

Developing a Sustainability Assessment framework for Thailand's Climate Change Master Plan

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Abstract

Thailand has adopted the Sustainable Development Goals (SDGs) by integrating the sustainable development (SD) concept in to their national constitution, and into policies and plans at the strategic level. However, the extent to which sustainability has been embedded in the Thai context, and how far SD operationalisation has progressed within national development actions, remains in doubt. A Sustainability Assessment (SA) is considered a suitable tool for supporting decision makers in delivering SD and, therefore, this paper aims at developing a framework for SA in the Thai context. An SA framework was developed based on current sustainability issues facing Thailand, comprising 19 sustainability objectives with 40 indicators. This was applied to evaluate the Climate Change (CC) Master Plan. The findings reflect that the plan tends to have positive impacts mainly on environmental aspects of SD while it may mitigate socioeconomic impacts. A few aims of the plan; i.e. smart grid network development and targets on GHG & energy intensity reduction may require further investigation to ensure sustainability.

Keywords: Sustainability assessment, sustainable development, sustainability, climate change

1. Rationale and background

Thailand has four sets of national Sustainable development (SD) agendas: ensuring sustainability; building resilience; reducing inequality and promoting human rights; and implementing SD in Thai society referring to the 2030 Agenda (Ministry of Foreign Affairs of Kingdom of Thailand,2015,United Nations,2015). Key SD issues were highlighted as social equality, sustainable consumption of natural resources, and mitigating climate change impacts, i.e. floods and droughts, all of which may affect the nation's economic potential. (Royal Thai Government,2014). SD has been the stated goal in the national socioeconomic development plan since 1997 regarding the imbalance of economic growth, resource depletion, and social well-being. Thailand has experienced the consequences of natural resource depletion and climate change (CC) impacts (Marks,2011, Naruchaikusol,2016). As such, the threat of CC impacts has been raised alongside sustainability concerns. Thailand's CC Master Plan 2015-2050 has been adopted as the national policy framework for authorities to implement in providing their own CC action plans along with CC budget plans. The CC Master Plan encompasses three main foci: CC adaptation; greenhouse gas (GHGs) emissions reduction; and capacity building for CC (ONEP,2015).

While Thailand's CC Master Plan aims at delivering adaptation and mitigation measures consistent with the three pillars of sustainability (economy, society, and environment), the concept of SD has not yet been clarified in it. This provides an opportunity for the application of sustainability assessment (SA), which is a tool applied to emerging policies, plans, programmes or projects prior to the decision-making process (Pope et al.,2017). SA emphasises '*positive net sustainability gains now and into the future*' (Bond et al.,2012,p.53), and it is considered as an approach that can deliver sustainable strategies for development (Adelle and Weiland,2012). Therefore, in order to operationalise the CC Master Plan towards sustainability, this research aims at developing an SA framework and using it to evaluate the sustainability of the CC Master Plan.

2. Developing SA framework & methodology

Data collection in this study was mainly conducted via documentary analysis of official documents as published by key authorities, and relevant research studies. Sustainability issues were drawn from the background context as stated in relevant national strategic documents and regulations (i.e. NESDB,2017c, NESDB,2015, NESDB,2017a, NESDB,2017b, Thai Constitution,2017), leading to the derivation of appropriate sustainability objectives (SOs) (**Table 1**). Sustainability indicators were established based on workshops & stakeholder involvement events previously conducted by the Office of the National Economic and Social Development Board (NESDB,2003), and from databases

provided by relevant authorities, such as, NESDB, Pollution Control Department (PCD), and the National Statistics Office (NSO) along with international databases (e.g. World Bank, UNICEF).

Table 1 Derived SOs based on sustainability issues in the Thai context

Sustainability issues	SOs	SOs' codes
Environment		
Deteriorated natural resources and environmental quality Chemical use and deteriorated soil quality	To enhance natural resources	ENV1
	To improve environmental quality	ENV2
Increasing trends of solid waste problems	To minimise waste generation	ENV3
	To enhance the waste management system	ENV4
CC impact and risks CC challenges on farmers	To reduce CC impacts	ENV5
	To reduce greenhouse gas emissions	ENV5
Unsustainable production and consumption Database integration and technology application Procurement system application for transparency	To encourage sustainable production	ENV7
	To encourage sustainable consumption	ENV8
Lack of SA Database integration and technology application Centralised natural resource management gaps	To encourage SA for natural resource management	ENV9
Social		
Human capital development Human resource development	To enhance the skills of the population	SOC1
Emerging-technology Lifestyle	To improve access to technology	SOC2
Health and well-being issues (inequality and quality of life) Immigration-led changes and unbalanced age structure of population	To improve the health and well-being of the population	SOC3
Employment opportunity	To improve opportunities for employment	SOC4
Poverty and social inequality Farmers are poor/net farm income	To reduce social inequality	SOC5
Socioeconomic inequality and conflicts Limited research studies applicable to national development Centralised natural resource management gaps		
Immigration-led changes Social welfare, networks and public consultation in national development Rapid urbanisation and plural society	To encourage a sense of community belonging and welfare	SOC6
National security threats	To reduce crime	SOC7
Economic		
Economic competitiveness potential Low productivity of agricultural produces and Lack of supporting technology	To reduce economic inequality	EC1
Income gaps according to rapid urbanisation		
Green economy challenges	To promote a green economy	EC2
Supporting Infrastructure, cooperative enterprises, and fair tax issues Research management gaps Unclear policy on science/ technology development Limited research applicable to national development Delayed national technology and innovation development Limited research findings applied with commercial sector Database integration and technology application Facing new challenges/ changes	To enhance economic growth	EC3

Source: Adapted from NESDB,2017,NESDB,2015,2017a,b,PCD,2017,Thai Constitution,2017;

Note: Bold text are issues that are not currently addressed through the SDGs

3. Results & discussion

3.1 SD as interpreted in Thailand's CC Master Plan 2015-2050

The vision of the plan focuses on building national climate-resiliency for CC adaptation and a low-carbon growth society, identified as part of SD. This suggests that the vision provides the components of sustainability, which the plan aims to achieve. 'Climate resilience' is interpreted in the Master Plan as the "capacity of all sectors in adapting to CC impacts". As such, sustainability and SD are considered important in the context of the CC Master Plan.

3.2 SA framework

An SA framework (Table 2) was established providing a set of 19 SOs associated with 40 sustainability indicators and 22 decision-making questions. The SOs aspire to resolve the issues identified in Table 1.

Table 2 SA framework for the Thai context

SOs' codes	Indicators	Decision making criteria ('it' = the CC Master Plan)
ENV1	Total natural resources rents (% of GDP)	Will it help enhancing natural resources?
	Washed-up rare sea species	
	Floating plastic debris density	
	Trespassed forest area	
	Threatened species	
ENV2	Water quality index	Will it support the improvement of surface water quality?
	Air quality index	Will it contribute to air quality improvement?
ENV3	Solid waste generation rate (kg/capita/day)	Will it help reducing household waste?
ENV4	% municipal waste recycled, composted, recovered as energy	Will it promote waste recycling practice?
	% industrial hazardous waste treated (by method of treatment)	Will it help increasing the percentage of proper treatment of hazardous waste?
ENV5	Number of provinces annually affected from: Flood, Landslides, and Droughts.	Will it help reducing CC impacts?
ENV6	CO ₂ emissions per capita (tonnes CO ₂ /person)	Will it support GHG emissions reduction?
	GHG emissions per year (tonnes CO ₂ equivalent)	
ENV7	Volume of water use by industry (m ³ /day)	Will it help reducing the use of industrial water?
	Final energy consumption by economic sectors	Will it contribute to reducing energy consumption by economic sector?
ENV8	Final Energy Consumption Per Capita	Will it help reducing energy consumption?
ENV9	Water availability	Will it contribute to water resource sustainability?
	Proportion of the population with access to clean drinking water (%)	
	Total water withdrawal	
	Total renewable water resource per capita (m ³ /inhab./year)	
SOC1	Human Achievement Index	Will it help promoting the population skills, including digital literacy skill?
SOC2	Household internet access (%)	Will it support improving accessibility to technology?
SOC3	Malaria incidence per 1,000 population	Will it support the improvement of health and well-being among the population?
	Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations	
	Tuberculosis incidence per 1,000 population	
	Death rate from road traffic injuries	
	Healthy Ageing (%)	
SOC4	Unemployment rate (%)	Will it support the improvement of employment opportunity?
SOC5	Poverty Gap Index (%)	Will it help reducing social inequality?
	Poverty line (Baht/ capita/ month)	
	Proportion of poor households (%)	
SOC6	Proportion of the population voting in local elections)	Will it help boosting a sense of community belonging & welfare?
	% of households taking part in community activities	
SOC7	Criminal offense cases (annually)	Will it contribute to reducing crime?
EC1	Income per capita among the bottom 40% of the population and the total population	Will it help reducing gaps of income distribution?
	Gini co-efficient of inequality	
	Annual resources allocated to promoting cooperative enterprises	
EC2	Green Growth Economy Index (GGEI) of Thailand	Will it help promoting a green economy?
EC3	Labour productivity index	Will it help enhancing economic growth?
	Global competitiveness Index (GCI)	

3.4 Sustainability of Thailand CC Master Plan 2015-2050: Impacts of proposed policy areas on SOs

The Master Plan is expected to dictate climate actions in Thailand in the coming decades, and challenges in operationalising these required actions are expected. This is because any long-term implementation plan can experience positive or negative changes over time, and success relies on collaboration between the relevant authorities, which could be problematic. Conducting SA of the plan can help to ensure the plan delivers SD outcomes through identifying and suggesting fixes for identified issues.

The findings show that the majority of the core aims of the CC Master Plan are compatible with the SOs in all of the three aspects: environment; social; and economic. Many neutral compatibilities are also identified. However, a few of the core Master Plan policies conflict with socioeconomic SOs. The assessment is briefly summarised in **Table 3**.

Table 3 Impacts of proposed policy areas on SOs

Core aims/ SOs	Environmental impacts	Social impacts	Economic impacts
Building resilience for CC adaptation	+2 (ENV1, ENV2, ENV5, ENV9)	+1 (SOC3, SOC5)	+1 (EC1, EC3)
Reducing GHG emissions	+2 (ENV2, ENV5, ENV6, ENV7, ENV8)	+1 (SOC3, SOC5)	-1 (EC3)
	+1 (ENV3,4)		
National CC capacity building	+2 (ENV2, ENV 5, ENV6, ENV7,)	+1 (SOC3)	-1 (EC1)
	+1 (ENV8, ENV9)	-2 (SOC5)	
		-1 (SOC7)	

Note: +2 = (strong positive), +1 = (positive), 0 = (neutral), -1 = (conflict), -2 = (strong conflict)

Environmental impacts

The findings highlight that the policies present positive impacts on environmental aspects, mainly in terms of mitigating CC impacts and GHG emissions, improving environmental quality, and encouraging sustainable production & consumption.

Social impacts

The core aims of the plan focus on mitigating social impacts; i.e. social inequality, health and well-being, which may be the consequences of CC. However, in the longer term, proposed policy related to technology development within the core aims, such as applying an electric smart grid network at national level, may lead to some negative social impacts, e.g. social inequality on accessing the service and data or privacy protection (Tuballa and Abundo,2016,Iqtiyanillham et al., 2017). This means further assessment on relevant issues is required.

Economic Impacts

The policies may have positive economic impacts, e.g. reducing economic inequality by providing measures to secure damages in agricultural sectors that may be affected by CC disasters. The policies also support health and well-being protection from CC disasters, which indirectly help to reduce health treatment costs. In addition, promoting ecological tourism could help to promote a green economy and enhance economic growth. However, challenges in achieving targets for GHG reduction and reduced energy intensity may not fully support the enhancement of national economic growth. This will likely lead to trade-off decision-making in practice.

4. Conclusions

The SA framework developed here is a good starting point for assessing sustainability at the national level in Thailand. It is a preliminary study, as such, it has not involved a wide range of stakeholders, which is usually recommended to achieve an effective SA framework. The framework has established a viable set of sustainability indicators for which data are required at the national

scale. Nevertheless, incomplete data and database accessibility were limitations in this analysis. Interconnections between relevant database systems and collaborations between authorities are required to strengthening the operationalisation of SD in the future. Concerning Thailand's CC Master Plan 2015-2050, this SA framework has shown its capability to identify sustainability issues that should be addressed to achieve sustainability as defined in the national SD agenda.

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