline

Based on this guideline, a healthcare facility’s green viability and climate vulnerability consists of three (3) dimensions: (1) hazard, (2) sensitivity and exposure, and (3) vulnerability. As explained in the previous section, scoring rubrics are used to analyze each individual dimension. For instance:

Hospital A

Dimension	Hazard	Sensitivity/Exposure	Vulnerability (Coping Capacity)	Vulnerability (Adaptive Capacity)
Aggregated Score	12	10	42	60
Level/intensity	High	Moderate	Moderate	High

For the hazard dimension, Hospital A receives an aggregated score of 12, which indicates that the hospital is situated in an area with a high level of climate-related hazard. A sensitivity/exposure aggregated score of 10 suggests that the essential working systems and types of patients served at this hospital currently experience a moderate degree of sensitivity and exposure to climate change and climate-related events. In terms of its coping capacity, Hospital A has a moderate degree of vulnerability (Score of 42). Considering its high-hazard location and the moderate degree of sensitivity and exposure, Hospital A may not be able to effectively mitigate the adverse effects of climate-related emergencies or hazards. Further, the hospital currently has a seriously low capacity to adapt to the effects of climate change.