Institutional Analysis for Government Organizations Involved in Policy Development and Implementation:
A Case Study of Energy-from-Waste Targets in Thailand's 2015 Alternative Energy Development Plan

by

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A dissertation submitted to the Engineering Course, Department of Engineering,

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For the degree of Doctor of Philosophy

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September 2019

ABSTRACT

To satisfy both municipal solid waste (MSW) management and diversification of energy resources problems, conversion of MSW into energy-from-waste (EFW) products is considered as the potentially efficient solution.

The Thai government has been trying to encourage the development and investment in EFW; however, there are various obstacles and limitation restraining such development and investment.

One important obstacle of EFW development which was realized by the government, but did not receive much attention is the ineffective cooperation among relevant government organizations.

In Thailand, adopting renewable energy technologies is not easy without support from the government as such technologies are complex and difficult to compete with conventional energy technologies in terms of profits for investment and development. To this end, the relevant government organizations have to develop and implement the public policies supporting this type of development and investment effectively for the long-run benefits and sustainability of the national environment.

The Alternative Energy Development Plan (AEDP) 2015 is one of the public policies of the Ministry of Energy, which is established to support the development of renewable energy, especially EFW. To accomplish the EFW targets, it is necessary to enhance the cooperative policy works among relevant organizations, especially the Ministry of Natural Resources and Environment and the Ministry of Interior who play an important role in controlling MSW generation rate and operating MSW management system, including the selection of treatment methods for the collected MSW.

It is believed that when relevant government organizations can conduct policy works effectively and corporately, Thai EFW will fully develop and the true value of EFW will be discovered. For this reason, this study aims to improve the cooperation among such organizations through institutional analysis approach. The influences of

institutions on rules and norms that control or constraint actors to decide and act corporately should be studied. The Institutional Analysis and Development (IAD) framework was used as an analytical tool to analyze the information obtained from the in-depth interview with government officials who directly involve and contribute in the AEDP 2015 and relevant policies as well as the governmental documents.

The objectives of this study are 1) to identify conditions of actors in conducting policy work effectively; 2) to examine the internal structures of situations constraining actors to work together; 3) to specify different extents of cooperative interaction generating under different ideals situations; and 4) to analyze external impacts on actors and action situations and how to alleviate such impacts.

Regarding the analytical units in the IAD framework, first, the actors are analyzed based on the concept of policy capacity. The variables of actors from the IAD framework are merged with the analytical framework of policy capacity. Then the policy capacity of individual actors was analyzed. The sufficient and insufficient policy capacity of actors were then identified.

Second, the internal structures of situation are examined based on the set of variables state in the IAD framework. The lack of information and the imbalance between the controls of actors over the expected outcomes were identified as the obstacles that discourage actors to cooperate with others.

Third, the concept of cooperation intensity was adopted to specify different extents of cooperative interactions. The five levels of cooperation intensity which reflect through actors' collaboration in 1) pursuing common goals and mutual benefits; 2) pooling resources; 3) sharing responsibilities; 4) synchronizing activities; and 5) monitoring partners were proposed as guidance for examining current situation and planning for future development as well as the ideal internal structure of situations matching individual levels of cooperation intensity. Comparing the actual and ideal situations, then the obstacles for each level of cooperation intensity were identified.

Fourth, the exogenous variables which are categorized into three groups of biophysical conditions, attributes of community, and rules-in-use influencing actors

and structure of situations were analyzed. Focusing on rules-in-use, the three key rules constrain actors are information rules, aggregation rules, and scope rules. The constraints from these key rules were used to explain the obstacles in the different levels of cooperation intensity.

Finally, the evaluative criteria were proposed as the indicators to show that actors are driving and maintaining their agreed cooperative interactions. The criteria are 1) effective communication; 2) shared motivation; and 3) capacity to joint actions. Additionally, the key elements that initiate and maintain the individual criteria were proposed as well.

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ACRONYMS

3R	Reduce, Reuse, Recycle
AEDP	Alternative Energy Development Plan
DEDE	Department of Alternative Energy Development and Efficiency
EEDP	Energy Efficiency Development Plan
EFW	Energy-from-Waste
EIA	Environment Impact Assessment
GDP	Gas Development Plan
GHG	Green House Gas
IAD	Institutional Analysis and Development
ktoe	Kilo Tons of Oil Equivalent
MoEN	Ministry of Energy
MoNRE	Ministry of Natural Resources and Environment
MoI	Ministry of Interior
MSW	Municipal Solid Waste
MSWMS	Municipal Solid Waste Management System
NGOs	Non-Government Organizations
NSWMP	National Solid Waste Master Plan
ODP	Oil Development Plan
PCD	Pollution Control Department
PDP	Power Development Plan
SWM	Solid Waste Management
SWMS	Solid Waste Management System
tCO_{2eq}	Tons of Carbon dioxide Equivalent
TIEB	Thailand Integrated Energy Blueprint

CHAPTER 1
INTRODUCTION

1.1 Current situation and research motivation

Thailand is one of developing countries facing problems in balancing economic growth along with environmental protection. The country has consumed energies increasingly to drive activities of economic and daily living. More than 60% of energy supplies are obtained by imported fossil fuels. Besides the energy consumption, these activities also generate a huge amount of municipal solid waste (MSW), which in turn, affects the environment and hygiene of the society.

To cope with the problems, the Thai government has selected the strategy in converting MSW into energy-from-waste (EFW) products as it is considered as the most potentially efficient approach that can satisfy both MSW management and diversification of energy resources. The development and application of EFW technologies have been promoted and supported by different government organizations through relevant public policies. Although the strategy is ideally suitable solutions, sustainable implementing the EFW technologies in practice is not that easy.

Different researches and studies have been conducted to improve such technologies implementation from various aspects; for instant, the feasibility of technologies (Makarichi, Jutidamrongphan, & Techato, 2018; Menikpura, Sang-Arun, & Bengtsson, 2016; Srisaeng, Tippayawong, & Tippayawong, 2017); the impact of inefficient systems for solid waste management (SWM) (Boonpa & Sharp, 2017; Jutidamrongphan, 2018; Sukholthaman & Sharp, 2016); and the influences of renewable energy policies (Blazquez, Fuentes-Bracamontes, Bollino, & Nezamuddin, 2018; Cheevapruk et al., 2017; Harjanne & Korhonen, 2019).

Focusing on renewable energy policies, they are the tools used by the government to initiate and encourage the development and investment of EFW. Similar to the applications of technologies, policies visibly exert a significant influence on the

development of renewable energy and investment in this resource; therefore, active involvement and effective cooperation among relevant government organizations are the major preconditions for the transition to renewable energy utilization (Mega, 2019). It has been reported by the Ministry of Energy (MoEN); however, the ineffective cooperation among relevant government organizations is the important obstacle of EFW development in Thailand (Ministry of Energy, 2008).

Although the government has realized such obstacle, the efforts put forward for EFW development mainly focus on the elimination of MSW management and EFW technology limitations rather than the improvement of collective and corporative policy works among relevant government agencies. Such endeavors disregarded the importance of effective cooperation to conduct policy works, which in turn, obstruct the sustainable and holistic development for EFW and its relevant public policies.

In particular, energy policy creation and enactment in accordance with waste management directives is required given that government organizations involved in energy and waste management must cooperate to ensure the feasibility of EFW development and investment and to derive value from these projects. Unfortunately, such partnership has not arisen in the Thai context, with ineffective cooperation among governed institutions weakening and impeding EFW development in the country (Chenboonthai & Watanabe, 2019).

Nevertheless, an optimistic outlook can be derived from Thai government organizations' realization of the negative effects of their inability to cooperate and their efforts to deal with this obstacle. This impediment, as stated in AEDP, can be resolved by searching for a host that will support the advancement of EFW programs, fostering integrated cooperation among relevant agencies, and developing a database system for data sharing among such entities (DEDE, 2015; Ministry of Energy, 2008). The difficulty now is that Thai government organizations have not released analytical or research results on the causes of ineffective cooperation; nor have they provided details regarding the proposed improvements to collaboration or presented clearly defined steps in implementing these enhancements. This challenge points to the critical need for comprehensive explorations

of the problem and systematic approaches to improving cooperative policy working among government organizations, especially MSW management and energy sectors.

1.2 Background

1.2.1 Thai MSW management situations

In Thailand, not only the energy demand that increases in parallel to the growth of economic, population, and urbanization, but also municipal solid waste generation and solid waste management problems (Visvanathan & Trankler, 2003). The total MSW amount and the generation rate during 2008-2018 reported by the Pollution Control Department (PCD) (2019) are illustrated in Figure 1.2. To cope with these problems and encompass vast amount of daily MSW generation, numerous strategies, such as 3R (Reduce, Reuse, Recycle), SWM system improvement, and financial support are applied by the government to encourage cooperation and participation from citizens and private sector in dealing with MSW issues (Chiemchaisri, Juanga, & Visvanathan, 2007). PCD (2016) defines MSW as "any solid waste generated from community activities, e.g., residential (household), commercial and business establishments, fresh market, institutional facilities, and construction and demolition waste, excluding hazardous and infectious wastes". Similar to other developing countries, organic waste is accounted for the largest composition in the collected MSW, followed by plastic and paper (Chiemchaisri et al., 2007).

1.2.2   Thai energy provision

At present, Thailand imports energies around 60% of the total energy consumption demand and tends to increase (Figure 1.1) (ONEP, 2017). The major shared of the imported energies is crude oil which is accounted for around 80%. For decades, Thailand has been suffering by economic crisis and oil price fluctuation due to the high dependency on imported fuel. To reduce the dependency on imported energy and increase the security of energy provision, the government has been trying to establish policies to encourage the development of domestic energy resources and renewable energy technologies.
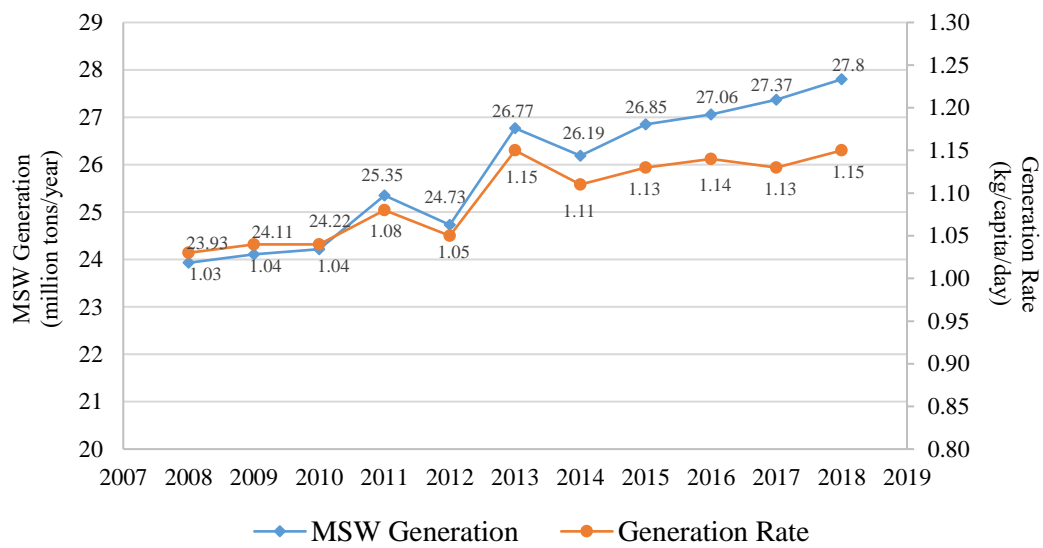
Figure 1.1 Trend of MSW generation and generation rate from 2008-2018
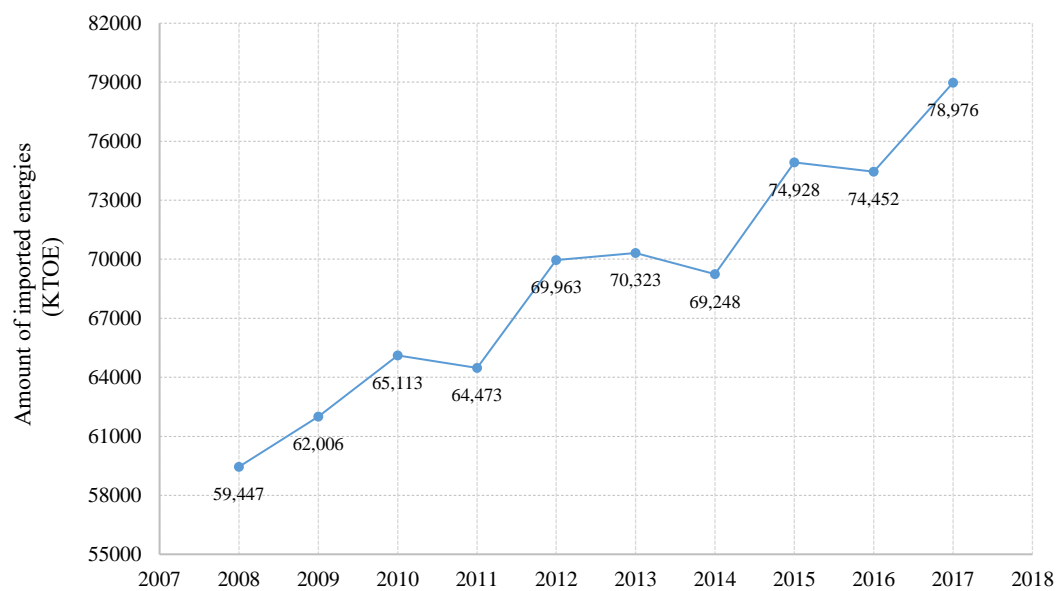
Figure 1.2 Statistic of Thai imported energy during 2008-2018

1.2.3 Alternative Energy Development Plan (AEDP) 2015

AEDP was first launched in 2008; however, Thailand is currently implementing the third version of the plan which is called AEDP 2015. Although AEDP is usually revised and updated when the government is changed, the main objectives in developing domestic energy resources and reducing dependency on imported energies still remain. The focus points of policy revision were mainly involved with the length of the policy and the adjustment of targets due to the change of national and global situations and trends. The ultimate targets and implementation period of each version are compared in Table 1.1.

Table 1.1 Comparison of policy target and implementation period of different AEDP versions

Year		Duration (years)	Forecasted final energy consumption demand at the end of AEDP (MW)	Alternative energy consumption target	
Start	End			MW	%
2008	2022	15	99,838	24,960	25
2012	2021	10	97,300	19,460	20
2015	2036	20	131,300	39,390	30

The revision of AEDP 2015 has been conducted in accordance with the Thailand Interrogated Energy Blueprint (TIEB) which is established to cope with all energy issues of the country during 2015-2036 (DEDE, 2015b). The MoEN has enacted the TIEB with concerns in 1) energy security to sufficiently serve energy demand and diversify energy resources, 2) economy to manage affordable and reasonable energy costs, and 3) ecology to encourage renewable energy and reduce environmental impacts from energy production.

Then, five energy plans which are 1) Power Development Plan (PDP), 2) Energy Efficiency Development Plan (EEDP), 3) Alternative Energy Development Plan (AEDP), 4) Oil Development Plan (ODP), and 5) Gas Development Plan (GDP) have been established to serve the TIEB.

Focusing on AEDP 2015, this plan has been developed with the main objectives in encouraging the development of domestic renewable energy resources and reducing dependency on imported fossil fuels. Thailand aims to develop renewable energy production with the full potential and concerns of the appropriate and benefits in social and environmental dimensions. The interesting point for AEDP 2015 is that the plan has promoted EFW as the most important target needed to be achieved.

At the end of the plan in 2036, Thailand will produce 30% of final energy consumption demand from renewable energy resources. For EFW targets, it is expected that the country will produce 500 megawatts of electricity and 495 ktoe of heat from MSW. The benefits gaining from the successful AEDP 2015 is the replacement of fossil fuel consumption demand around 40,000 kilotons of oil equivalent (ktoe) and reduction of greenhouse gas (GHG) emission around 140 million tons of CO_2 equivalent (tCO_{2eq}) (DEDE, 2015a).

Concerning the benefits obtained from the successful implementation of AEDP 2015, the average cost of renewable energy production based on the levelized cost of energy (LCOE) is forecasted to reach 17.4 million baht/ktoe, and the average price of fossil fuels is estimated at 15 million baht/ktoe (DEDE, 2015a, 2015b). However, the advantages that Thailand is expected to gain in terms of the mitigation of GHG emission through the use of renewable energy for electricity and heat generation are is 2,350 and 4,120 tCO_{2eq}/ktoe, respectively (DEDE, 2015a). Additionally, around 16,060,000 tons of MSW per year is used to produce energy rather than having such waste sent to landfills or treated through other methods. Aracil et al. (2018) estimated that landfill treatment for a ton of MSW can produce 0.454 tCO_{2eq} of GHG emissions, indicating that Thailand can reduce its GHG emissions to around 9,944,728 tCO_{2eq}. Furthermore, at a carbon credit price of 300 baht/tCO_{2eq} (Weekly carbon market, 2019), Thailand can acquire additional benefits valued at 1,168,346,000 baht. The projected costs and benefits of AEDP 2015 are summarized in Table 1.2.

Table 1.2 Estimated costs and benefits of achieving EFW targets in 2036

	Costs and Benefits	Million baht	Million USD	Calculations
Costs	Costs of EFW production	13,159.27	438.64	756.28 ktoe x 17.4 million Baht/ktoe
	Total costs	*13,156.27*	*438.64*	
Benefits	• Replacement fossil fuels usage by EFW	11,344.20	378.14	756.28 ktoe x 15 million Baht/ktoe
	• Reduction of GHG emission from replacing fossil fuels by EFW	796.05	26.53	[(261.28 ktoe x 2,350 tCO_{2eq}/ktoe) +(495 ktoe x 4,120 tCO_{2eq}/ktoe)] x 300 Baht/ tCO_{2eq}
	• Reduction of GHG in MSW treatment in landfills	2,187.37	72.91	44,000 tMSW/day x 365 day x 0.454 tCO_{2eq}/tMSW x 300 Baht/ tCO_{2eq}
	Total benefits	*14,327.62*	*477.58*	
	Total Benefits	**11,344.20**	**378.14**	total benefits – total costs

Notes: * 1 USD = 30 baht. ** An electricity generation of 500 MW is equal to 261.28 ktoe (DEDE, 2015a). The total EFW target is 261.28 ktoe of electricity + 495 ktoe of heat = 756.28 ktoe.

1.2.4 The three main government organizations involved in EFW development

Effective collective and corporately works and supports from the relevant government organizations are the key drivers for the achievement of EFW targets, especially among waste management and energy sectors. To this end, it is useful to understand the scopes of the roles and responsibilities of the main government organizations influencing the success of EFW development.

To simply depict the scope and responsibilities of the main relevant actors, the functional elements of the MSW management diagram is applied. Starting from MSW generation by

In order to achieve the EFW targets, effective cooperation and collective works from actors who involved in the control and management of MSW resource, the treatment and conversion process of MSW into energy, and the distribution of the produced energy to market are required. Therefore, it is necessary to understand the relevant situations, conditions, and how relevant actors decide and interact to support the EFW target development and implementation.
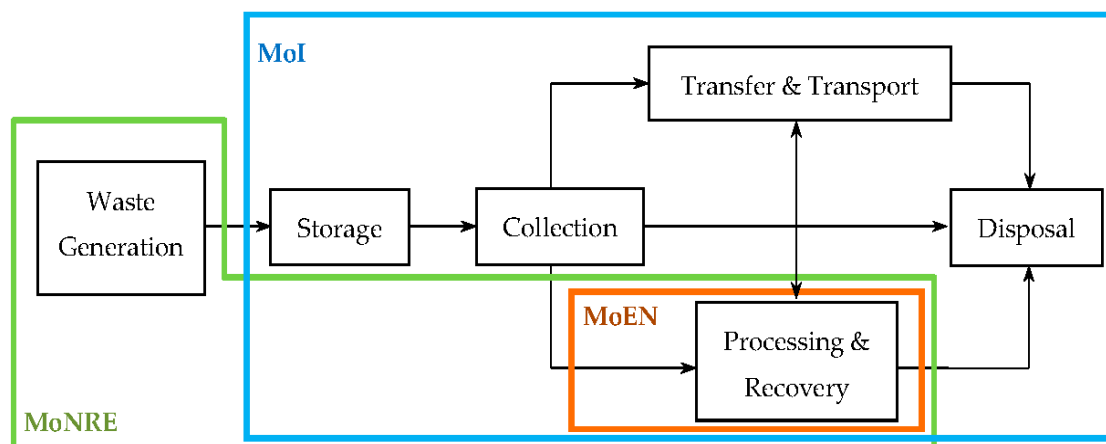
Figure 1.3 Scope of roles and responsibilities of different government organizations under functional elements in the solid waste management diagram

Following the functional elements in the SWM diagram as shown in Figure 1.3, the first main actor who involves in waste generation is the MoNRE. The ministry is responsible for the control of MSW generation rate that impacts the quantity MSW sent to treatment process; therefore, the MoNRE has launched the National Solid Waste Master Plan (NSWMP) (2016–2021) with the objectives to encourage 3R campaign and reduce the cumulative MSW from the key disposal sites and transform the waste into energy resource (PCD, 2016; Vassanadumrongdee & Kittipongvises, 2018). The campaign of 3R was promoted to reduce waste generation and increase waste separation. The ministry believes that this campaign directly benefits the national SWM system and EFW development.

The second actor is the MoI who is responsible for operating and managing the SWM system. With support from the MoNRE as the regulator and consultant, the two ministries together set up action plans and policies to manage the SWM system in accordance with the MSWMP. Besides the control over the SWM system, the MoI also has the authority to decide how to treat or manage the collected MSE, as the collected waste is considered as the properties of the MoI (OCS, 2017).

The third actor is the MoEN who steps in the SWM system towards supports and incentives promoted for the conversion of MSW into EFW products followed the direction stated in AEDP 2015. The ministry intends to attract and elevate the level of interest in EFW development and investment, especially from the MoI and private sectors.

1.3 Theoretical framework

1.3.1 Institutional Analysis and Development (IAD) Framework

To improve effective cooperation among government organizations for the successful development of EFW; therefore, it is important to understand and consider the existing institutions thoroughly (Imperial, 1999).

To examine institutional impacts on social and situation, the IAD framework (Figure 1.4) is counted as the suitable framework for the study because it is a generalized and systematic approach that provides a set of common basis necessary for analyzing institutional impacts, collective actions, and the relationship between outcomes and actor's decision to interact corporately with others (Imperial, 1999; Polski & Ostrom, 1999).

This framework is famous and widely used as it is simplified and compatible with a wide range of analytical techniques which can serve a better understanding in a particular situation. This framework was constructed on the basis of the effects of rules and norms that were determined from logical observations; it is useful in deriving a set of typical regulations that influence the different elements necessary for policy analysis (Rudd, 2004; White, Lunnan, Nybakk, & Kulisic, 2013). The framework also uncovers details of an action situation, thereby reinforcing our understanding of interactions among actors and the outcomes of such exchanges (Li, van den Brink, & Woltjer, 2016).

The IAD framework consists of exogenous variables, action arena, patterns of interaction, outcomes, and evaluative criteria. The concept of "action arena" is the focal unit where actors make decisions and interact with others under influences of exogenous variables, especially rules-in-use (Ostrom, 2011). Outcomes are the consequences of interactions among actors in the considering situation. When outcomes cannot satisfy objectives or expected goals, then the rules that control the action arena are needed to be adjusted. To this end, it is a challenge to find proper criteria to evaluate the outcomes.

Focusing on action arena as it is the first and the most important unit needed to be analyzed. It is described as a conceptual space where the key interactions occur (Polski & Ostrom, 1999). The action arena consists of (1) the actors/participant, referring to individuals or groups of corporations; and (2) the action situation, referring to the social space where actors interact (Ostrom, 2010; Polski & Ostrom, 1999). In other words, an action arena is the combination of a particular activity and the people who participate in such activity (Smajgl, Leitch, & Lynam, 2009).

Two sets of variables necessary for the analysis of actor and action situation are explained in the following sections. The details of actor and action situation variable are concluded in Table 1.3.
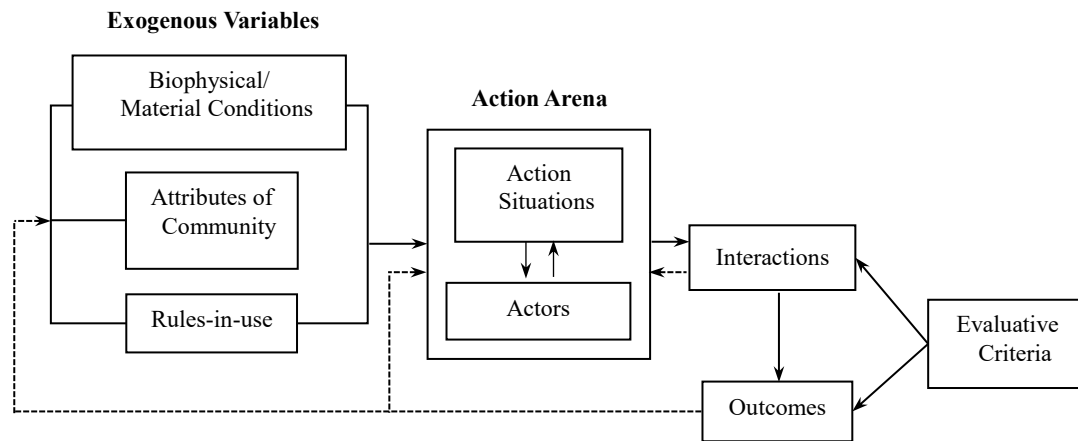
Figure 1.4 A framework for institutional analysis (Ostrom, 2010)

Table 1.3 Summarized actor and action situation variables in the IAD framework

Action Arena			
Action Situation		**Actor**	
Variables	**Definitions**	**Variables**	**Definitions**
Actors	Individuals and organizations who participate in the situation	Resources	The resources that an actor brings to a situation
Positions	The specific position to be filled by the actors	Valuation/ preferences	The valuation actors assign to states of the world and to actions
Actions	The set of allowable actions and their linkages to outcomes		
Information	The information of action situation available to actors	Information process	The way actors acquire, process, retain, and use knowledge contingencies and information
Control	The level of control each actor has over choices		
Potential Outcomes	The outcomes that are linked to individual sequences of actions	Selection process	The processes actors use for selection of a particular course of action
Costs and Benefits	The incentives and deterrents assigned to actions and outcomes		

1.4 Research objectives

The study aims to provide a deeper comprehension in current situations and the institutional obstacles that restrain effective cooperation of government organizations, which in turn, impede the successful achievement of the expected policy targets. In regard to the intention of solving ineffective cooperation, this study is conducted with the objectives:

(1) To identify conditions of actors in conducting policy work effectively

(2) To examine internal structures of situations constraining actors to work together

(3) To specify different extents of cooperative interaction occurring under the individual ideal situations

(4) To analyze the impacts of external factors and how to adjust such factors to facilitate the more effective cooperative interactions

1.5 Structure of dissertation

Following the analytical units in the IAD framework, the content of this dissertation is divided into eight chapters. Brief contents of individual chapters are explained as follows.

Chapter 1 provides an overview of the dissertation, the background of the study, research motivation, questions, and objectives.

Chapter 2 presents an overview of the methodological framework of the research. In this chapter, the methods to collect data and the concepts of qualitative descriptive analysis are presented.

Chapter 3 – 7 present analytical results of the individual analytical unit followed the IAD framework which is actors (chapter 3), action situation (chapter 4), patterns of interaction (chapter 5), exogenous variables (chapter 6), and outcomes and evaluative criteria (chapter 7).

Chapter 8 concludes the major findings, research limitations, as well as the implications of the study and recommendation for future research.

CHAPTER 2
METHODOLOGY

This research was conducted following the concept of qualitative analysis. The objectives of such study are to gain understanding in the underlying conditions or reasons to explain the causes of ineffective cooperation in developing and implementing EFW targets among the relevant government organizations and to find the suitable ways to improve cooperative interactions when such organizations have to work together under the policy process.

To this end, this research decided to analyze the problems by institutional analysis approach because such an approach provides better understanding of how rules and norms that control actors' decisions and actions are influenced by institutions.

The IAD framework was selected to conduct analysis in this study because it is a flexible, systematic, and simplified analytical tool which is widely used by numerous scholars for various field of studies. Additionally, such a framework provides common sets of variables necessary for the analysis of intuitional impacts and collective actions.

In order to use the IAD framework, it is important to acquire information and interpret such information for analysis. For this reason, this study has to scope the area of study, especially actors and situations and select data collection and data interpretation techniques that match the case study. The methodological details are described in the following sections.

2.1 Case study selection

This research selected cooperative working among the three main Thai government organizations directly involved in the development and implementation of EFW targets under AEDP 2015. These actors are:

(1) Ministry of Energy (MoEN)
(2) Ministry of Natural Resources and Environment (MoNRE)
(3) Ministry of Interior (MoI)

There are two reasons for selecting the case study. Firstly, to achieve the successful EFW development, effective policy works from on waste management sector or energy sector is not enough, but both sectors have to work together to integrate their policies or at least link their policies. Second, according to the previous version of AEDP, ineffective cooperation among relevant organizations was identified as one obstacle of EFW development which until now there is no serious attention to fine concrete and practical solutions for this problem. To fulfill this gap; therefore, the causes of such an obstacle should be intensively studied to find a way of improvement.

2.2 Data collection

The data used for analysis in this research was obtained through two ways, review of relevant government documents and in-depth interview with government officials who work in the three ministries. Based on responsibilities and involvement in the development and implementation process of alternative energy and MSW management policies, a snowball method was applied to identify and select the interviewees. Focusing on the richness of information from individual officials, nine staff from three ministries were interviewed. A semi-structured question was developed and adopted during the interview to examine the situation during the policy process. Government documents reviewed in this research included relevant policies, yearly government reports, and statistical records. The details of information acquisition are explained as follows.

2.2.1 Document research and literature review

The content of desk research is divided into two parts: (1) context of Thai government organizations in developing and implementing EFW targets under AEDP 2015 and related policies (Table 2.1), and (2) context derived from research literature reviews involving and supporting the advancement of IAD approach for institutional analysis of the case study.

Table 2.1 Sources of information related to EFW development

Organizations	Documents
MoEN	AEDP 2015
	AEDP 2015 Action Plan
	Renewable and alternative energy annual reports
MoNRE	The National Solid Waste Management Master Plan (2016–2021)
	Waste management annual reports
	Booklet on Thailand State of Pollution 2018
MoI	Action Plan "Thai Zero Waste" (2016–2017)

2.2.2 In-depth expert interview

The in-depth interviews were carried out in September 2017 with nine government officials working in three ministries of the Thai government. In accordance with the basic principles of interpretative phenomenological analysis (Smith & Osborn, 2009), the interviewees were thoroughly screened because this research attached more weight to the significance and richness of information than to the number of respondents.

All the selected interviewees were evaluated as having relevant roles, responsibilities, and solid contributions to the AEDP policy process and were determined as having trustworthy work experiences and specialized expertise. Details regarding the interviewees and their contributions to AEDP 2015 and/or EFW management are shown in Table 2.2.

The interviewees from the MoEN were selected because they were involved in AEDP 2015 since it was in the agenda-setting step and until it was approved as a master plan. The interviewees are involved in analyzing information and situations, and coordinating both internal and external organizations for identifying the policy problems, setting up policy assumptions and scenarios, and evaluating the alternative choices. During the interview, the questions focused on the policy process and cooperation, especially when AEDP 2015 was in the agenda-setting and policy formulation step. The MoEN staff were also asked about the problems and difficulties faced during the process and the solutions, the requirements or support necessary for policy works, and how the policy could be improved.

Similarly, the interviewees from the MoNRE were involved in setting up the National Solid Waste Master Plan form the beginning until it was approved. Moreover, they also worked with MoI officers to set up action plans for effective MSW management. Interviewees from the MoNRE were asked questions focusing on their cooperation with the MoEN and MoI, policies and plans to support AEDP 2015, and the problems faced for the cooperation of all actors.

The interviewees from the MoI were selected because they worked in a city municipality to manage and improve the SWM system. Moreover, they also worked closely with local people through various policy activities. The interviewees from the MoI were mainly asked about their opinions about AEDP 2015, actions to support AEDP 2015, the solid waste management system (SWMS) related to EFW, problems during work, and the required support.

Table 2.2 Organizations, number of informants, and their contribution in policy process

Organizations	Contributions	Number of Interviewees
MoEN	Acquiring and analyzing information to set up the agenda Comparing alternative scenarios and making decisions in the formulation of AEDP 2015 Cooperating with relevant organizations to implement and monitor AEDP 2015	5
MoNRE	Sharing information and suggestions for the development of AEDP 2015 Formulating the National Solid Waste Master Plan Supporting the Zero Waste Action Plan Approving funding for local administrative organizations and EIA for EFW plants	2
MoI	Sharing information and suggestions for the development of AEDP 2015 Operating MSW management systems Investing in EFW plants	2

2.3 Data analysis

2.3.1 Qualitative descriptive approach

Qualitative description is a quantitative research approach mainly used for describing perception and experiences of the world and its phenomena from informant's view in a simple manner (Loeb et al., 2017; Neergaard, Olesen, Andersen, & Sondergaard, 2009). This technique is commonly used for descriptive studies as it is useful for research questions to specifically discover who, what, and where of events (Kim, Sefcik, & Bradway, 2017).

Qualitative description is flexible, thus, it can be combined with various methods, techniques, and a number of studies. The focus point of the approach is to obtain rich data and increase understanding of the phenomenon of the investigated case studies (Kim et al., 2017). This approach is different from other qualitative analysis approaches because the study results obtained through qualitative descriptive analysis

present a vibrant and straight description of events and perceptions through weak inference. Moreover, this approach interprets and represents the collected data in the language similar to the informant's own language which is considered as the unique characteristic of the approach (Neergaard et al., 2009; Sandelowski, 2000, 2009).

1) Study design of qualitative description

To design a qualitative descriptive study, it is involved with selective but logical and well-considered techniques for sample selection and data collection, analysis, and presentation (Sandelowski, 2000). The qualitative description analysis can provide straight and undecorated answers to questions specially related to practitioners and policymakers. Following the approach, the current study can obtain answers to the questions in 1) what are the current institutional arrangements exists in the process of AEDP 2015 development and implementation, 2) what are the institutional conditions obstructing the policy process and deterring the successful achievement of policy targets, and 3) what are the institutional solutions or directions that can improve the effective cooperation among government organizations under policy development and implementation process.

Regarding the studies by Kim et al. (2017), Neergaard et al. (2009), and Sandelowski (2000), the typical design features of the qualitative descriptive study are concluded and explained as follows.

2) Theoretical framework

Qualitative descriptive study is constructed based on the perspective of naturalistic inquiry which always uses techniques allowing the considering phenomenon to present itself naturally. For this reason, variables are not pre-selected, manipulated, and committed to any theoretical view.

However, it is possible to combine qualitative description with various techniques or approach to generate a mixed study method for a particular study (Tashakkori & Teddlie, 1998).

3) Sampling and data collection

Similar to the general qualitative study, the richness in the information of the samplings is the ultimate goal. As a result, the selection of any purposeful sampling techniques that is reasonable for the study is the obligation of the researcher.

When the sampling technique is selected, usually, data collection techniques revolve around minimally to moderately open-ended interviews with the individual and/or focus group. Data collection techniques may also include observations of targeted events and the examination of documents and artifacts.

4) Data analysis and result report

Similar to other qualitative analysis techniques, the principle of content analysis is normally used for qualitative description. To conduct qualitative content analysis, researchers modify data process to generate new insights about the analyzed data. The efforts are put forward to understand not only the explicit but also the implicit content of data.

Straight description of the phenomena and/or perceptions which is organized in the original language is the expected result from qualitative descriptive studies. To this end, comprehension and accuracy of information are crucial because the study results are at the same time valued as end-product and as entry points for further studies.

2.4 Research scope

Regarding the ineffective cooperation among government organizations in the development of EFW reported by DEDE, MoEN (2015a; 2008) and the lack of study to support a more comprehensive understanding and improvement of effective cooperation among government organizations, this research places the focal point on cooperative working among the main Thai government organizations involved in the EFW targets development and implementation under AEDP 2015.

The study particularly focuses on cooperative working behavior and level of cooperation intensity among government organizations rather than the quality of policy and appropriateness of policy targets. Additionally, the participation and information from stakeholders (e.g. local people, private sectors, or NGOs) were excluded as they are counted as the important information for government organizations to consider and bring it as their own resources to the situations.

CHAPTER 3

ACTORS
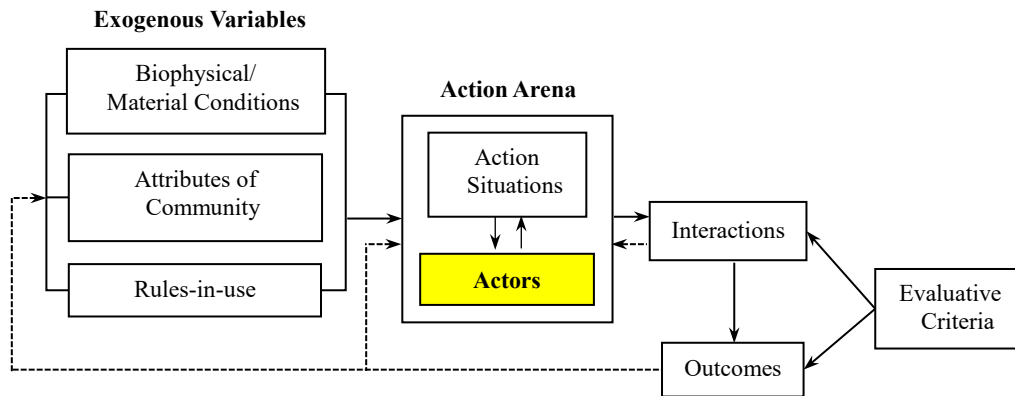
Summary

This chapter studies the challenges and conditions of the relevant government organizations (actors) when they are required to conduct policy works as well as cooperate with different organizations to serve targets of other's policy. To analyze the conditions of actor, the concept of policy capacity and its analytical framework which described the conditions to conduct policy process effective based on skills and resources of actors are adopted and merged into the analysis of actors in the IAD framework. The elements of policy capacity at the organizational and systemic level are categorized into three groups (skills, resources, and processes) which are adopted from the variables of actors in the IAD approach. Then, the results from the in-depth interview were examined through the modified analytical framework to examine the policy capacity of actors in the case study.

3.1 Introduction

To accomplish the EFW targets under AEDP 2015, the government organizations involve in MSW management and renewable energy sectors have to work collectively and corporately. Herein, such actors are the MoEN, MoNRE, and MoI.

These actors are required to support each other and conduct policy works together as well as respond to their own duties and policies. To this end, individual actors have to balance their own interests and allocate resources to serve both their own responsibilities and corporative interactions with others. Such requirements, sometimes cause difficulties and hesitations for actors in making decisions to work with others. These constraints can be considered as the conditions of actors to conduct policy work effectively which influence the effectiveness of cooperation among actors. Such actors' conditions can be described as the policy capacity of actors (Wu, Ramesh, & Howlett, 2015).

To improve the effective cooperation and support among government organizations; therefore, it is important to understand the capacity of actors (D. Gleeson, Legge, O'Neill, & Pfeffer, 2011) as well as the institutions affecting the decision-making of actors to interact in the particular situations (Polski & Ostrom, 1999).

To fulfill the improvement of government organizations in conducting their own policy works and cooperating with others, which in turn, enhance the development of EFW, this study was conducted with the objectives:

(1) to analyze actors' conditions influencing effective policy works
(2) to identify the sufficient and insufficient policy capacity of the main actors for further improvement

3.2 Background

3.2.1 Actors

According to the IAD framework, actors are identified as one important component of the action arena. Such actors who interact in a situation can be seen as a single individual or as a group of corporate actors (Ostrom, 2010). In order to analyze actors, the framework facilitates analysts by identifying four important variables influencing actors which are:

(1) Resources that an actor brings to a situation;

(2) Valuations or preferences which refer to the wishes of actors;

(3) Information processing which is the way actors acquire, process, retain, and use knowledge and information; and

(4) Selection processes which actors use to select a particular course of action

These variables are beneficial for analyzing the decision-making capabilities of actors in a particular situation which result in the patterns of interaction among actors (Polski & Ostrom, 1999).

Although the provided variables of actors are useful for analysis of actors, the proposed variables are broad because in general actors who associate in the situation are from diverse sectors under different conditions and limitations.

As all of actors focused in this study is government organizations; therefore, the scope for actor analysis can be conducted in a more specific and intensive manner which related to the conditions supporting the development and implementation of policy works.

3.2.2 Conceptualization of policy capacity

To sustainably and successfully develop EFW, it is important for the relevant government organizations to conduct policy works together. These actors are required to conduct research and analysis, design and recommend, clarify arguments and values, and provide strategic advice and mediation together (Wellstead, Stedman, & Lindquist, 2009). Individual actors; however, have their own responsibilities, duties, and routine

works needed to be operated. Consequently, actors face the challenges to balance their interests and cooperative interactions to support others. To this end, it is crucial to understand the conditions of actors to conduct policy works effectively which is described as the policy capacity of actors (D. H. Gleeson, Legge, & O'Neill, 2009).

Understanding actor's policy capacity is important for the development of policy works as it is considered as a precondition for policy success and superior policy outcomes (Howlett & Ramesh, 2014; Woo, Ramesh, & Howlett, 2015). This concept is broadly used for policy assessment, especially for the government (Wu, Ramesh, & Howlett, 2018).

Although analysis of policy capacity is widely used, its definition and analytical concepts are still unclear and under discussion (Hughes, Gleeson, Legge, & Lin, 2015). Numerous scholars, including Honadle (1981), define it as "the ability to anticipate and influence change, make informed intelligent decisions about policy, develop programs to implement policy, attract and absorb resources, manage resources, and evaluate current activities to guide future actions". For Cummings and Nørgaard (2004), policy capacity refers to "the intellectual and organizational resources of the state", while Painter and Pierre (2005) define policy capacity as "the ability to marshal the necessary resources to make intelligent collective choices and set strategic directions for the allocation of scarce resource to public ends". Howlett (2009) considers policy capacity as "the ability to frame options, the application of both qualitative and quantitative research methods to policy problems, and the effective use of communications, and stakeholder management strategies".

In addition to the unclear concept and definition of policy capacity, the identification of its components constitutes policy capacity. The understanding of how skills and resources can be combined in policy capacity is also required because they result in the limited use of policy capacity (Hughes et al., 2015).

To overcome such limitation and argument, Wu et al. (2015) proposed an analytical framework for policy capacity by defining policy capacity as the set of skills and resources (or competencies and capabilities) necessary to perform policy function. The framework is presented in the form of a 3 × 3 matrix model which consists of

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three skills or competencies (analytical, operational, and political) at three different levels of resources or capabilities (individual, organizational, and systemic). As a result, nine components of policy capacity were generated. Moreover, some specific indicators of the policy capacity components were also suggested. The brief definitions of individual skills and levels of resources are described in Table 3.1.

Table 3.1 Definitions of skills and levels of resources for policy capacity by Wu et al. (2015)

Combination of policy capacity	Terminology	Definitions
Skills	Analytical	The abilities required to make a technically sound policy
	Operational	The abilities needed to guarantee that the policy is implementable
	Political	The abilities to gain and sustain social and political supports for policy works
Levels of resources	Individual	Resources of individual policy staff
	Organizations	Resources of an organizations or agency
	Systemic	Resources among relevant organizations

3.2.3 Categorization of policy capacity elements

1) Factors contributing to policy capacity

Policy works are mainly accomplished by government organizations who play an important role in the policy process (Peters, 2015). To conduct policy process effectively, Wu et al. (2018) identified the main tasks of an organization in supporting policy works at the individual level which are;

(1) To acquire and process information necessary for individual policy works

(2) To collect and disseminate information among organizations

(3) To mobilize and deploy the resources necessary for performing policy works

(4) To communicate and cooperate with relevant organizations, and

(5) To evaluate the policy

To understand policy capacity, an organization has to know the factors contributing to its own policy capacity. To this end, Wu et al. (2018) identified some factors and indicators that could be used as guidelines to analyze policy capacity in the analytical framework. Grounded from the analytical framework and its factors, results and suggestions from relevant empirical researches were added to enhance the details and understanding of factors influencing policy capacity which are presented as follows.

As suggested by Howlett, Wellstead, and Craft (2017), other factors that contribute to policy work should be considered in order to gain a better understanding of policy capacity's impact on the policy process. To improve the analytical framework in accordance with the main tasks of an organization under the policy process, this study reviewed several empirical articles related to policy capacity from different aspects to extend the variety of policy capacity factors at the organizational and systemic level, and they are summarized below.

Adequate and timely information and evidence are the most important resources for individuals to perform policy work effectively; moreover, it is considered as an indicator for policy capacity evaluation (Gleeson et al., 2009; Gleeson et al., 2011). For this reason, an organization is responsible to acquire and process the required information and evidence to serve policy works at the individual level, which Wu et al. (2018) considered to be organizational analytical capacity. To exercise organizational abilities in analysis, an organization requires resources, including *adequately skilled staff, time, and tools for analysis and evaluation* (Gleeson et al., 2009; Ramesh, Howlett, & Saguin, 2016; Wu et al., 2015). Furthermore, a systemic analytical capacity, described by Wu et al. (2018) as an *information system* that supports an organization to manage information systematically, is also required. With an effective and transparent information system, an organization can collect, process, evaluate, and disseminate the information necessary for policy work within and across the organization effectively (Angel, 2015). Moreover, an organization can create *channels for stakeholders* to participate in the information system for benefits in system development (Angel, 2015).

In addition to the abilities to acquire and processing information and evidence, an organization is also required to have *the ability to manage the required resources*

necessary for effective policy implementation. Consequently, an organization requires *leadership skills*, described as performance in planning, staffing, budgeting, delegating, directing, coordinating, and managing the required resources and supporting the policy works (Gleeson et al., 2009; Hughes et al., 2015; Wu et al., 2018). In order to implement policy effectively, Peters (2015) identified *information* as an important resource, because an organization can use its information to negotiate for other required resources, while Hughes et al. (2015) considered *financial and human resources* as the important resources. Although the important resources might differ, *external and internal coordination processes* for obtaining the required resources are similarly important for every organization (Wu et al., 2018). In addition, organizations could implement their policy more effectively with support from a *system that helps them manage cooperation and relationships*. Wu et al. (2018) called this operational capacity at the systemic level. This system can help an organization communicate with and control other relevant organizations; moreover, it also helps build and maintain relationships among stakeholders for the benefit of policy implementation. In addition to coherence and engagement of policy networks and communities, *clarity in roles and responsibilities* is an important factor that could also identify effective operation capacity at the systemic level (Wu et al., 2018).

To maintain the stability of a policy, an organization is required to gain and maintain support for its policy from different stakeholders. Wu et al. (2018) defined these abilities as political capacity at the organizational level. Therefore, it is crucial for an organization to have *skills in communicating and pursuing* its own organization and policy goals (Peters, 2015). Within the organization, policy goals, plans, and procedures are communicated; at the same time, the organization communicates and collaborates with other stakeholders (Wu et al., 2018). Moreover, an organization should have an understanding of stakeholders to gain their policy support. Therefore, communication skills and *a communication process* that allows two-way communication between the organization and different stakeholders are required for a better understanding of each other (Wu et al., 2018). Furthermore, *trust* is another factor to consider because it promotes public support for both policies and the organization (Rudolph, 2009; Rudolph & Evans, 2005). Trust is not legal protection, but it is closely related to legitimacy, which

Woo et al. (2015) and Wu et al. (2018) consider a factor necessary for political capacity. Similarly, Wu et al. (2018) consider that *a system that can enable stakeholder engagement and manage policy activities* is necessary for an organization, and they define it as systemic political capacity. With an effective process for stakeholder engagement under the political system, an organization is able to maintain trust and increase the level for stakeholder participation and public support for its policy (Wu et al., 2018).

Concluding from the aforementioned literature, the factors contributing to policy capacity at the organizational and systemic level were organized into the six policy capacity components, as shown in Table 3.2.

Table 3.2 Categorized factors contributing to policy capacity, following the analytical framework developed by Wu et al. (2015)

Level of Resources	Factors Contributing to Policy Capacity		
	Analytical Skills	**Operational Skills**	**Political Skills**
Organizational Level	• Information collection, analysis, evaluation, and dissemination • Availability of adequately skilled staff and time • Tools for analysis and evaluation	• Leadership and management skills • Availability of information, human resources, and financial resources • External and internal coordination process	• Skills in communication and persuasion • Legitimacy of policy process • Stakeholders' information • Accessing process to key policy-makers • Internal and external communication process
Systemic Level	• Information collection, analysis, evaluation, and dissemination • Effective and transparent information system • Channels for stakeholder participation in information system	• Skills in communication with and control over stakeholders • Relationship building and maintenance • Clarity in roles and responsibilities • Coherence and engagement of policy networks and communities • Communication and negotiation processes	• Skills in enabling stakeholder participation and managing policy activities • Level of stakeholder participation, public support, and trust • Stakeholder participation process

3.3 Results

3.3.1 Key findings and recommendations for analyzing policy capacity

Constructing of the analytical framework of policy capacity from the matrix of three skills at three levels of resources proposed by Wu et al. (2015) is considered as the initial step to organize and analyze policy capacity systematically. When considering the analytical framework and relevant researches thoroughly; however, it can be seen that there are some gaps needed to be improved.

Firstly, the proposed factors in the framework were not well organized and could not cover every element of the policy process. The best example is the factors of political capacity at an organizational level. Legitimacy for policy process, the process for stakeholder engagement, and access to key policymaker are identified as the factors of such policy capacity of the organization to acquire support for its policy work. These factors are undoubtedly important; however, other factors such as skills in communication and persuasion are also vital and need to be added.

Secondly, skills and resources are truly important components of policy capacity; however, considering only these components is not enough because such components are directly impacted by the processes used for exercising the resources (Thissen & Twaalfhoven, 2001). Some processes such as stakeholder engagement process, communication process, and coordination process were also identified by Wu et al. (2018) as the factors of systemic political capacity, systemic operational capacity, and organizational operational capacity, respectively. These factors; therefore, raise the importance of processes and the suspicion in identifying them as a skill or resource.

Thirdly, the importance of process in policy capacity is also supported by other research. For example, Tiernan and Wanna (2006) defined capacity as "the structural and organizational resources and processes that contribute to the policy-making process", whereas Gleeson et al. (2011) explained policy capacity as "the organizational structures, processes, and cultures that support effective policy development and implementation.

For these reasons, we propose the processes that affect the decisions and actions necessary to conduct policy work as another important factor of policy capacity. Consequently,

skills, resources, and processes should be taken into consideration when policy capacity is analyzed or examined. Based on our findings (the incomprehensive consideration of policy capacity factors, effects of processes on skills and resources, and support for the importance of processes for policy capacity in other research), we propose to categorize the factors of policy capacity into three groups of elements: (1) skills, (2) resources, and (3) processes, since the factors suggested under the framework by Wu et al. (2018) were not identified and categorized systematically.

Regarding the key elements of actors identified in the IAD approach, which are (1) resources, (2) preferences, (3) information processes, and (4) selection processes for courses of action (Polski & Ostrom, 1999), the categorization of policy capacity factors into skills, resources, and processes encourages the results to be used for analyzing policy capacity for further institutional analysis following the IAD approach.

Therefore, as shown in Table 3.3, the analytical framework for policy capacity should be improved by adding more relevant factors derived from the previous section and by categorizing these factors into three groups of elements which are as follows:

(1) *Skills*—the abilities and expertise needed to conduct policy work effectively. Examples of these skills include analytical skills, coordination skills, and communication skills.

(2) *Resources*—any supplies and support that an organization brings to the policy process, such as information, human resources, coordination, trust, political support, and legitimacy.

(3) *Processes* that affect the decisions and actions required to conduct the policy work, for example, the communication process, internal and external coordination processes, and the stakeholder participation process.

It is believed that categorizing factors of policy capacity in this manner could create benefits by (1) improving the understanding of constituents of the policy process affecting policy capacity, (2) helping an organization scope out the area for policy capacity development, and (3) applying the policy capacity analysis to the IAD approach.

Table 3.3 Three elements of policy capacity under the modified analytical framework at the organizational and systemic levels

Level of Resources	Policy Capacity		
	Analytical Skills	**Operational Skills**	**Political Skills**
Organizational level	*Skills*: Information-acquiring and processing skills *Resources:* Adequately skilled staff, time, and tools for information analysis and evaluation *Processes:* Information collection, analysis, dissemination, and evaluation processes	*Skills:* Leadership and management skills *Resources:* Information, human resources, and financial resources *Processes:* External and internal coordination process	*Skills:* Communication and persuasion skills *Resources:* Legitimacy for policy process, and stakeholders' information *Processes:* Accessible processes to key policy-makers, and internal and external communication processes
Systemic level	*Skills:* Information collecting, analyzing, evaluating, and disseminating *Resources:* Efficiency and transparency of the information system, and channels for stakeholder participation in information system *Processes:* Information collecting, processing, evaluating, and disseminating	*Skills:* Communication and control over stakeholders, and building and maintaining relationships *Resources:* Coherence and engagement of policy networks and communities, and clarity in roles and responsibilities *Processes:* Communication and negotiation	*Skills:* Enabling stakeholder participation and managing policy activities *Resources:* Level of stakeholder participation, public support, legitimacy, and trust *Processes:* Stakeholder participation

3.3.2 Policy Capacity of the Thai Government

The in-depth interview results are transcribed and summarized below. Then, the modified analytical framework was used to examine and analyze policy capacity at the organizational and systemic levels of the government organizations involved in EFW development under AEDP 2015.

1) Ministry of Energy

The MoEN is the main organization responsible for establishing energy plans, including AEDP 2015. Before starting the agenda-setting step, interviewees mentioned the internal coordination and communication required for ensuring all energy plans were consistent in the operational period and policy direction. However, the deficiency of the required information, especially information from across organizations, was emphasized as the most serious problem faced during the agenda-setting and decision-making steps.

The MoEN used various processes to acquire the required information, for example, sending formal letters asking for information from relevant ministries, sending questionnaires to local authorities and organizations, and arranging formal meetings with relevant organizations and stakeholders. Unfortunately, the information received was not enough to fulfill policy works effectively, especially the information about supplies and the forecasted supply of MSW that can be used as an energy resource.

To cope with the limited information, the MoEN applied different techniques and tools to analyze and evaluate the given information to forecast the missing information. The MoEN tried to communicate and cooperate with other government organizations by sharing ideas and setting up policy action plans in accordance with relevant policies from different ministries. The interviewees mentioned the difficulties in establishing relevant policies that were truly harmonized across ministries because of the ineffective cooperation, especially at the in-depth level.

The ministry; however, has put forwards efforts and tried to overcome the problems which show its sufficient analytical capacity. The ministry has tried its best to set EFW targets that achievable, appropriate, and beneficial for everyone. Similar to most of the

government organizations, the inadequacy of human resources to conduct policy work and a lack of time due to the red tape of the Thai government system was also mentioned.

To successfully implement the EFW targets, the MoEN did not require only the information, but also the effective cooperation from the MoNRE and MoI in controlling MSW generation and management system to serve the conversion of MSW into energies. These two ministries; however, have to respond to their own policies and routine duties which focus on reduce, reuse, and recycle process of MSW rather than converting such waste into energies. To this end, the MoEN was not fully satisfied with the received responses. This is considered as the insufficient operational capacity of the ministry as it is difficult to manage and coordinate with other organizations to implement the EFW target effectively.

To obtain policy support, the MoEN organized public hearings, expert discussions, and focus group meetings to gain feedback and suggestions from stakeholders before making final decisions for all energy plans. A high level of interest and participation from stakeholders was mentioned. However, it is challenging for the MoEN to balance stakeholder benefits and serving the government direction in national renewable energy at the same time.

2) Ministry of Natural Resources and Environment

The MoNRE took advantage of a fire incident at the open dumpsite to push the waste management problem onto the national agenda. As a result, it is authorized by the government to establish the NSWMP with aims to control MSW generation and solve MSW treatment processes. To this end, the government assigned the MoNRE and MoI to cooperate with each other to solve the MSW problems.

The MoNRE, then, cascaded its targets from the NSWMP into short-term action plans that were implemented by the MoI by advising the MoI in establishing the action plan "Thai Zero Waste" (2016–2017) and monitoring the actions of the MoI in implementing the plan. This shows the sufficient operational and political capacity of the MoNRE in leading, managing, communicating, and persuading others to conduct and support its policy works.

The MoNRE; therefore, considered itself as a regulator and consultant for the MoI in managing waste, especially for technical and information support by sharing technical information, knowledge of waste management technologies, and feasibility studies with the MoI, while the MoI shared information about waste management results with the MoNRE.

The MoI; however, has full power to made decisions in implementing the plan and operating the waste management system and considered the MoNRE differently as a policy supporter.

Therefore, the main constraint for the MoNRE mentioned by the interviewees was the clarity of roles and responsibilities, especially as a regulator, because the MoI conducts policy work based on its judgment and decisions. Consequently, the MoNRE who monitors the actions of the MoI cannot regulate or force the MoI to take actions for policy success. This shows the insufficient operational capacity at the systemic level of the MoNRE in communicating to establish clarity of roles and responsibilities between itself and the MoI.

Similar to the MoEN, the inadequacy of human resources was mentioned as well as the limited financial resources because the government did not approve 100% of the proposed budget for waste management investment.; therefore, The MoNRE; therefore, chose to encourage the private sector to invest in the remainder to achieve the policy target.

3) Ministry of Interior

Coordinating with the MoNRE, the MoI agreed and responded to the Thai Zero Waste action plan to support the NSWMP. The MoI supported the MoNRE in promoting waste separation, and in applying the 3Rs through direct communication and arrangement of activities with local people. Combining with the routines of the MoI in operating MSW system, especially MSW collection, these help the MoI to acquaint and close to local authorities and local people.

Although interviewees mentioned that campaigns or projects involving changing the behavior of local people assigned by the MoNRE should be conducted continuously for the certainty of achieving maximum results, the MoI shows its sufficient political capacity

at the systemic level of the actors as it can arrange policy activities and enable stakeholder participation. It was mentioned that, previously, these projects were stopped or ended once the target was reached. This discontinuity can cause hesitation or tediousness for the MoI to support policy activities asked by others.

Considering waste treatment and management, an interviewee reported the difficulty in conducting operational works due to the lack of human resources. However, interviewees showed confidence in the knowledge and expertise of their staff in waste management, which could impact the way they consult with the MoNRE.

The inadequacy of human resources does not only impact routine waste management practices, but also the collection and dissemination of information about waste management, which is required by many sectors. Interviewees mentioned the effort in collecting the information, but noted it was not their main responsibility. Moreover, a system that collects information in the standard format is required as it helps reduce burdens in filling the required information in different formats and reducing duplicate information sharing. This shows the need for improvement for analytical capacity at systemic level of the MoI, especially the process for data collection and dissemination. This is supported by the comments from the MoEN and MoNRE which mention the impact of the MoI's capacity in dealing with the information. For the MoI interviewees; however, the abilities in operating its main responsibilities and routine for MSW management are more important.

According to the interview results on the basis of individual organizations, the details of policy capacity and the summarized key sufficient and insufficient policy capacity are shown in Table 3.4 and 3.5, respectively.

Table 3.4 The examined policy capacity of government organizations as noted from in-depth interviews

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Organizational Analytical Capacity	Skills: Information acquiring and processing	Abilities in acquiring and processing the required information for policy were demonstrated.	The MoNRE can acquire and process the required information necessary for policy works.	Not mentioned.
	Resources: Adequately skilled staff, time, and tools for information analysis and evaluation	Even though the MoEN applies various tools for helping analyze and evaluate the acquired information, more human resources are still required due to the quality of the information.	The MoNRE uses different analytical information and evaluation needed to overcome the limitation of human resources.	Not mentioned.
	Processes: Information acquisition, analysis, dissemination, and evaluation	Different processes and methods were used to acquire and process the required information, such as sending formal letters and questionnaires, discussing with relevant organizations, cross-checking the received information, and forecasting the missing information.	The inspection manual was used by local organizations to evaluate the situations and information for the MoNRE. Moreover, sending formal letters, discussing with the relevant organizations, and searching for the required information from secondary data were also used.	The MoI disseminated the existing information when there was a request from other organizations.

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Organizational Operational Capacity	Skills: Leadership and management	The MoEN prepared counter plans for the flexibility in conducting future activities and projects if the approved budget was lower than the expectation.	The MoNRE plans to solve the inadequate budget by encouraging coordination from private sectors.	The MoI manages and directs its policy activities and projects through the cooperation of local delegates such as community leaders, teachers, and monks.
	Resources: Information, human resources, and financial resources	The MoEN required more staff to deal with various information sources related to policy works. Moreover, the expected budgets for AEDP 2015 might be adjusted by the government.	The MoNRE faced the challenge of inadequate time and updated information, human resources, and the approved budget.	The MoI requires information, human resources, and financial resources to establish and operate 18 waste collection centers effectively; however, the expected annual budget might be changed by the government.
	Processes: External and internal coordination	Internally, the MoEN set all energy plans consistently to support each other. Externally, the MoEN tried sharing information, communicating, and consulting with other organizations to adjust the energy plans in harmony with other relevant policies.	The MoNRE consulted and coordinated internally to adjust the regulations for renewable energy plan approval. Externally, the MoNRE consulted and shared information with the MoI to establish the action plans to support the National Solid Waste Master Plan.	The MoI communicated and cooperated internally to conduct policy works among teams. Externally, the MoI worked with the MoNRE to establish action plans to support the waste management roadmap, and shared its information with relevant organizations.

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Organizational Political Capacity	Skills: Communication and persuasion	The MoEN communicated within and outside organizations to gain support for policy works with different groups of stakeholders.	The MoNRE communicated with other organizations to share information and gain support for its policy works.	The MoI mainly communicated and persuaded local authorities to participate and support its policy works.
	Resources: Legitimacy for policy process, and stakeholders' information	The MoEN used the information of different groups of stakeholders to establish and implement energy policies consistent with the direction and final decision made by the government.	The MoNRE was assigned by the government to solve the waste management problem urgently by setting up the waste management roadmap.	The MoI was assigned by the government to establish waste management action plans and work corporately with the MoNRE to solve waste management problems.
	Processes: Access to key policy-makers, and internal and external communication	The MoEN accessed key policy-makers through formal proposals and reports. Moreover, the MoEN analyzed and consulted within organizations to select some special groups of stakeholders, such as energy experts.	The MoNRE accessed key policy-makers by raising the waste management problem and causing it to be on the national agenda.	The MoI consulted and communicated with the MoNRE for support of the waste management action plans.

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Systemic Analytical Capacity	Skills: Information collecting, analyzing, evaluating, and disseminating	The MoEN tried collecting the received information, and analyzed, evaluated, and disseminated it -systematically within the organization.	The MoNRE tried analyzing and evaluating the received information systematically.	The MoI lacks the skills in collecting and disseminating information systemically.
	Resources: Efficiency and transparency of information system including channels for stakeholder participation	The MoEN lacks an effective and transparent information system and formal channels for stakeholder participation in the information system.	The MoNRE lacks an effective and transparent information system and formal channels for stakeholder participation in the information system.	The MoI lacks an effective and transparent information system and formal channels for stakeholder participation in the information system.
	Processes: Information collecting, processing, evaluating, and disseminating	The MoEN used different techniques to process and evaluate the received information, then collected and disseminated the information within the organization through internal reports and discussions.	The MoNRE used different techniques to process and evaluate the received information and disseminate the information through annual reports, meetings, and discussions.	The MoI requires a standard format for information collection and central channels to disseminate accurate and timely information to the relevant organizations.

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Systemic Operational Capacity	Skills: Communication and control over stakeholders, and building and maintaining relationships	The MoEN communicated with other organizations and stakeholders to build and maintain support for policy works.	The MoNRE communicated with other organizations to maintain their relationships and to monitor policy implementation.	The MoI communicated and controlled the local authorities to build and maintain their relationships for the support of policy works.
	Resources: Coherence and engagement of policy networks and communities, and clarity in roles and responsibilities	The MoEN tried working coherently, especially with private sectors and local communities.	The MoNRE requires clarity in roles and responsibility, especially as a regulator of the MoI.	The MoI works closely with local authorities and communities.
	Processes: Communication and negotiation	The MoEN communicated and negotiated with stakeholders through the public hearing process to balance the interests and benefits of all stakeholders.	The MoNRE communicated with stakeholders through the public hearing process and negotiated with relevant organizations through discussions and consultations.	The MoI communicated and negotiated with stakeholders, especially local authorities, through public hearings and different policy activities.

Policy Capacity Component	Categorized Factors Contributing to Policy Capacity	Government Organizations		
		MoEN	MoNRE	MoI
Systemic Political Capacity	Skills: Enabling stakeholder participation, and skills in managing policy activities	The MoEN showed effective abilities in enabling stakeholder participation by arranging various policy activities to gain support from different sectors of stakeholders.	The MoNRE enabled stakeholder participation and managed different policy activities.	The MoI received good participation in different policy projects and activities from local authorities, communities, and private sectors.
	Resources: Level of stakeholder participation, public support, legitimacy, and trust.	AEDP 2015 was supported by various sectors which reflected a high level of stakeholder participation and interest during the policy process, especially public hearings. However, stability and continuity of the policy and incentive measures were questioned by the private sector.	Level of stakeholder participation was not mentioned. However, the MoI supports the MoNRE and works with locals concerned about the continuity of policy projects and activities launched by the MoNRE.	High level of stakeholder participation and public support was reflected in different policy activities and projects. However, the discontinuity of past projects and activities might affect the level of participation in the future.
	Processes: Stakeholder participation	Public hearings, focused group meetings, and expert discussions were the processes used by the MoEN to encourage stakeholder participation.	The MoNRE uses public hearing processes for stakeholder participation.	Similar to the MoEN and the MoNRE, the MoI also uses public hearings as the main process for stakeholder participation.

Table 3.5 Summary of the key sufficient and insufficient policy capacity of individual actors

| Organizations | Key Policy Capacity | |
	Sufficient	Insufficient
MoEN	Organizational Analytical Capacity	Organizational Operational Capacity
MoNRE	Organizational Operational Capacity	Systemic Operational Capacity
MoI	Systemic Political Capacity	Systemic analytical Capacity

3.4 Discussion

Cooperation among relevant government organizations is important to conduct policy works effectively. Therefore, it is important to understand the policy capacity of different organizations because it affects the whole policy process. Moreover, as shown by the results, an organization also values its own capacity and others' capacity differently. Therefore, categorizing factors of policy capacity into skills, resources, and processes facilitates an organization to understand its policy capacity and policy capacity impacts, and to identify the missing or inefficient policy capacity factors systematically.

According to the study results, we found that factors contributing to policy capacity could be categorized in a more systematic manner. Following the combination of policy capacity and elements of actors from the IAD approach, this article contributes to improving the existing analytical framework for policy capacity by categorizing factors of policy capacity into three groups: (1) skills, described by the abilities and expertise of an organization in conducting policy work effectively, (2) resources, described as the supply or support that an organization brings into the policy process, and (3) processes that affect the decisions and actions necessary to conduct policy works. Moreover, the modified analytical framework is compatible with the IAD approach which could facilitate the utilization of policy capacity analysis results for further analysis under the IAD framework.

Analyzing the policy capacity of the Thai government organizations involved in EFW development by the modified analytical framework, it can be seen that actors mentioned the limitation of their resources, especially human resources and budgets. The actors; however, have enough abilities to overcome the limitation and manage their policy works. Referred to the original analytical framework, this can be implied that they have sufficient abilities to conduct policy works. If the government want to improve the capacity, more resources should be provided. In reality, it is common that organizations always mention the lack of human resources and inadequate budget. To improve and understand the cause of insufficient policy capacity better; therefore, the processes used to exercise the resources by skilled staff should be analyzed.

Considering the same policy capacity of individual actors, it can be seen that the underlying processes of individual actors are not well supportive, consistent, and compatible with others. For example, the processes to require, analyze, and disseminate information at organizational analytical capacity. The actors who require information choose the processes that match themselves, but cause difficulties for the actors who disseminate the information. For coordination process of the organizational operational capacity, all actors mentioned that they communicate with relevant stakeholders to gain coordination, but no one mentioned the procedure or principle of communication to ensure the effective collaboration among them. To this end, analyzing only skills and resources of actors to identify their policy capacity; therefore; not effective enough.

Hence, to improve cooperative policy works in the case study, processes applied by individual actors, especially at systemic level, should be adjusted to facilitate actors in producing and conducting policy works that compel with others.

Additionally, to advance understanding in actors, it is recommended to study the external impacts that influencing or constraining actors when they have to make decisions for cooperation or interact corporately with others.

3.5 Conclusions

This chapter studied the challenges of the Thai EFW development plan from the perspective of institutional analysis by examining policy capacity, described as the conditions for effective policy development and implementation that affect the decision-making and interaction of the relevant government organizations.

We studied the policy capacity of Thai government organizations involved in EFW development under AEDP 2015 at the organizational and systemic level. The information was acquired through a literature review and in-depth interviews which carefully selected interviewees. The results of this research are based on the judgment of the interviewees that reflect the factors contributing to policy capacity.

According to the reviewed literature, policy capacity is mainly applied in the health sector and public organizations, which benefits the development of policy and policy implementation (Dunlop, 2015; Gleeson et al., 2009; Gleeson et al., 2011; Hughes et al., 2015). Therefore, we believe that applying the policy capacity analysis to the Thai energy sector can broaden our understanding of the challenges of EFW development from a different perspective.

We started with the analytical framework for policy capacity developed by Wu et al. (2015), and modified it by adding more factors that contribute to policy capacity, as derived from the literature review, and adopted the key elements of actor identification under the IAD approach to link policy capacity analysis to the IAD framework. Then, the case study was analyzed through the modified analytical framework to identify the key sufficient and insufficient policy capacity of individual actors as well as the direction to further improvement of their policy capacity.

CHAPTER 4

ACTION SITUATION
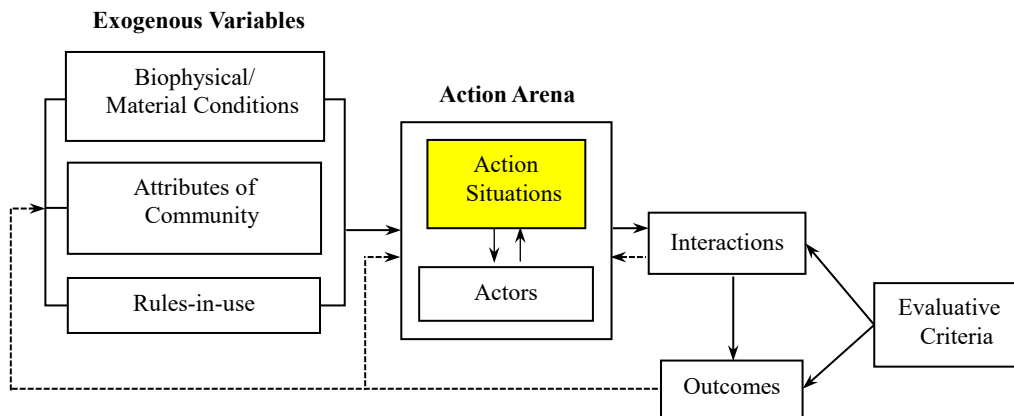
Summary

This chapter examines the action situation which is considered as another main component of action arena apart from actors (chapter 3). We adopted the set of common variables of internal structure of action situation identified in the IAD framework to analyze the structure of current policy situations for EFW development. Considering such situations occurring under the policy process, this study divides situations in the case study into 1) EFW target development situation and 2) EFW target implementation situation. Individual actions situations are then examined on the basis of individual actors participate in such situations.

4.1 Introduction

After understanding the conditions of individual actors in the previous chapter, it is also important to understand the situation which such actors step in as it is the space they have to interact with others. Following the suggested variables of the internal structure of action situation in the IAD framework, this study examines two action situations in the case study which are the situations in EFW target development and implementation. This part of study is aimed to:

(1) To examine the current internal structure of EFW target development and implementation situations

(2) To identify constraints caused by the structure of situations

4.2 Background

4.2.1 Action situation

According to the IAD framework, an action arena consists of actors and action situation. It is explained that the action arena is considered as a social space where individual actors interact with their partners. Under different action situations, actors may negotiate, solve problems, take actions, discuss, or event fight with others (Ostrom, 2011).

A set of variables which consists of actors, positions, actions, information, control, potential outcomes, and costs and benefits is identified as elements of action situation in the IAD framework. It is described that when actors step into an action situation, they are assigned positions that obliged them to take the allowed actions under the light of information (Ostrom, Gardner, & Walker, 1994). This information informs actors 1) the linkage from the selected actions to potential outcomes, 2) the levels of control that actors have over such linkages, and 3) the costs and benefits gaining from actions and outcomes.

Additionally, the information available for individual actors in an action situation can be divided into two types which are complete information and perfect information (Ostrom, 2005a). The actors who have complete information know well about the internal structure of the situation (e.g., who participate in what positions and what actions they can or cannot do). However, the actors with complete information do not know what happened

in the past and how their partners will move in the future if they do not have the perfect information. The relationships among these variables are illustrated in Figure 4.1
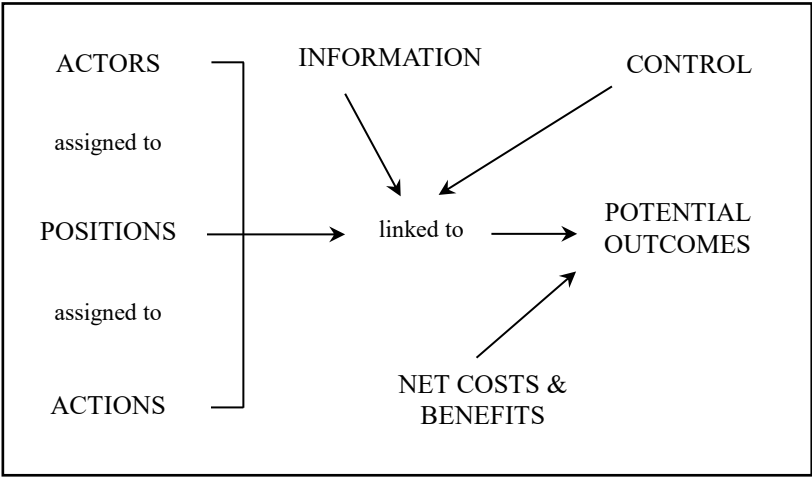
Figure 4.1 Relationships among variables of an action situation

4.3 Results

4.3.1 The internal structure of action situation

The action situation of interest in this work was explored with reference to the variables related to an action arena, as proposed in the IAD framework. Given that all the actors examined are government organizations, their roles, scopes of authority, and responsibilities were delineated.

All the actors were assumed to have the same complete information about the internal structures that characterize situations. Nevertheless, their abilities in analyzing and interpreting such information can differ. Another essential issue for consideration is whether the actors have perfect information given that this affects decisions. Table 4.1 and 4.2 present details regarding the internal structure of the AEDP 2015 development and implementation processes.

In this study, all the actors were assumed to have the same complete information about the internal structures (actors, positions, actions, controls, potential outcomes, and costs and benefits) that characterize situations. Nevertheless, their abilities in analyzing and interpreting such information can differ. Another essential issue for consideration is

whether the actors have perfect information given that this affects decisions. Tables 5 and 6 present details regarding the internal structure of the AEDP 2015 development and implementation processes.

1) AEDP 2015 development process

The ongoing development of AEDP 2015 includes agenda-setting, decision-making, and policy formulation. The interviews showed that the main actor in this process is the MoEN as this is the agency responsible for establishing the development plan. Its core mandates are identifying problems, comparing alternative solutions, discussing policy directions and targets, and formulating policy. The MoNRE and MoI participate in the policy development process as consultants that are required to share information, especially on the MSW generation rate and capacity of the WMS; exchange ideas, comments, and suggestions; and discuss policy direction and targets. Although the information, ideas, and suggestions provided by the MoNRE and MoI are important and can influence the EFW context, control over EFW targets remains with the MoEN.

With respect to potential outcomes/consequences of actions, the measures carried out by the MoNRE and MoI can result in a renewable energy policy that is consistent with the MSW policies. The MoNRE and MoI are obligated to add to their works, but they can also gain benefits from a renewable energy policy that promotes the provision of support and incentives for MSW policies. Simultaneously, the MoEN's actions lead to achievable EFW targets and attractive incentives for stakeholders, thereby enabling the ministry to acquire assistance and cooperation for EFW development and investment.

Table 4.1 Internal structure of policy development situation on the basis of actors

Variables	Internal structure vis-à-vis individual actors		
Actors	MoEN	MoNRE	MoI
Positions	Policy maker	Policy consultant	
Actions	• Identify problems • Compare alternative solutions • Formulate policy • Allow MoNRE and MoI to discuss policy directions and targets	• Provide required information • Share ideas, comments, and suggestions	
Information	Complete, but not perfect information		
Control	Full effect on EFW target setting	Partial effect on EFW target setting	
Potential outcomes	Achievable EFW targets and attractive incentives for all stakeholders	Renewable energy development policy consistent with MSW policies	
Costs and benefits	Support and cooperation for EFW development and implementation	• Increased workload • Support and incentives for converting MSW into EFW	

2) AEDP 2015 implementation process

Implementing AEDP 2015 to achieve EFW targets necessitates that the three actors work collectively and cooperatively. The MoEN is the actor mandated to ensure policy success, the MoI is the key actor who can drive EFW development and investment, and the MoNRE is a critical agent involved in environmental impact assessment (EIA) approval of the construction of EFW plants.

In this process, the MoEN has partial control over the goal achievement because it serves as a consultant, grants approval for financial support and incentives, and monitors policy monitor. Contrastingly, the MoI enjoys greater jurisdiction because it acts as a policy operator and investor who can decide on investments and select MSW treatment options. Similar to the MoEN, the MoNRE can influence EFW development to a limited extent owing to its functions as a consultant, supporter, and EIA endorser that can facilitate the EIA application and approval as well as provide knowledge about EFW and related technologies.

As regards potential outcomes from individual actors, for the actions of the MoEN foster interest in EFW development, which in turn, advances the realization of policy targets. When the MoEN monitors implementation results, it can ascertain achieved and unachieved targets, thereby paving the way for dealing with unexpected results. The potential outcomes of MoNRE actions are a convenience in EIA applications and increased interest in EFW development and investment. Although the MoNRE is compelled to work exhaustively in adjusting the EIA approval process, it gains support for MSW solutions. The possible end result obtainable by the MoI is increased investment in the conversion of MSW into EFW products—a development that is advantageous to the reduction of landfilling, the production of electricity or heat from MSW, and the acquisition of financial support.

Table 4.2 Internal structure of policy implementation situation on the basis of actors

Variables	Internal structure vis-à-vis individual actors		
Actors	MoEN	MoNRE	MoI
Positions	Incentive and support endorser, consultant, and policy monitor	EIA endorser, consultant and supporter	Policy operator and investor
Actions	• Provide supports (knowledge and technology) • Approve incentives and financial support • Monitor target achievement	• Approve EIA for EFW plant • Provide supports (knowledge and technology)	• Select treatment for collected MSW • Decide to invest in EFW plants
Information	Complete, but not perfect information		
Control	Partial impact on EFW target achievement	Partial impact on EFW target achievement	Major impact on EFW target achievement
Potential outcomes	• Increased interest in EFW development and investment	• Convenience in applying for EIA approval • Increased interest in EFW development and investment	Increase in EFW investment
Costs and benefits	• EFW target achievement • Information to deal with unexpected outcomes	• Increased workload • Support for MSW policy	• Reduction of landfilling • Energy in the form of electricity or heat • Financial support

Figure 4.2 illustrates the concluded linkages between the roles, responsibilities, actions, and effects of relevant problems and policies that influence the three ministries involved in EFW development.

In EFW development situation, the MoEN requires information of MSW and MSWMS from MoI, then the received information is processed and analyzed for the formulation of tentative EFW targets. This information is also required by the MoNRE for its information processing and analyzing in order to serve its own policy works and provide discussion and comments on the EFW target formulation of the MoEN. After the discussion and exchange of comments between actors, the MoEN decides on the EFW targets as well as the incentive measures and support.

After the formulation of the targets; then, the situation of EFW target implementation is considered. It can be seen that the proposed incentive measures and supports from both the MoEN and MoNRE are the tools to encourage the MoI to select the treatment method in the conversion of the collected MSW into EFW products. As the MoI controls and operates the MSWMS; therefore, they can collect the information of MSW and MSWMS which is required by others in order to evaluate the achieved targets and situations for further policy development.
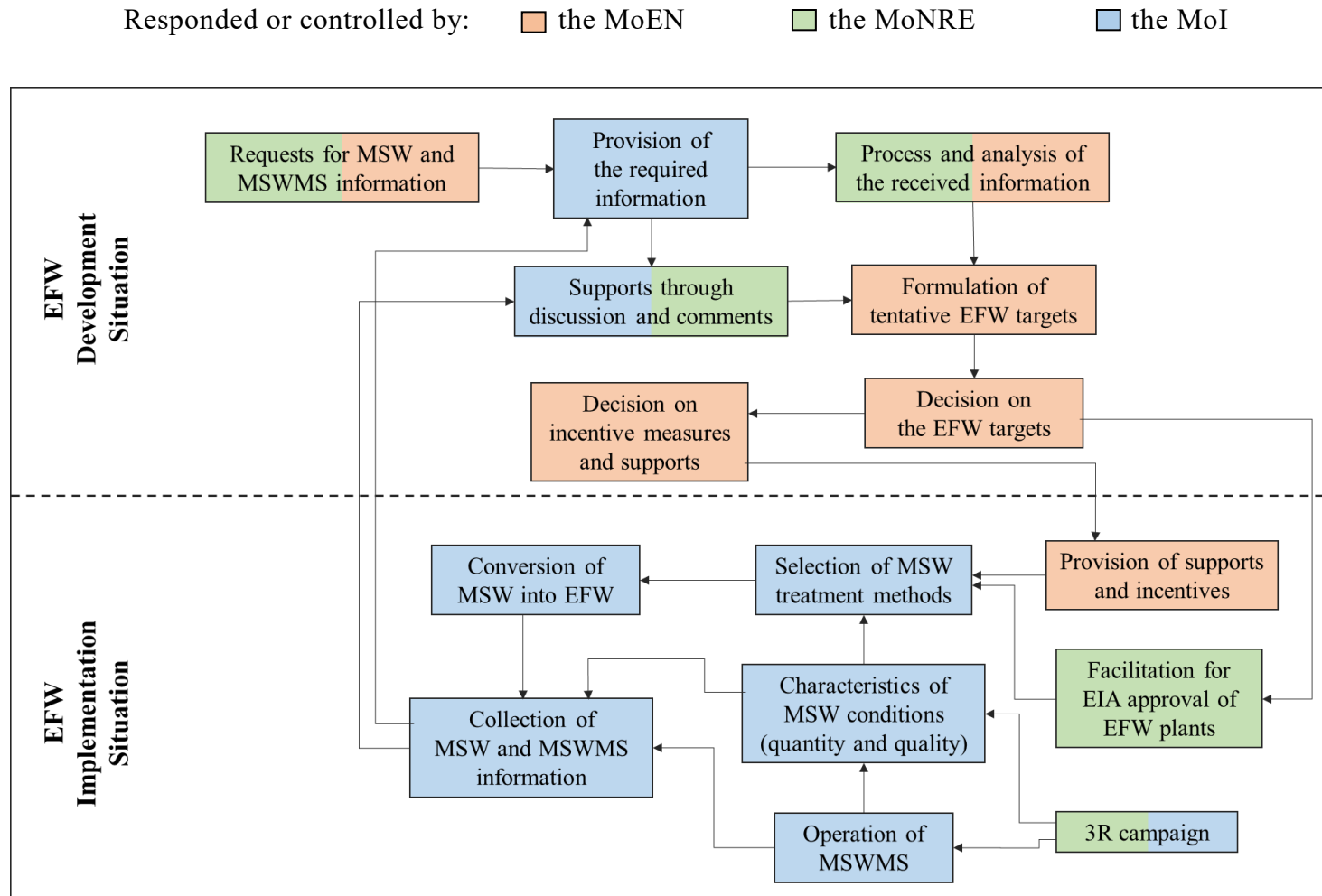
Figure 4.2 The involvements of the three ministries in EFW development and implementation situations

4.4 Discussion

Starting from policy development situation, it is seen that the MoEN steps in the situation as a policymaker who is allowed to formulate the policy. To develop such a policy and set up its target effectively, the ministry requires perfect information. Although the MoEN did not have the perfect information, its position and actions still give the ministry full control over the potential outcomes. While, the MoNRE and MoI participate in the situation as a policy consultant who allowed to share ideas, comments, and suggestions and required to share information. Control of the MoNRE and MoI over the policy development is, however, less than the MoEN.

Similarly to policy implementation situation, the imbalance between allowed actions and control over the potential outcomes still remains. The major control in this situation, however, is shifted to the MoI as it is a policy operator and investor who can decide on MSW treatment options and EFW plant investment, whereas the MoEN and MoNRE participate in the situation as supporter and consultant. Nonetheless, the MoEN is still the actor who is responsible for the success of the policy target achievement.

When the imbalance between responsibilities, required actions and control over the potential outcomes associated with the current analytical capacity at both organizational and systemic level of actors and impacts of information and aggregation rules, these can cause difficulty and oppressiveness for actors incorporate working with others for policy development and implementation.

Additionally, actors have their own conditions to conduct policy work; therefore, they value their own policy capacities and those of others differently, which in turn, causes difficulties for actors in cooperating during policy works (Chenboonthai & Watanabe, 2018).

To encourage cooperative policy works among actors, besides the understanding in actors and action situation conditions, it is important to specify the extents of such cooperative works and the ideal situations that facilitate such collaborations as a guidance for further improvement.

4.5 Conclusion

Following the set of variables for analyzing the internal structure of situation in the IAD framework, this study examined two situations in the case study which are: 1) AEDP 2015 developing situation and 2) AEDP 2015 implementation situation.

The lack of information and the imbalance between the controls of actors over the expected outcomes were identified as the obstacles of current situations that discourage actors to work corporately with others.

CHAPTER 5

PATTERNS OF INTERACTION

Exogenous Variables

Biophysical/ Material Conditions

Attributes of Community

Rules-in-use

Action Arena

Action Situations

Actors

Interactions

Outcomes

Evaluative Criteria
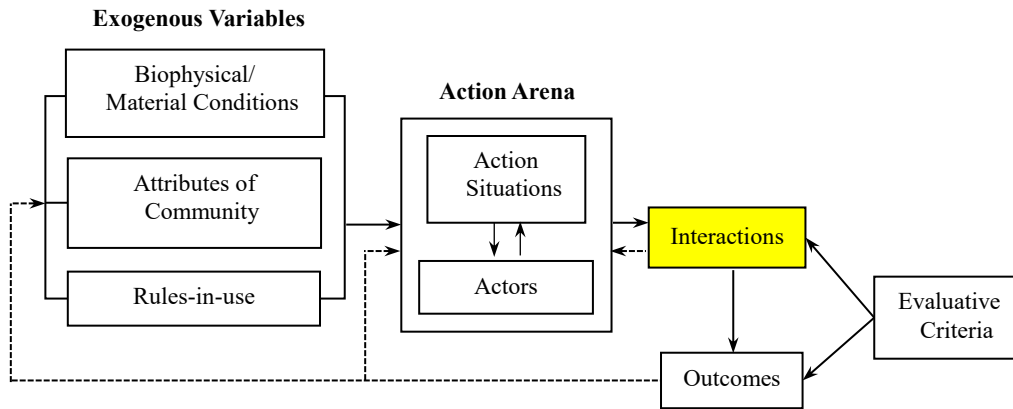
Summary

This chapter examined cooperative interactions among the three main government organizations (actors) in developing and implementing EFW targets. Following the IAD framework, such interactions are resulted by the decisions and actions of actors in considering situations. The concept of cooperation intensity was used to specify the different extents of cooperative interactions in accordance with the internal structures of the situation. To strengthen the novelty of this work, we categorized cooperation intensity into five levels and proposed the ideal internal structure of situations, which can serve as guidance in the evaluation and improvement of collaborative endeavors. These levels are reflected in collaboration through (1) the pursuit of common goals and mutual benefits, (2) the pooling of resources, (3) the sharing of responsibilities, (4) the synchronization of activities, and (5) the monitoring of partners. Using the proposed cooperation intensity levels, we identified the following causes of ineffective cooperation: Differences in perceptions of problems related to municipal solid waste (MSW) and the prioritization of solutions put forward by the individual actors; the actors' commitment to different solutions; the inconsistency among responsibilities, actions, and control over the expected outcomes of the actors; the failure of the actors to clarify and synchronize related and duplicate policy activities; and the unwillingness of the actors to undergo checking and monitoring.

5.1 Introduction

The success of EFW development depends on the creation and implementation of energy policies in accordance with waste management directives. Therefore, government organizations involved in energy and waste management must cooperate to ensure the feasibility of EFW development and investment and derive value from these endeavors through collective and corporative policy works.

Policy process generally involves different types of knowledge, actors, and activities, thus leading to situational overlaps, which inevitably drive activities in one circumstance to affect those occurring in another (Polski & Ostrom, 1999). To this end, effective cooperation among parties is necessary for a successful public policy. As asserted by Edward (1980), disunity in organizations hinders the cooperation essential to the implementation of complex policies, especially those that require joint efforts from many parties. The inappropriate institutional arrangement is indicated as a factor influencing the lack of cooperation, which in turn, contributes to ineffective policy process (Ariti, van Vliet, & Verburg, 2019).

Effective cooperation should be accorded priority because many policy-related tasks required different actors to interact collectively and help one another in managing difficulties. Cooperation is also a primary driver of good understanding among actors, which can increase policy effectiveness (Ferretti, Pluchinotta, & Tsoukiàs, 2019; Lin, 2007) and encourage actors to share resources, information, and competencies to support enhanced decision making, interactions, and the achievement of mutual goals and policy outcomes (Marra, Mazzocchitti, & Sarra, 2018; Wäsche, 2015).

To enhance understanding in cooperative interactions among actors to conduct policy work together, the IAD framework is used as a tool to illuminate the intricacies of such collaboration, which reflects interactions that flow logically from the decisions and measures taken by actors in an action arena.

Additionally, we applied the concept of cooperation intensity, which is described as actor interactions that involve vigorous contribution to policy work and policy outcomes to specify different extents of cooperative interactions.

In this regard, the objectives of the study were:

1) to examine the intensity of cooperation among the actors and

2) to propose internal structures of action situation promoting cooperative working for different levels of cooperation intensity

5.2 Background

5.2.1 Patterns of Interaction

Patterns of interaction are the conducts of actors who participate in a particular structure of action situation. Such interactions flow logically from the behavior of actors in the action arena (Polski & Ostrom, 1999). The dynamics of institutional arrangement; therefore, can be determined towards the association of actors' behavior and the patterns of interaction (Smajgl et al., 2009).

Generally, policy situations generate ambiguous patterns of interaction. As a result, individuals choose to decide interdependently within the context of community norms which "dramatically change the structure of the situation" (Polski & Ostrom, 1999). Otherwise, actors and stakeholders might discuss together to find a new arrangement of institutions and organizations. It is believed that when actors learn the results of past actions, policy situation will change over time (Polski & Ostrom, 1999). This leads the analyst to make weaker but well-informed inference about the pattern of interaction. Consequently, the inference helps in narrowing the possible range of prediction in the policy development process.

Considering interactions among actors under the policy process, especially, relevant government agencies, one of the most important interactions influencing the success of public policy development and implementation is how they work and support each other. For this reason, it is necessary to understand how conditions of actors and action situation impact on cooperative interactions that lead to the expected policy accomplishment.

5.2.2 Cooperative behavior

An important consideration in attempts to foster cooperation is that it is not a "simple behavior, nor even as specific pattern of behaviors. Rather, it is seen as a set of relations among behaviors and their consequences" (Marwell & Schmitt, 1975). Cooperation has been defined in different ways (e.g., Kretschmer and Vanneste 2017; Pechlaner and Volgger 2012; Tee, Davies, and Whyte 2018), but explanations of the concept always revolve around the manner by which actors effectively work together. Sometimes the term "cooperation" is used interchangeably with "coordination" and "collaboration" (Czernek-Marszałek, 2018; Denise, n.d.). Cooperation has likewise been elucidated as involving goal-directed behaviors, rewards for each participant, distributed responses, coordination, and social coordination, whose combination can augment the accuracy with which the types of cooperation transpiring among actors are classified (Marwell & Schmitt, 1975).

In a social network, individual actors are connected with others through four types of ties, namely, similarities, social relations, interactions, and flows (Borgatti, Mehra, Brass, & Labianca, 2009). When actors are linked, cooperation can occur (1) tacitly without communication or explicit agreement given that the expectations of actors are merged; (2) through negotiation; and (3) through enforcement by a strong actor, provided that such actor also adjusts its own policies and endeavors to achieve mutual benefits (Milner, 1992). The decision of actors to cooperate with one another is influenced by various factors, such as the previous interactions of an individual actors (Das & Teng, 2002; Luo, 2007; Marwell & Schmitt, 1975; Poppo & Zenger, 2002), the achievement of cooperation objectives in the past (Arslan & Ariño, 2017), the effects of institutions (Polski & Ostrom, 1999) and neighboring municipalities' decisions (Di Porto, Parenti, Paty, & Abidi, 2016), and an actor's willingness, intensives, self-interest, and opportunism (Kretschmer & Vanneste, 2017; Williamson, 1975).

Because cooperation results from the decisions and actions of actors to work together, the patterns that underlie such collaboration are flexible. That is, cooperation can vary depending on the degree of interaction among actors as they jointly create values (Park, Srivastava, & Gnyawali, 2014; Weber & Heidenreich, 2018). Accordingly, researchers have been attempting to systematically classify cooperation to broaden our understanding

of this behavior. Weber and Heidenreich (2018), for example, categorized cooperation in product development into three types (vertical, horizontal, and institutional) and three stages (concept development, product development, and implementation) on the basis of the actors involved in the industrial process. Alimov (2018) classified cooperation among partners, from the perspective of regional economics, into cooperation in the political and security domains, in trade and economic activities, and in the development of culture and humanitarianism. In their study on cooperation among Indonesian government organizations to support the implementation of an e-government system, Nurdin, Stockdale, and Scheepers (2014) classified cooperation into vertical (within an organization) and horizontal (between different organizations) collaboration.

5.3 Research proposal

5.3.1 Classification of the Cooperation Intensity

Park, Srivastava, and Gnyawali (2014) and Weber and Heidenreich (2018) asserted that the degrees to which an actor cooperates with its partners can vary across different partners and periods of time; these aspects relate to the conditions that characterize a situation. The authors regarded these extents of interaction as reflective of the intensity of cooperation. This explanation motivated the current research to classify patterns of cooperation in the AEDP policy process into different levels of cooperation intensity given that cooperation is the result of varying scales of an actor's decision to interact or work with another. In consonance with this approach, we defined the intensity of cooperation as actor interaction that involves vigorous contribution to policy works and outcomes. The levels of cooperation intensity in the AEDP policy process are reflected in an actor's decision to; cooperate by (1) pursuing common goals and mutual benefits, (2) pooling resources, (3) sharing responsibility, (4) synchronizing activities, and (5) monitoring partners. Each level of cooperation intensity is described as follows.

First, *the pursuing of common goals and mutual benefits* is the initial level of cooperation intensity occurring among actors. The goal-directed behaviors and rewards of actors are important stimuli of cooperation because actors cooperate to create mutual value together (Marwell & Schmitt, 1975; Weber & Heidenreich, 2018). Benefits are equally important

prerequisites for cooperation (Klinge Jacobsen, Pade, Schröder, & Kitzing, 2014). Nevertheless, different goals or needs can act as barriers as they may obstruct the advancement of common goals among actors (Pennings, 1975; Wäsche, 2015).

In the current research, two types of goals in a policy process are considered and adopted. The first is system goals, which relate to "the characteristics of the system as a whole" and the second are derived goals, which refers to "the uses to which power generated by organization activities can be put" (Perrow, 1967).

Goal- and benefit-induced cooperation can also occur tacitly (Milner, 1992), in which case actors work toward the same general objectives but each interacting individually to accomplish its own goals and maintain control of its own resources (Pechlaner & Volgger, 2012). In simple terms, actors espouse the same system goals but do not necessarily pursue derived goals that translate to support among actors. However, individual actors can still acquire benefits from related policies that do not impede another.

Alternatively, when actors cooperate in pursuing common goals and mutual benefits that are obtained through negotiation and communication, all actors perceive situations, problems, and the resolution directions congruently. Ideally, all derived goals are set consistently, thus serving both the system goals and the derived goals of others. In achieving this, the control of actors over the expected outcomes should be consistent with their contributions to the success of outcome accomplishment.

When actors understand situations and partners well enough, they willingly agree to commit to collaboratively solving problems that cannot be rectified individually. In this situation, all actors band together, remain dedicated, and cooperate by devoting resources to problem resolution (David, 2015). The upshot of all these is the second level of cooperation intensity.

Second, *the pooling of resources* occurs when actors combine their resources to overcome the limitations encountered in satisfying the resources necessary in joint policy works. Resources should be pooled openly and systematically, and actors should keep in mind that the blended resources are now designed to benefit the public, with such resources belonging to everyone. Although resource pooling facilitates a smooth policy workflow,

some actors can be compelled to share cherished resources and/or disclose sensitive information.

The combination of resources can solve certain problems, such as information and human resource shortage, but an important requirement is for actors to work collectively in competing for policy works; that is, all actors should cooperate to ensure successful policy initiatives. These actions demand a higher level of cooperation intensity—a requirement that can be satisfied through the sharing of responsibilities.

Third, *the sharing of responsibilities* among actors leads such actors to be accountable together or share the blame for outcomes. Here, responsibilities are considered as tasks that actors are obligated to accomplish (Feinberg, 2006). At this level of cooperation intensity, certain actors should be authorized as representatives, whereas others should be instructed to work in concert in eliminating constraints and difficulties (May, 1987; Van De Ven, Delbecq, & Koenig, 1976) and thereby advance a smooth workflow. Cooperation is the result of joint efforts that are motivated by a good working relationship among actors (Rahman & Korn, 2014), but such agents are inevitably affected by others' unpleasant behaviors and results. At this intensity, therefore, perfect information becomes necessary for cooperative decision making.

To share responsibilities systematically, actors must clarify duties and roles, with a view to addressing overlaps. When actors concertedly bear obligations, they are mutually working toward policy targets. An essential component, therefore, is assigning responsibilities that match an actor's actions and control over outcomes. This level of cooperation can lead to the integration of relevant policies among actors, which brings us to the fourth level of cooperation intensity.

Fourth, *the synchronization of policy activities* for the achievement of effective and sustainable cooperation. Without such coordination, it is difficult for actors to achieve successful cooperation (Marwell & Schmitt, 1975).

Synchronized activities prompt improved policy outcomes (Parsons, 1951), which are the results of the effective policy process. Duplicate policy activities should be pinpointed and synchronized, and collective policy affairs should be organized consistently to

cultivate a lean policy process and conserve resources. It is important to remember, however, that the synchronization of policy activities can affect the control that actors can wield over policy works and outcomes. Because actors are required to cooperate with others to support and conduct activities together, critical tasks are for all actors to plan and agree on the level of cooperation intensity and how to integrate and implement policy works and activities together. Moreover, the synchronization of activities intensifies the involvement of other actors, underscoring the necessity of ensuring systematic and effective cooperation. As noted by Ajzen (1991), that if actors consider a situation unmanageable or if they have insufficient control over actions, the likelihood of cooperation can diminish.

It is inevitable that when actors cooperate with others, they monitor the behaviors and interactions of those with which they collaborate (Marwell & Schmitt, 1975). Systematic and formal monitoring is essential to strengthening the intensity of cooperation.

Fifth, the *monitoring of partner* is considered the highest cooperation intensity in a policy process because its initiation requires close coordination and involvement among actors. At this level of cooperation, actors can check the decisions and actions implemented by their partners and share monitoring results with one another. In doing so, they can solve problems and plan preventive measures together. Note that partners should monitor one another in an unbiased fashion to ensure that all actors interact purposefully and harmoniously under limited resources and to guarantee that work redundancy is minimized. Although monitoring might render work and decision making, actors should willingly undergo scrutiny.

Systematic and formal monitoring is important in enriching policy works and outcomes because it facilitates an effective policy process. An issue that must be emphasized, however, is that actors should not monitor their partners as a means of fault-finding but as a guarantee of the successful achievement of the common goals. The concerted effort toward goal achievement is the fundamental factor that triggers cooperation among actors under a policy process.

To facilitate the examination of cooperation intensity among government organizations in a policy process, this research identified general attributes of the seven internal

structure variables of an action arena (Table 5.1). Because the evaluated actors are government organizations who occupy different positions in the AEDP policy process, they were assumed to have complete information about the action arena. Note that a high level of cooperation intensity necessitates perfect information.

Table 5.1 Comparison of the internal structure of the action situation at different cooperation intensities

Variables	Cooperation intensity				
	Common Goals and Benefits	**Pooled Resources**	**Shared Responsibility**	**Synchronized Activities**	**Partner Monitoring**
Actors	Government organizations responsible for policy development and implementation				
Positions	Policy-maker, policy consultant, and/or policy operator				
Actions	• Communicating on situations, problems, and solution direction • Negotiating common goals and mutual benefits	• Committing to the same problems and solutions • Devoting resources openly and systematically	• Clarifying and addressing the overlapping responsibilities • Responding to the same derived policy targets • Accepting authorized representatives • Working collectively with others	• Clarifying and synchronizing duplicate policy activities • Organizing collective activities consistently • Planning and agreeing on activity synchronization • Conducting policy activities together	• Checking and monitoring partners' decisions and actions • Sharing monitoring results with all actors • Collaboratively solving problems and planning for prevention
Information	Complete, but imperfect information		Complete and perfect information		
Control	Varied on the contributions to the potential outcomes				
Potential outcomes	• All actors agree on common goals and mutual benefits. • Individual derived goals are set consistently	• Actors solve the problems together. • Pooled resources belong to everyone and used to solve problems. • Limitations in resources are overcome	• Overlapping roles and responsibilities are minimized • Policy target achievement is the responsibility of all actors • Policy integration is realized	• Policy activities are well-organized • Policy activities are addressed and supported by all actors	• Actors work purposefully and harmoniously • Work redundancy is minimized • Problems are solved or prevented in time
Costs and benefits	• Individual policy direction does not obstruct others • Both system and derived goals are served	• Access to more resources • Partners that help manage problems • Disclosed or sharing of sensitive resources	• Smooth policy workflow • Effects from others' unpleasant behaviors and results	• Lean policy process • Saving resources • Effects on individual actor's control over policy works and outcomes	• Effective policy process • Inflexibility in work and decision-making

5.4 Results

5.4.1 Intensity of cooperation under the policy process of AEDP 2015

      1) Policy development

In the development of EFW targets for AEDP 2015, the MoEN plays the most important role as a decision-maker that is accorded full power to decide on and formulate policy. The MoNRE and MoI are involved principally as policy consultants who share information, suggestions, and knowledge required by the MoEN.

Considering the intensity of cooperation in the development of AEDP 2015, all the actors share a common goal in solving problems caused by MSW and will gain mutual benefits in serving the national agenda when the goal is achieved. Therefore, actors can use commonality in goals and benefits as a reference when deciding on whether or not cooperate with other parties. This is considered a good starting point for further cooperation given that all actors agree on a single direction. Nevertheless, it is important to note that individual actors are still committed to their own policies, which are regarded as different derived goals.

As demonstrated by the interview results, the MoEN's derived goals lie in the conversion of MSW into EFW, as stated in the AEDP 2015 targets. The derived goals of the MoNRE are to reduce MSW generation and increase sanitation in MSW treatment, but the ministry views EFW as a by-product of MSW reuse and recycling. For the MoI, a derived goal is the reduction of organic waste at dumpsites, driving it to focus on encouraging people to separate organic waste and use it as a fertilizer. All these actors try to solve the MSW problems experienced by Thailand, but variances in their derived goals have given rise to different solutions—a situation that can hinder elevation to a stronger level of cooperation for a particular policy.

During the development of EFW targets, the MoEN required cooperation from the MoNRE and MoI in pooling resources, especially information about MSW management. The interview findings uncovered that even though the two aforementioned actors shared ideas and information with the MoEN, they did not openly accomplish this task and acted similar to outsiders that do not bear responsibility for the success of AEDP 2015. This

discrepancy in commitment was further compounded by varying EFW priorities, as reflected in the ministries' derived goals. As a result, the MoNRE and MoI did not see the necessity of the information sharing, which in turn affected the pooling of resources and impeded the movement toward increased cooperation intensity.

Cooperation through the sharing of responsibilities among the actors is not easily discernible, but the MoEN staff have attempted such sharing with the MoNRE by setting up action plans in as much accordance as possible with the National Solid Waste Master Plan. The interviewees explained that when problems occur, all relevant actors should concertedly assume accountability for solving problems.

During the development of AEDP 2015, one of the most important activities were public hearings. The interview stated that individual actors conducted these events separately possibly because of differences in the timing of policy development and the duration of policy implementation. Had relevant policies been integrated, the actors could have at least synchronized their public hearing activities. This synchronization would have enabled them to acquire various views and comments on MSW problems and solutions and, in the end, analyze the situation together and identify solutions holistically.

In the matter of partner monitoring, because the AEDP 2015 development is the sole responsibility of the MoEN, such checks and balances were not mentioned by interviewees.

2) Policy implementation

Achieving EFW targets under AEDP 2015 implementation necessitates the establishment of collective waste collection centers, whose construction is the responsibility of the MoI with support from the MoNRE.

In this respect, the actors still pursue the same common goals and benefits seeing as such elements cascaded from the development of AEDP 2015. However, the MoNRE and MoI continue to be devoted to the implementation of their own policies.

Another significant strategy is motivating the MoI and the private sector to invest in EFW plants. In keeping with this approach, the MoEN provides incentives to investors and

cooperates with the MoNRE in sharing knowledge and information on EFW technologies to interested parties.

In the implementation of AEDP 2015, the actors do not fully shoulder responsibilities as a team. As mentioned previously, the building of the collective waste collection centers is the responsibility of the MoI, which is aided by the MoNRE in terms of ensuring feasibilities, knowledge, and information about technologies and investments. The MoNRE also supports the MoEN in research and development for EFW technologies and production.

Similar to the synchronization of activities, cooperation intensity at this level is imperceptible. Cooperation among the actors, in its current form, is limited to linking activities for EFW investment owing to the MoEN's encouragement of the MoI, through inducements, to convert collected MSW into energy and the MoNRE's facilitation of the EIA process through a reduction of the time spent on the approval process.

The interviewees indicated that the actors failed to fully monitor one another given the inflexibility and suspicion of fault-finding actors; against this backdrop, no one took the monitoring process seriously. Employees of the MoEN and MoNRE stated that they simply monitor policy implementation results because they do not have the right or authority to force or push others to accomplish policy works. Furthermore, no formal and effective monitoring system is implemented by the actors. The sluggishness in developing an effective monitoring system may be attributed to the unwillingness of actor to be subjected to scrutiny. Table 5.2 compares the ideal situation for each level of cooperation intensity with the actual cooperation occurring during the AEDP 2015 development and implementation.

Table 5.2 Comparison of ideal and actual cooperate in the AEDP 2015 development and implementation

Cooperation intensity	Ideal Situation	Actual Situation	
		Policy Development	**Policy Implementation**
Common goals and mutual benefits	• Actors have similar common goals and consistent derived goals that support one another. • Problem responses and solutions are prioritized in the same direction • All actors agree on and satisfy mutual benefits.	• Actors have common goals in solving MSW problems, but they see and prioritize problems and solutions differently • Actors agree on mutual benefits in serving the national agenda, but their satisfaction is doubtful	_
Pooled resources	• Actors are committed to problem-solving and are concerned with public benefits more than individual benefits • Resources are combined openly and systematically • Pooled resources are devoted to the public and belong to all actors.	• Actors are not committed to the same solutions. • Information is not pooled openly. Actors are still concerned about the possible negative consequences of fully disclosing information.	_
Shared responsibilities	• All overlapping responsibilities and roles are clarified and shared systematically • All relevant policy works are linked systematically • Policy target achievement is the responsibility of all actors • Actors trust and respect their partners. • Responsibilities match an actor's action and control over outcomes	• MoEN has tried to link policy works with others by adjusting EFW targets in accordance with the related policies that were launched. • Mismatch requires action and control over the outcomes of MoNRE and MoI in the policy development process	• No policy targets are assumed by actors. • Some roles and responsibilities are still overlapping • Each actor is responsible for its own policy only • There is a mismatch in MoI responsibilities and actions intended to support the EFW development and investment.

Cooperation intensity	Ideal Situation	Actual Situation	
		Policy Development	**Policy Implementation**
Synchronized activities	• All actors work and agree on the synchronization of policy activities • All duplicate activities are clarified and synchronized • Collective policy activities are organized • Actors support and conduct synchronized policy activities	• No plan to clarify and synchronize the related policy activities formally	• Many activities remain duplicated • Policy activities are conducted separately
Partner monitoring	• Actors monitor their partners without bias to ensure the effectiveness of policy workflow, not for fault-finding. • Actors are willing to let others check and monitor their work. • A formal and effective monitoring system is in place.	–	• No formal and effective monitoring system is in place. • Actors monitor the outcomes after the completion of activities or processes. • Actors are unwilling to be checked and monitored.

5.4.2 The key obstacles for individual levels of cooperation intensity

Considering the comparison between the ideal and actual situations at different levels of cooperation intensity (Table 5.2), the results show the main gaps between ideal and actual interactions are:

(1) Differences in perceptions of MSW problems and the prioritization of the solutions put forward by individual actors;

(2) The actors do not openly provide sensitive or disconcerted information to partners;

(3) The actors are responsible and committed to only their own policies;

(4) It is a challenge for actors to clarify, synchronize, and reorganize the duplicated or collective policy works and activities; and

(5) The unwillingness of the actors to undergo checking and monitoring

The concluded obstacles for each level of cooperation intensity are summarized as shown in Table 5.3.

Table 5.3 The obstacles at an individual level of cooperation intensity of the case study

Levels of cooperation intensity	The key obstacle
Common goals and mutual benefits	Different views of problems and prioritization of solutions
Pooled resources	Actors do not provide sensitive or disconcerted information to others
Shared responsibilities	Responsible and committed to different policies
Synchronized activities	Challenges to clarity, synchronize, and reorganize duplicated or collective policy activities
Monitored partner	Unwillingness to be checked

5.5 Discussion

The active involvement and effective cooperation among relevant actors are considered as the major precondition to accomplish public policies. For this reason, it is necessary for the government to examine how relevant government organizations cooperate and interact with others under a policy process. These interactions relate to the behaviors of actors and the consequences of such conduct on expected policy outcomes (Marwell & Schmitt, 1975).

Park, Srivastava, and Gnyawali (2014) classified the different degrees to which actors cooperate with their partners given that the extent of collaboration can vary depending on partners and period of time (Weber & Heidenreich, 2018). This concept was adopted to classify cooperative interactions in the AEDP policy process. In this study, the intensity of cooperation was defined as *actor interactions that entail intensive contributions to policy works and outcomes*.

Correspondingly, five levels of cooperation intensity were conceptualized; collaboration through (1) the pursuit of common goals and mutual benefits, (2) the pooling of resources, (3) the sharing of responsibilities, (4) the synchronization of activities, and (5) the monitoring of partners. This cooperation hierarchy can be used as a guide in analyzing current and future (projected) cooperation and advancing enhanced collaboration. Additionally, the ideal internal structures of situation serving individual levels of cooperation intensity were proposed.

This study likewise identified and scrutinized the variables that influence the gaps between ideal and actual cooperation in the case study. This objective was accomplished by probing into different cooperation intensity levels during the AEDP policy development and implementation on the basis of ideal action arena structures (Table 5.1).

Then, the gaps in cooperation intensity with respect to ideal and actual situations of the case study were examined (Table 5.2) as well as the key obstacle of each level of cooperation intensity (Table 5.3).

Considering collaboration which is pursued through common goals and mutual benefits, it can be seen that the actors are influenced by the differences in the available information,

which in turn, impacts how actors perceive the problems and select solutions. The problems from limited information can be solved through the collaboration in pooling resources among actors, especially information.

In actual situation; however, actors do not openly provide sensitive or disconcerted information to partners. These behaviors of actors are considered as the critical obstacle among Thai government organizations which can also constrain the improvement of cooperative works at a higher level of cooperation intensity. It is explained that to share responsibilities, synchronize policy activities, and monitoring partners, the relevant actors have to clarify their roles, responsibilities, directions, status of current policy works, problems, concerns, weaknesses, etc. All actors have act straightforwardly and arguably. These interactions; however, can cause displeasure, discomfort, and conflict during the communication and clarification process. For these reasons, the improvement for the higher levels of cooperation intensity is not only constrained by the extents and internal structures of the situation, but also external factors controlling and influencing behaviors of actors.

To improve cooperative interaction holistically; therefore, it is necessary to consider the impacts of external factors constraining actors to decide and act corporately with others.

5.6 Conclusions

Following the IAD framework in analyzing patterns of interaction and adopting the concept of cooperation intensity, this study categorized such cooperative interactions into five levels, which are reflected in collaboration through (1) the pursuit of common goals and mutual benefits, (2) the pooling of resources, (3) the sharing of responsibilities, (4) the synchronization of activities, and (5) the monitoring of partners. This cooperation hierarchy can be used as a guide in the analysis of current and future (projected) cooperative initiatives and the advancement of enhanced collaboration.

With the five levels of cooperation intensity as a basis, we found that the causes of ineffective cooperation are differences in perceptions of MSW problems and the prioritization of solutions put forward by the individual actors; the actors do not provide sensitive and disconcerted information necessary for policy works openly; the actors' commitment to different policies; the challenges in clarifying, synchronizing, and reorganizing the duplicated and collective works; and the unwillingness of the actors to undergo checking and monitoring. Finally, it is recommended to study the impacts of external factors influencing actors' behavior to enhance the understanding and improvement of effective cooperation for government organizations to better conduct policy works.

CHAPTER 6
EXOGENOUS VARIABLES
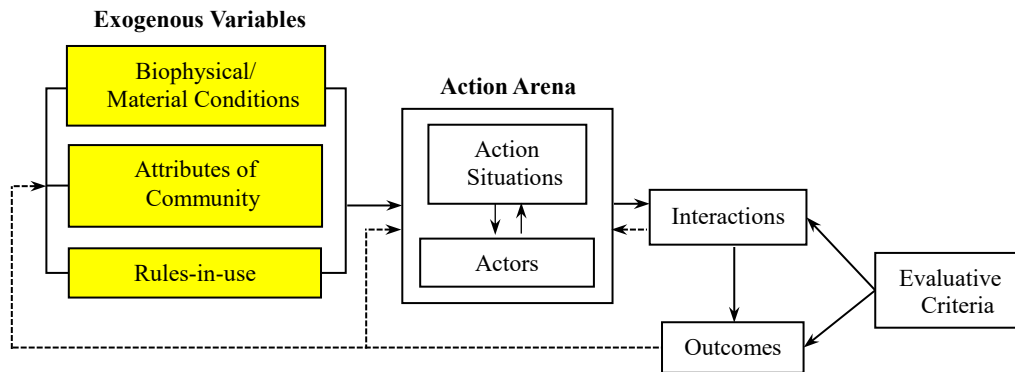
Summary

This part of the study aims to identified and depict the impacts of exogenous variables that constraint actors when they interact in an action arena.

According to the three groups of exogenous variables in the IAD framework, the characteristic of MSW (compositions and amount) and the efficiency of SWM systems are identified as the biophysical conditions, while the impacts of the relevant policies (e.g. the NSWMP and Thai Zero Waste action plan) are considered as the attributes of community because they influence the government organizations' policy working values, preferences, and belief.

Focusing on rules-in-use, this study specifically investigated aggregation, information, and scope rules that chiefly affect the actors' decisions and consequent outcomes.

6.1 Introduction

To depict the institutional dynamics influencing the case study, the overview of exogenous variables influencing action arenas is presented in this chapter.

Regarding the IAD framework, three types of exogenous variables are identified. It is important to clarify and understand these variables because their associations create incentives and constraints for actors when they interact in an action arena (Smajgl et al., 2009).

The IAD framework divides such external variables into three groups which are:

(1) Biophysical conditions
(2) Attributes of community, and
(3) Rules-in-use

This part of the study was carried out with the objectives:

(1) To examine exogenous variables influencing actors decisions in working corporately with others
(2) To analyze the key rules necessarily influencing and constraining effective cooperation among actors

6.2 Background

6.2.1 Exogenous variables

Regarding the IAD framework, exogenous variables are considered as external impacts which are divided into three groups (biophysical conditions, attributes of community, and rules-in-use).

It is explained that when these variables associate, incentives and constraints for actors in an action arena are created (Smajgl et al., 2009). Simultaneously, such incentives and constraints influent actors' behavior and decisions when they participate in a particular internal structure of the situation. The details of individual groups of exogenous variables are described as follows.

1) Biophysical conditions

This group of variables refers to the physical resources or capabilities influencing the production of goods or services in the action arena (Polski & Ostrom, 1999). Such conditions affect actors and internal structure of a situation because they control nature of resources related to actor's actions.

Material conditions considered as influencing attributes, for example, funding, infrastructure, and incentive measures are also included in this variable group (Ostrom, 2005a).

2) Attributes of community

This group of variables mainly refers to the demographic features of the community and accepted norms of behavior influencing actors in an action arena (Ostrom, 2010; Polski & Ostrom, 1999). Additionally, the homogeneity of actors' values, beliefs, and preferences about the situations and policy-oriented strategies and outcomes, the distributions of resources, and common understanding are also included (Shah & Niles, 2016).

In a policy situation; however, North (1990) and Ostrom (2005a) argued that the organizational structures, scopes of authority, and policy directions of government organizations are encompassed by governance. Such governance can be explained in general as the act of governing (Emerson, Nabatchi, & Balogh, 2012), while in collective actions, it can be seen as norms or rules designed to control actors behaviors (Ostrom, 1990).

3) Rules-in-use

Rules are "shared understandings among those involved that refer to enforced prescriptions about what actions (or states of the world) are required, prohibited, or permitted" (Ostrom, 2011). As indicated in the IAD framework, rules-in-use are consulted and applied by actors in action situations, thus reflecting that their decisions and behaviors are directly controlled by rules (Li et al., 2016). Rules-in-use are classified into seven types on the basis of the key influence that they exert on variables related to an action

situation (Li et al., 2016; Ostrom, 2005a; Polski & Ostrom, 1999). The concluded influences and impacts of individual rules are presented in Table 6.1.

As shown in Figure 6.1, it is explained that p*osition rules* are intended to manage the positions or roles of actors who participate in an action situation. *Boundary rules* identify the manner by which an actor enters or leaves a situation and therefore, affect the number of actors participating in a given state of affairs. *Choice rules* specify which actions are allowed, obligatory, permitted, or prohibited, and thus influence the responsibilities borne by actors and the freedom with which they act. *Aggregation rules* determine how an actor makes a decision and how the decision contributes to outcomes, and *information rules* are meant to control the availability of information and communication channels to actors. *Scope rules* delineate the coverage of potential outcomes that can be influenced and the possibility of achieving such ends. Finally, *payoff rules* shape the benefits and costs derived from actions and outcomes possibility of achieving such ends. Finally, *payoff rules* shape the benefits and costs derived from actions and outcomes.
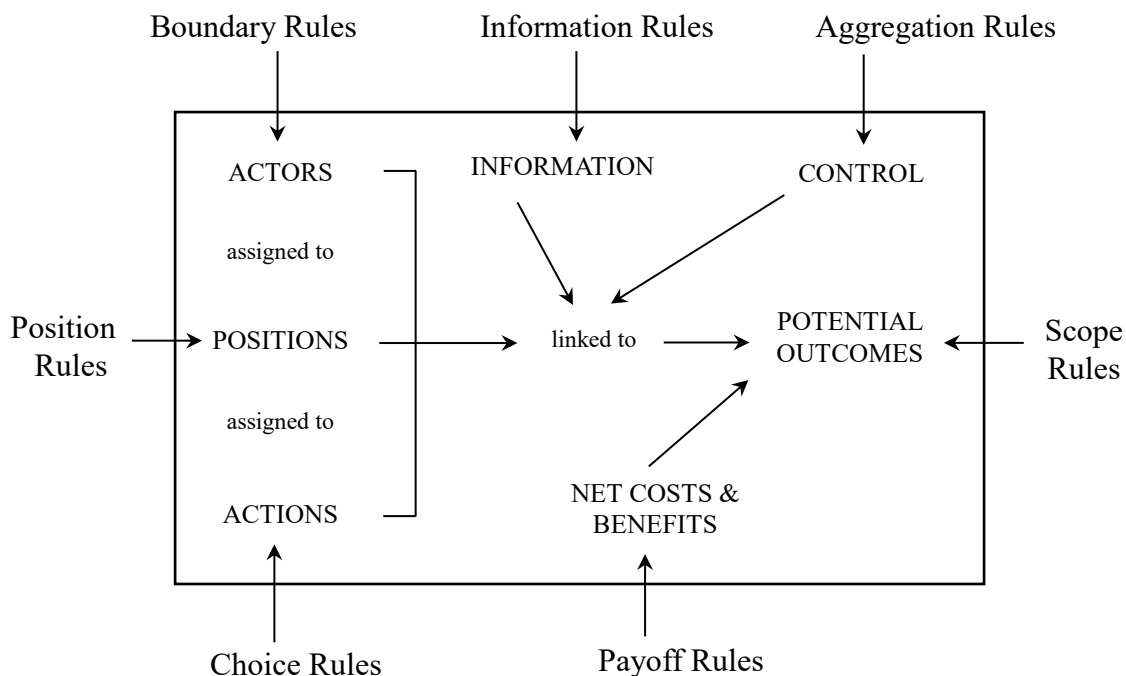
Figure 6.1 The relationship between rules-in-use and variables of an action situation

Table 6.1 Summarized influence and impacts of the seven rule-in-use

Types of Rule	Influence and impacts
Position	Specify the set of positions or roles that participants assume in an action situation and the number and type of participants who hold each position.
Boundary	Specify which participants enter or leave positions and how they do (conditions for entering and leaving the situation); therefore, these rules affect the number of participants and their attributes and resources
Choice	Specify the actions for different positions by assigning sets of allowed, permitted, prohibited, obligated actions that actors in positions at particular nodes may, must, or must not take
Aggregation	Determine how decisions are made in an action situation and affect the level of control that a participant in a position exercise in the selection of an action at a node
Scope	Specify the jurisdiction of outcomes that can be affected and whether these outcomes are or not final and delimit the potential outcomes that can be affected and, working backward, the actions linked to specific outcomes.
Information	Affect the amount and type of information available to participants in an action arena
Payoff	Affect the incentives and deterrents that will be assigned to particular combinations of actions and outcomes

6.3 Results

6.3.1 Exogenous variables necessary for case study

1) Biophysical conditions

The biophysical context for the analysis carried out as part of this research is the characteristic of MSW and the efficiency of SWM systems because these conditions affect each other and result in the quantity and quality of MSW that is potentially available for EFW production. Ultimately, these conditions constraint actor's decision and action to join and cooperate for the EFW development.

Here, the focused characteristics of MSW are compositions and amount. While the efficiency of SWM systems pertaining to the rate of MSW separation and technologies for converting MSW into EFW products.

According to the record of the SWM system (Table 3.1), there are 3,101 SWM sites in 2017. However, 234 SWM sites closed for operation (202 sites are owned by the government and 32 are owned by the private sector). Considering the treatment methods for MSW, around 85% of 3,101 SWM sites use land-burying methods, i.e. landfilling and open dumping. While only 6 SWM sites use technologies in converting MSW into energy.

In 2018 Thailand produced 27.80 million tons of MSW, indicating a 1.64% increase in production from the previous year (PCD), 2019). The trends of MSW generation and management from 2009-2018 are depicted in Figure 3.1. The compositions of Thai MSW are similar to other developing countries as organic material is the largest proportion which is accounted for around 50% followed by plastic and paper (Challcharoenwattana & Pharino, 2016).

The MoNRE and MoI have been trying to reduce the MSW generation rate and the improper disposal of such waste in the country.

Correspondingly, the MoEN established EFW targets on the basis of the assumption that in 2036, Thailand will have inappropriately disposed of approximately 70,000 tons of MSW, among which 44,000 tons would be useable as an energy resource.

Table 6.2 Statistics of 2,867 operating SWM sites in 2017 (PCD, 2018)

Status	Treatment method	Number of site operated by	
		Government	Private sector
Proper disposal (643 sites)	Sanitary and engineer landfilling	94	14
	Control dumping (< 50 tons/day)	386	86
	Incinerator with air pollution control system	25	12
	Compost and mechanical-biological treatment	13	7
	Energy converting	0	6
	Total	**518**	**125**
Improper disposal (2,237 sites)	Control dumping	2	4
	Open dumping	1,822	231
	Open-air burning	89	4
	Incinerator without air pollution control system	51	6
	Total	**1,964**	**2,209**

2) Attributes of community

Norms of behavior, preferences, and valuation of actors can be considered as attributes of community that influencing actors involved in renewable energy policy (Shah & Niles, 2016). When the working community of government organizations is considered; therefore, it is important to concern the directions of the relevant policies influencing actors to balance their responsibilities, interests, and cooperative works with others.

To this end, the policy directions of the central government which are cascaded to different organizations are the critical attribute impacting the working community of government organizations. The consequences from the central government reflect in policy establishment and revision of relevant policies, which in turns, influence government organizations' policy working values, preferences, and belief with respect to the policies that individual organizations are responding to.

Currently, the government concerns problems related to MSW, thus they promote this issue as the national agenda (Vassanadumrongdee & Kittipongvises, 2018). Amid this

backdrop, the relevant organizations are compelled to formulate policies and collaborate in serving the central government, including AEDP 2015 which places EFW as the most important targets.

Apart from AEDP 2015, this research considers the NSWP (2016-2021) of MoNRE and Thai Zero Waste Action Plan (2016-2017) of MoI as the attributes influencing the main actors of the case study.

> **The National Solid Waste Management Plan (NSWMP) (2016-2021)**

In 2014, the MoNRE established a roadmap for MSW and hazardous waste management with the objectives in 1) solving national accumulated MSW; 2) establishing a new SWM system; 3) setting regulations and measures for SWM; and 4) creating discipline for Thai people (PCD, 2016).

To serve the third objective of the roadmap, the NSWMP was established by the MoNRE and approved by the government in September 2016. Before finalized the plan, feedbacks from citizens were obtained via the PCD website, while opinions from ten relevant ministries were received through official correspondences.

The NSWP was constructed based on the ideas in promoting 3R, establishing proper SWM system, collective waste center, EFW supports, and encouraging cooperation from all relevant sectors. These ideas lead to the plan objectives in 1) directing solutions for SWM problems; 2) providing directions to integrate cooperation among government, private sector, and people to solve the national SWM; and 3) supporting local authorities to establish individual action plan in managing local MSW.

In 2019, the NSWMP aims to properly eliminate at least 30.5 million tons of national accumulated MSW. Meanwhile, in 2021 national MSW more than 19.6 million tons must be disposed properly and more than 3,889 local authorities must separate MSW at the generation sources. To accomplish the plan targets, the MoNRE emphasize the need for or effective cooperation from related actors, specifically the MoI.

> ➤ **Action plan: Thai Zero Waste (2016-2017)**

This action plan is the cooperative working result between the MoI, MoNRE, and related agencies which was approved by the government in September 2016 (DLA & PCD, 2016). To serve NSWMP by reducing MSW generation rate, increasing waste separation at generation sources, and setting directions for effective SWM, the MoI has consulted with the MoNRE in establishing this short-term action plan. The plan's objectives are 1) reduction of MSW amount sent to SWM system and 2) increase the MSW separation rate. It is believed that the plan will help in preparing the country for a zero-waste society by using 3R.

2) Rules-in-use

In line with the concept of rules-in-use as conceived in the IAD framework, the analysis in this work centered on aggregation, information, and scope rules because these are the rules that principally influence the decisions and actions of actors to interact in accomplishing policy works and outcomes.

The remaining four types of rules-in-use were excluded from consideration because all the actors involved in this case study are government organizations. Their positions and actions are mandated by law and regulations, thereby eliminating the need to consider the position, boundary, and choice rules. We also minimally examined payoff rules because we believe that the most important benefits obtainable by the actors are improvements to overall national social welfare (White et al., 2013). We regarded actor-oriented benefits as the support and cooperation that they receive under relevant policies and costs as the increase in workload and responsibilities of actors.

The aggregation rules that influence cooperation among actors in this case study, determine how decisions are made and how the effects of such decisions contribute to policy outcomes. When a government organization needs to decide on an issue, it is assumed to concern itself mainly with current situations and the value that it can offer citizens in an effort to guarantee that the decision promotes improves social welfare from different perspectives (White et al., 2013). The nature of Thai bureaucracy means that decision-making is a centralized responsibility (Bamroong, 1997; Lee, 1999), but efforts

have been exerted to balance the demands and benefits of all stakeholders, especially local people, during a policy process. Such balance is realized through public hearings, discussions featuring expert panels, and focus group meetings, wherein various types of feedbacks and recommendations are elicited. Nonetheless, even though the Thai government has been gradually leaning toward a balance-oriented approach, its key concern remains the avoidance of decisions that cause conflicts, tensions, and increased workload for officials because these can offend other organizations (Lee, 1999; Pimpa, 2012).

Information rules affect the availability of information and communication channels. The actors in this case study communicate and share information through formal channels, such as official correspondence, questionnaires, and discussions. However, the interview results indicated that the actors disclose certain information in accordance with how convenient and confident they feel about it. Some data that need to be divulged, such as information processing methods, are therefore concealed. This behavior was explained by Velayutham and Perera (2004) as originating from a shame-prone behavior, which drives government sectors to avoid disclosing information pertaining to themselves. Consequently, obtaining perfect information in an is difficult for actors, which is a problematic situation because such information is what enables actors to determine what happened in the past and how their partners will move in the future (Ostrom, 2005a). Therefore, it is necessary to consider not only the availability of complete information, but also perfect information.

Scope rules specify the extent of outcomes that can be influenced and whether desired outcomes are achieved. Potential outcomes are the consequences of an actor's decisions to implement actions given the availability of certain information. For this reason, when the MoEN evaluates potential policy outcomes with limited information as a foundation, path dependency is used to delimit results that are affected by actions. Path dependency refers to decisions that are made on the basis of past knowledge and situations. The MoEN believes that ensuring the completion of policy works necessitates adjustments to AEDP 2015 targets in accordance with related policies that were established before the issuance of this version of the plan. These adjustments are expected to clear the way for gaining the support and cooperation of other actors.

To emphasize the impacts of the exogenous variables on the EFW target development and implementation among the three actors clearly, such variables are added and linked to Figure 4.2 and then represented in Figure 6.2.

Following the IAD framework, Figure 6.3 illustrates the reorganization of elements from Figure 6.2. This diagram shows a clearer separation between external impacts and internal conditions occurring in the EFW target development and implementation leading to different levels of cooperation intensity. Under the same boundary, this diagram also shows the association between conditions or variables as well as the linkages between boundaries which provides a more organized overview of the situations.
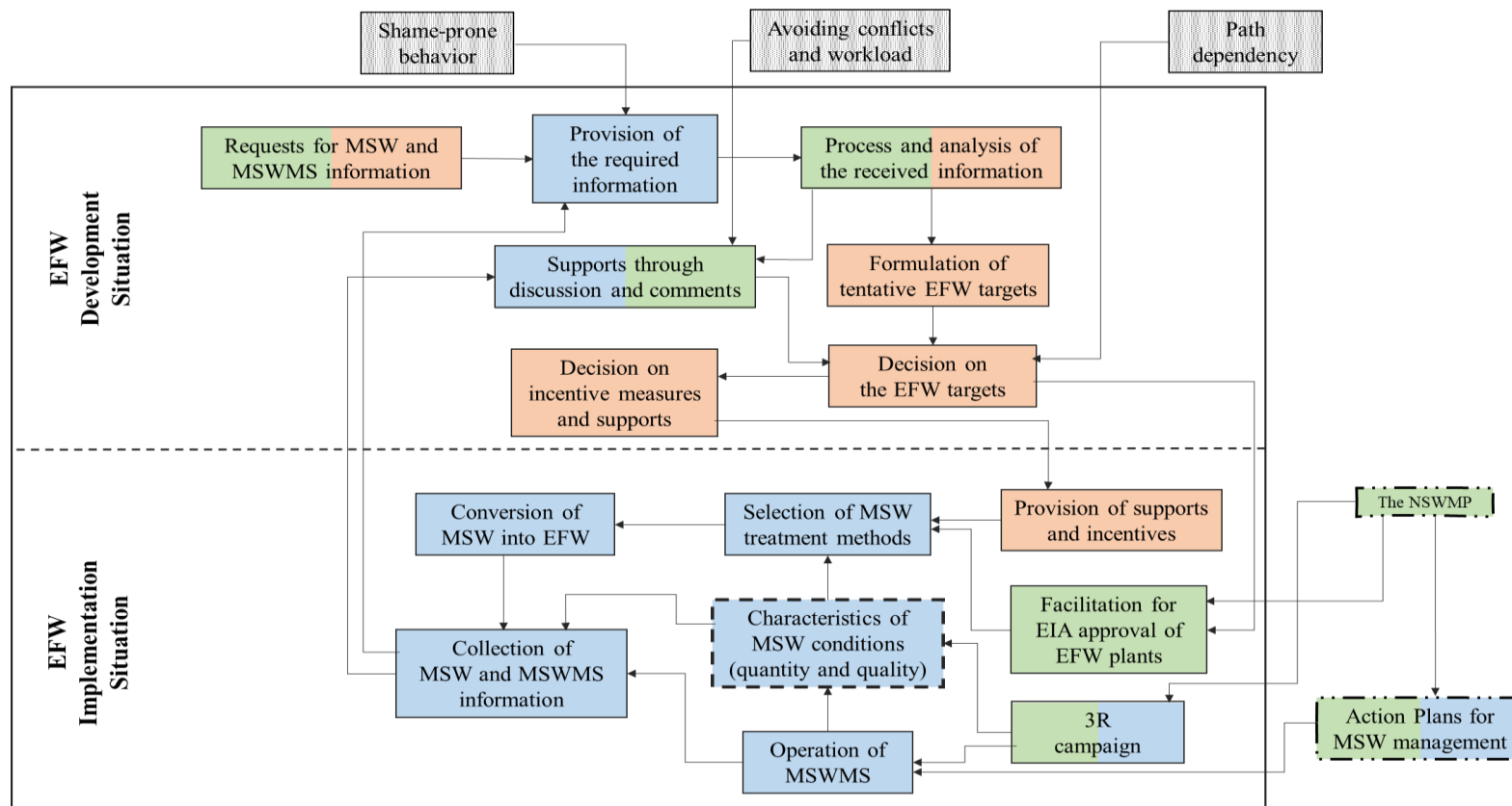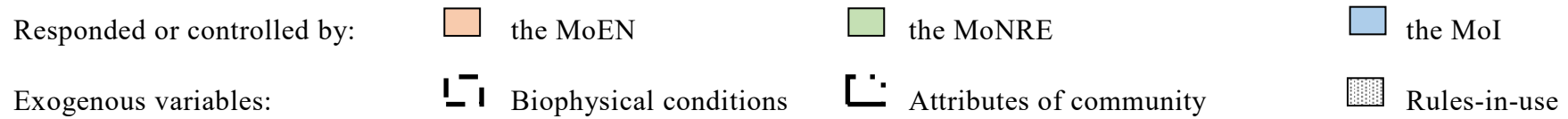
Figure 6.2 The association of exogenous variables on the policy works involved in the EFW development
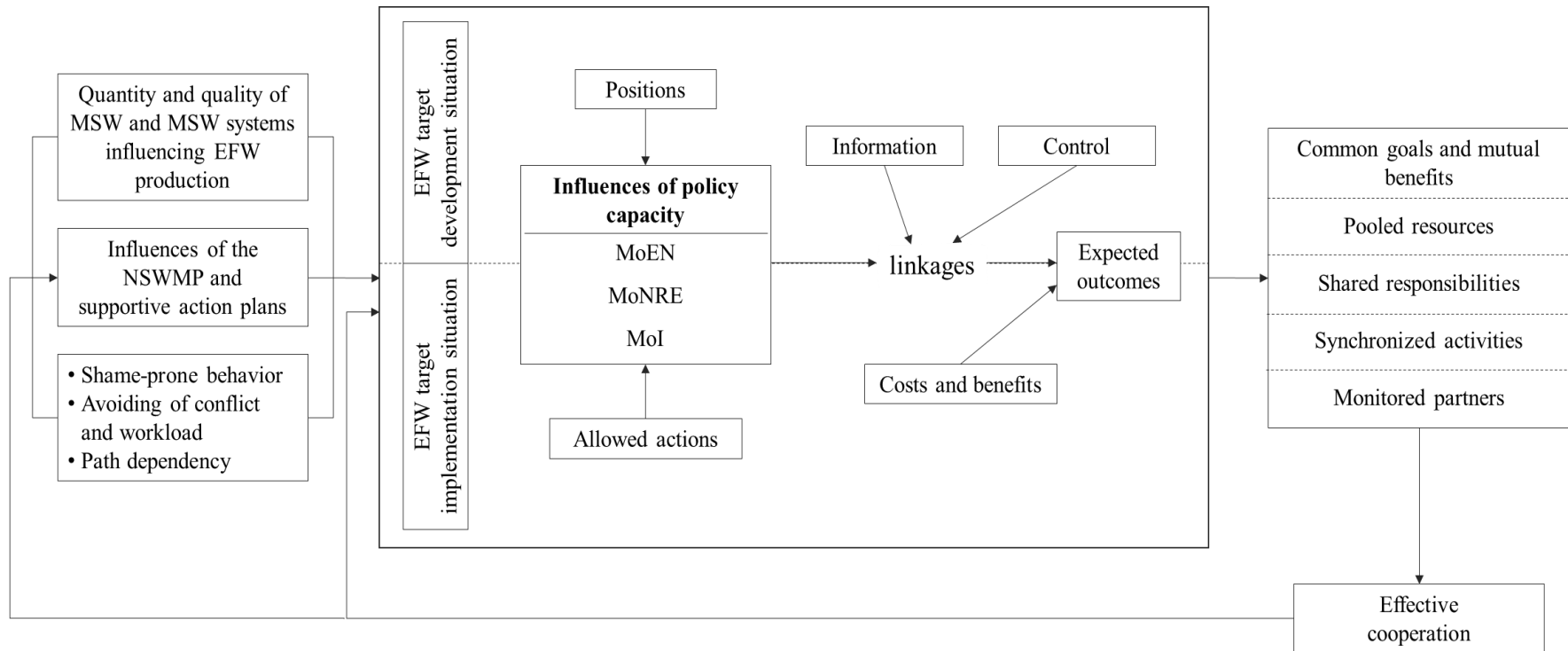
Figure 6.3 The simplified EFW development process based on the IAD framework

6.3.2 The influence of rules on the obstacles for cooperative interactions

Because rules-in-use influence and control actors who participate in different action situation, which in turn, generate patterns of interactions. Therefore, the influences of rules should be linked and used to explain the causes of the obstacles which are generated by the imbalance in the structure of the situation at different levels of cooperation intensity.

In the previous chapter, the obstacles for each level of cooperation intensity are identified. Such obstacles are:

(1) Differences in perceptions of MSW problems and the prioritization of the solutions put forward by individual actors;

(2) The actors do not openly provide sensitive or disconcerted information to partners;

(3) The actors are responsible and committed to only their own policies;

(4) It is a challenge for actors to clarify, synchronize, and reorganize the duplicated or collective policy works and activities; and

(5) The unwillingness of the actors to undergo checking and monitoring

Considering the first two obstacles which are the different perspectives on the perceived problems and the selected solutions and the hiding of sensitive or disconcerted information, this can be explained by the shame-prone behavior which is considered as the information rules. When actors have to share or discuss with partners, they avoid to disclose sensitive information; consequently, different actors understand and perceive the situations or problems based on their available information.

For the other three obstacles which are the commitment and responsibilities in different policies, the challenges in clarifying and integrating activities, and unwillingness to be checked, it can be explained by the avoiding of conflicts and increased workload when actors have to make decisions. As aforementioned in the previous chapter, to reach the higher levels of cooperation intensity, it is inevitable for actors to be opened, straightforward, and arguable as they have to clarify their workloads and working status, discuss their problems which might cause by their partners, show their concerns, failures, weakness, etc. These activities potentially cause displeasure, discomfort, and conflict

among actors; therefore, actors who controlled by the aggregation rules in avoiding conflicts and increase workload are hesitated or restrained to face these problems.

The rules influencing the obstacle for different levels of cooperation intensity are summarized and presented in Table 6.3.

Table 6.3 The key rules influencing the key obstacles for different levels of cooperation intensity

Levels of cooperation intensity	The key obstacle	Influenced by
Common goals and mutual benefits	Different views of problems and prioritization of solutions	Shame-prone behavior
Pooled resources	Actors do not provide sensitive or disconcerted information to others	Shame-prone behavior
Shared responsibilities	Responsible and committed to different policies	Avoiding conflicts and workload
Synchronized activities	Challenges to clarity, synchronize, and reorganize duplicated or collective policy activities	Avoiding conflicts and workload
Monitored partner	Unwillingness to be checked	Avoiding conflicts and workload

6.4 Discussion

According to Smajgl, Leitch, and Lynam (2009), all action arenas are influenced by rules-in-use. In the IAD framework, such rules include both formal and informal rules that significantly impact an action arena (Ostrom, 2005a). This study mainly investigated aggregation, information, and scope rules that chiefly affect the actors' decisions and consequent outcomes.

The effects of these rules on action arena variables were used to explain the decisions, actions, and behaviors of the actors as well as the obstacles for cooperation intensity at different levels. Because all the actors are government organizations, formal rules are enacted as laws or regulations. Focus; therefore, revolved around the informal rules that are molded by norms and behaviors (Van Karnenbeek & Janssen-Jansen, 2018). Informal

rules can be combined with formal ones, which can then restrict how actors interact and make decisions.

In consideration of different rules under the category of information rules, the one that most essentially affects the information variable in the action arena is the shame-prone behavior that discourages the disclosure of sensitive information (Velayutham & Perera, 2004). This rule prevents actors from acquiring perfect information, which is necessary for movement toward a higher cooperation intensity. Limited information affects actors' decisions seeing as they are forced to decide with inadequate knowledge as a basis, which in turn, affect the perceived problems and situations and the prioritization of solutions.

Elevation to more intense cooperation is likewise impeded by the control variable that is governed by the rule on avoiding decisions that can cause conflicts, tensions, and, particularly, increased workload among actors (Lee, 1999; Pimpa, 2012). This rule is categorized as of aggregate type, specifying how actors decide over choices. When actors' decision-making hinges on the desire to avoid conflicts, tensions, and increased workload, potential outcomes can be constrained. As it is difficult for actors to drive or force others for supports and cooperation.

The potential outcome variable is controlled by scope rules. In the case study, the most important scope rule is path dependency. Given that the MoEN faces imperfect information and is constrained by the avoidance of conflicts, tensions, and increased workload for its partner, it is obligated to forecast potential outcomes on the basis of path dependency. Cooperation intensity in the case study is low; thus, predicting potential outcomes with past situations as a basis is inevitable, although a higher cooperation intensity in the future might be deterred.

As patterns of cooperation are influenced by an action arena and variables in the action arena are influenced by rules-in-use, theoretically, changing the latter should result in a more appropriate internal action arena structure, which should improve the patterns of that underlie cooperation among Thai government organizations. For example, when actors make decisions, they should concern themselves with elevating the quality of national social welfare rather than devoting resources to circumventing conflicts, tensions, or increased employee workload. This does not mean, however, that actors should be

aggressive and inflexible; rather, they should decide sincerely and reasonably for the benefit of the country.

Considering the solution for shame-prone behavior, this study proposed to prevent actors from this behavior rather than eliminate the behavior by improving their policy capacity. Actors are suggested to develop their policy capacity, especially the analytical and operational capacity at systemic level because the transparent and effective information system and communication and negotiation processes can help in blocking the function of the shame-prone behavior. It is explained that when actors can process the information effectively as well as understand and accept the conditions of others, the gaps between the request and provision of information and support are reduced. Actors do not have reasons to hide or close their information from partners; therefore, shame-prone behavior is gradually inoperative.

CHAPTER 7

OUTCOMES AND EVALUATIVE CRITERIA
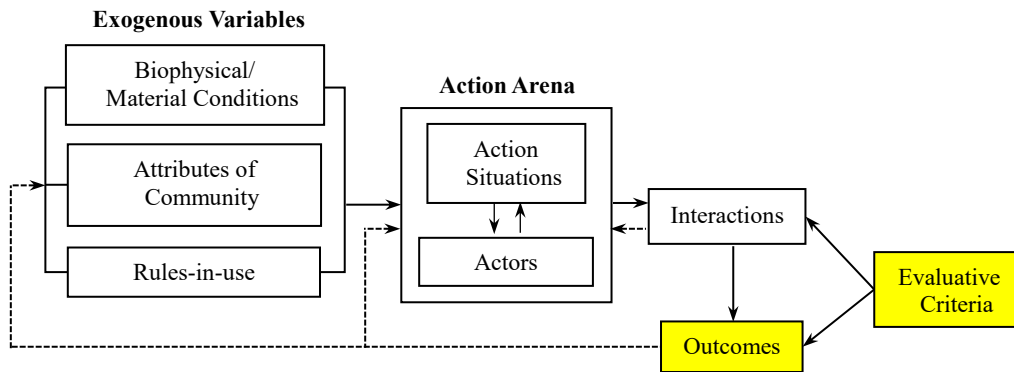
7.1 Introduction

To accomplish public policies together, actors decide to work with others at different extents which are influenced by institutions understood as rules, norms, or strategies that create incentives for the actor. Therefore; patterns that underlie such collaboration are flexible. That is, cooperation can vary depending on the degree of interaction among actors as they jointly create values (Park et al., 2014; Weber & Heidenreich, 2018). For actors who perceive problems differently, cooperation can be seen as a process that improves understanding and helps actors to find solutions that are possible to handle individually.

When different actors work together, they are inevitably interdependent; therefore, cooperation is spontaneously required (Heavey & Murphy, 2012). Although many studies have put forward efforts to increase understanding and to improve cooperation, problems in evaluating such cooperation are still challenging and required more studies (e.g. Augustyn & Knowles, 2000; Czernek-Marszałek, 2018; Lemmetyinen & Go, 2009).

It is common for actors to evaluate the effectiveness of their cooperation by using the achievement of cooperative objectives as the criteria. The problems; however, arise due to the different aims of cooperation which are varied on scopes and perspectives. Different types of entities are; therefore, used as evaluative criteria for different types of cooperation (Czernek-Marszałek, 2018). Furthermore, cooperation itself is complex as mentioned by Marwell and Schmitt (1975) that cooperation is not "a simple behaviour nor even as specific patterns of behaviours". For these reasons, cooperation can be evaluated differently. The evaluation of cooperation and selection of evaluative criteria should; therefore, be carried in respect to aims, strategy and interactions conducted in the considered situations (Pyo, 2010).

Considering public policy works in the Thai context, very few empirical researches have been conducted in in-depth study to increase understanding and find practical improvements for cooperation among Thai government organizations.

For this reason, this work; therefore, tries to apply theories and empirical studies related to the problem by conducting outcomes from cooperative interactions among the three main Thai government involve in EFW development as a case study with the study objectives:

(1) to examine the relationships between actor interactions leading to effective cooperation outcomes
(2) to propose alternative evaluative criteria for effective cooperation of government organization to conduct policy work

7.2 Background

7.2.1 Outcomes

Exogenous variables impact the structure of the action arena and generate the interactions that yield outcomes (Ostrom, 2005b). By examining the patterns of interactions and outcomes, the performance of the policy process is evaluated through the evaluative criteria (Ostrom, 2005a). When the patterns of interactions are logically generated from uncompromising IAD analysis, comprehension in outcomes then reasonably flows from the observed patterns of interaction (Polski & Ostrom, 1999).

Inference about the outcomes depends on the analytical structure of policy situation and the particular assumptions about the actor which can be changed over time when the result from the past actions are perceived (Ostrom, 2005b). Different outcomes are produced by different strategic interactions among actors (Tang, 1992); therefore, the analysis of exogenous variable impacts and the linkages between actions and outcomes can be conducted based on the observation of actual behavior or the theoretically forecasted behavior (Smajgl et al., 2009).

Outcomes are the performance of a policy process which requires standards or criteria for comparing and analyzing (Polski & Ostrom, 1999). Therefore, it is critical to identify evaluative criteria when a policy is analyzed.

7.2.2 Evaluative Criteria

Rather than forecasting outcomes, an analyst can also evaluate the achieved outcomes as well as the possible set of outcomes that could be achieved under alternative institutional arrangements (Ostrom, 2005b). Actors in the action arena and outside observer use evaluative criteria that suitable for the outcomes and the processes of achieving outcomes for outcome evaluation; however, there are numerous potential evaluative criteria.

The number of potential evaluative criteria is large. Examples of evaluative criteria provided in the IAD framework are (1) economic efficiency; (2) equity; (3) adaptability, resilience, and robustness; (4) accountability; and (5) conformance to general morality (Ostrom, 2005a).

Regarding the patterns of interactions and outcomes which can be evaluated based on particular evaluative criteria, different actors, stakeholders, or observers may use different criteria to evaluate the outcomes (Smajgl et al., 2009). This brings out the importance of clarification of the evaluators and their perspective because the same outcomes can be evaluated differently by different evaluators.

Although the selected situation, focused impacts, and evaluative criteria can be varied, the IAD analysis can somehow bring out understanding in the obstacles of the current institutional arrangements (Smajgl et al., 2009). These analytical results facilitate benefits

in enabling the desirable policy outcomes or advising the adjustment of institutional arrangement providing more desirable outcomes.

7.2.3 Collaborative process and dynamic

Considering results from patterns of cooperative interaction from Chenboonthai and Watanabe (2019) with the explanation about outcomes of collaborative process from Mandarano (2008), this work describes cooperation outcomes as the effects of actor interactions on changing working conditions under policy process. That is, effective cooperation among actors helps them to share authorities, information, and resources, and enhance capacities to overcome individual limitations, or solve problems at a larger scale from holistic view together (Ferretti et al., 2019; Lin, 2007; Liu & Zheng, 2018). In other words, effective cooperation among actors can promote better working conditions leading to the achievement of policy objectives and targets.

To initiate collaborative actions, it is necessary to drive the three interactive components to work together. Emerson (2012) identified 1) principled engagement, 2) shared motivation, and 3) capacity for joint actions as those three components and called the interaction among these components as the collaborative dynamic.

The principled engagement refers to the way how actors work together, while shared motivation refers to the relationship among actors, and capacity for joint actions refers to the arrangement and resources to create the basis for taking collaborative actions (Emerson et al., 2012; Kathrin, 2019).

Adopting the importance of collaborative dynamic for driving and maintaining collaborative actions and the fact that conducting public policy work is a continuous process; therefore, the indicators to evaluate the cooperative interaction should be able to show whether actors are driving and maintaining their cooperative interaction leading to the possible or observable outcomes.

7.3 The proposed evaluative criteria

According to the first interactive components of collaborative dynamic which is the principled engagement. This component defines the way how actors work together. This study; however, has already identified such way through the ideal internal structure of the situation. Additionally, the extents of cooperative work are identified through a different level of cooperation intensity.

Aforementioned, it is important for actors to communicate as it initiates a better understanding among them, which in turn, enhance their relationships and good working atmosphere. Moreover, communication is also identified in this work as an important process needed to be improved. For these reasons, effective communication is selected as the first criteria to evaluate the linkage between cooperative interactions and their outcomes.

To specify the nested elements of effective cooperation, the consideration starts from the first level of cooperation intensity in pursuing common goals and mutual benefits among actors. It is explained that individual actors have their own interests, responsibilities, and limited resources; therefore, when they are required to work together, it is important to set up communication relationship (O'Brien, 1968). Such communication can help actors to raise mutual support, smooth workflow, and working feedback, and understanding among actors (Rico, Alcover, Sánchez-Manzanares, & Gil, 2009). To enhance and maintain the cooperative interactions, actors must exchange information and engage in communication in order to develop a strategy and manage their work together (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). To check whether the communication is conducted effectively, National Research Council (2009) and Roberts (2004) identified 1) positive self-assertion, 2) asking and answering challenging questions, 3) expressing honest disagreements, and 4) listening to other's perspective as important elements of effective communication.

When actors communicate effectively, it initiates shared motivation among actors. Conversely, when actors have the strong shared motivation, they are encouraged to communicate more with others (Huxham & Siv, 2005).

Before actors share their motivation, firstly, they must trust each other. It is explained that when actors trust and understand each other, they are likely to cooperate (Beritelli, 2011). Additionally, when actors trust their partners, they potentially increase the level of cooperation and tend to accept risk at a higher level (Heavey & Murphy, 2012). While Nunkoo & Ramkissoon (2011) explained the linkage between trust and likelihood of cooperation that when actors trust each other, they are more likely to cooperate for overcoming their obstacles and moving towards for the accomplishment of their goals together. On the other hand, trust also encourages actors to perceive, appreciate, and reveal the differences between themselves and others (Daniels & Gregg, 2001). Consequently, trust initiate understanding among actors.

It is argued by Ansell and Gash (2007) that mutual understanding is different from a shared understanding. It is explained that mutual understanding does not only refer to the abilities to understand others, but also the abilities to respect others' positions and interests even when one might not agree. This element is very important because it can alleviate the concerns in avoiding conflicts and increased workload of others. The understanding and respect for the differences or disagreement can encourage the cooperative interaction because actors have to confront the truth, but when actors decide to avoid conflicts, the ambiguity and problems among them still remain. Consequently, actors are discouraged to maintain their cooperative works with others.

The last criteria is the capacity to joint action. Actors decide to cooperate together to generate joint values and desired outcomes which cannot accomplish individually (David, 2015; Park et al., 2014; Weber & Heidenreich, 2018). Similar to the case study, the MoEN cannot develop EFW products without supports from MSW management sectors. On the other hand, the MoNRE and MoI require support from the MoEN to encourage and facilitate the usage of EFW products. To this end, cooperative interactions among them can support each other to accomplish their goals.

According to the analysis results of the policy capacity of actors, it is identified that the processes used by actors to conduct policy works are not supportive and compatible with each other. For this reason, the supportive and compatible processes should be set as an important element under the capacity to joint action criteria. Another important element

for conducting policy works effectively and corporately is the information. When considering the argument by Groff and Jones (2003), the more important thing beyond the information is knowledge. They explained that knowledge is the combination of information and understanding in the actor's mind that guide and control actions, whereas information just informs the actors which sometimes confuse. To this end, knowledge is placed as another important element.

The three proposed criteria and its key elements for the evaluation of whether actors are driving and maintaining their cooperative interaction are concluded in Table 7.1.

Table 7.1 The proposed evaluative criteria for cooperative interaction

Criteria	Key Elements
Effective Communication	Positive self-assertion
	Asking and answering challenging questions
	Expressing honest disagreement
	Listening to other's perspectives
Shared motivation	Trust
	Mutual understanding
Capacity for joint action	Compatible and supportive processes
	Knowledge

7.4 Discussion

Adopting the concepts of the collaborative process and collaborative dynamic, this study proposes to evaluate the linkage between cooperative interactions that lead to the change of working conditions in order to corporately conduct public policy works together.

The proposed criteria are cascade from the interactive elements in collaborative dynamic as they are factors driving and maintaining the collaborative actions. Such criteria are 1) effective communication, 2) shared motivation, and 3) capacity to joint action. These three criteria drive and support each other. When effective communication is initiated, it enhances shared motivation among actors and vice versa. Then, the effective communication and shared motivation help actors to develop their capacity to joint actions, which in turn, stimulate the communication and motivation among actors.

Underlying individual criteria, its key elements that initiate and sustain the criteria are identified based on empirical researches and the analysis results from different parts of studies (policy capacity of actors, internal structure for different cooperation intensity, and key rules-in-use).

It is believed that when the three criteria are fulfilled, cooperative interactions are more likely to be implemented, maintained, and improved by all actors.

CHAPTER 8
CONCLUSION

8.1 Conclusion

This dissertation studies how to encourage EFW development in Thailand by increasing the effectiveness of the relevant government organizations in conducting policy works collectively and corporately. It is believed that when such government organizations can develop and implement the relevant public policies supporting the whole processes of EFW production, then the country will fully develop the EFW as well as discovering the true value of such alternative energies.

For this reason, the IAD framework is adopted to study the impacts of institutions influencing government organizations (actors) in cooperating with others to developing and implementing the EFW target effectively. The study aims to enhance a better understanding of rules and norms restraining actors' decisions and actions to conduct and support public policy works.

To remedy ineffective cooperation among Thai government organizations; firstly, the conditions of actors to conduct policy work effectively which is described as policy capacity are examined. The analytical framework for policy capacity is modified by adding the consideration of processes that affect the decisions and actions of the actor to conduct its policy works. Then, the policy capacity of individual actors is analyzed and the sufficient and insufficient policy capacity is identified for further improvement.

Secondly, the internal structures of action situation are analyzed on the basis of variables of action situation proposed in the IAD approach. The results show the lack of information and imbalance between the controls of actors over the expected outcomes are the main problems that discourage actors to work corporately with others.

Thirdly, to encourage cooperative works, the extents of cooperative working are specified on the basis of cooperation intensity which refers to the extents of interactions of actors

involve the contribution to policy works and outcomes. The five levels of cooperation intensity which reflects through the collaboration among actors in 1) pursuing common goals and mutual benefits; 2) pooling resources; 3) sharing responsibilities; 4) synchronizing activities; and 5) monitoring partners are proposed as well as the ideal internal structure of situations for individual levels of cooperation intensity. Examining and comparing the actual situations to the ideal situations at different cooperation intensity levels, the key obstacles restraining actors from effective cooperation are identified.

Fourthly, the external impacts influencing actors who interact in an action situation are examined based on the three groups of exogenous variables (biophysical conditions, attributes of community, and rules-in-use) stated in the IAD framework. The three types of rules-in-use which are information rules, aggregation rules, and scope rules are identified as the key rules constraining the effective cooperation among actors. These rules are considered as the causes of the obstacles at different levels of cooperation intensity.

8.2 Key findings

8.2.1 Actors

- It is necessary to consider the processes that affect the decisions and actions to conduct policy works of actors because such processes influence the results of policy works of individual actors and among organizations. It is recommended that; therefore; actors should adjust their processes to be supportive, compatible, and consistent.

- Individual actor values its own policy capacity and partners' policy capacity differently; therefore, the difficulties in cooperative working can occur.

- For the MoEN, the sufficient policy capacity is the organizational analytical capacity, while it needs to improve the organization operational capacity.

- For the MoNRE, the organizational operation capacity is considered as its sufficient capacity, but it is recommended to improve the systemic operational capacity.

- For the MoI, the sufficient policy capacity is systemic political capacity; however, it should improve the systemic analytical capacity.

- To improve the overall actors' policy capacity, the processes of individual actors at systemic levels are suggested to be adjusted to facilitate actors in producing policy works that compel well with others.

8.2.2 Situations in the policy process

- The lack of information and the imbalance between the controls of actors over the expected outcomes are the main problems in the internal structure of the situation of the case study.

- The ideal structure of action situations should be set as guidance for the current situation analysis and the further development

8.2.3 Cooperative interactions

- The concept of cooperation intensity that helps to identify a clear extent of cooperative interactions is useful for the enhancement of cooperation among actors.

- Different levels of cooperation intensity can be divided into five levels which reflect the collaboration among actors through: 1) pursing common goals and mutual benefits; 2) pooling resources; 3) sharing responsibilities; 4) synchronizing activities; and 5) monitoring partners.

- Besides the extents of cooperative interactions, it is also important to identify the ideal internal structures that match the individual level of cooperation intensity which can be used as guidance for examining current situations and improving in the future.

- The key obstacles constraining individual levels of cooperation intensity of the case study from the pursuing common goals and mutual benefits to monitoring partners are 1) actors perceive problems and prioritize solutions differently; 2) actors close their sensitive or disconcerted information; 3) actors respond and commit to different policies; 4) actors face the challenges in clarifying duplicated or collective policy works; and 5) actors are unwilling to be checked.

- The different information available for individual actors is the initial problem that drives actors to different directions.

- It is difficult for actors to be straightforward and arguable as they might cause tension, conflicts, or displeasure among actors. This restrains and discourages actors to improve to the higher level of cooperation intensity

8.2.4 External impacts

- Rules-in-use are considered as the most important external factors constraining actors to interaction in the action situation.

- Because of the shame-prone behavior, actors hide their information, which in turn, influence the availability of information for others as well as how they perceive the problems and focus on the solutions.

- However, it is difficult for actors to drive or force others to provide the required information, resources, or supports because actors are also constrained by the concerns in avoiding conflicts and increased workload of others.

- To cover the missing information and support, actors make decisions based on the path dependency in order to forecast the expected outcomes and set the working plans.

- It is necessary for the Thai government to disable the shame-prone behavior as well as the concerns in avoiding conflicts and increased workload of others by improving analytical and operational capacity at systemic level to initiate effective and transparent information system, and communication and negotiation processes.

8.3 Research implication

- It is recommended that actors should cooperate at monitoring partner level in order to advance the Thai EFW development because the success or failed policy outcomes of their partners directly influence the direction of EFW investment.

- All actors must agree on the level of cooperation intensity as well as the adjustment of the internal structure of the situation to drive the expected cooperation.

- To encourage all actors to agree on such cooperation intensity and the adjustment of situation structures, all actors must improve their communication and negotiation process at systemic level.

- Shame-prone behavior and the concerns in avoiding conflicts and increased workload must be remedied by the initiation of effective information system and communication and negotiation processes among actors.

- Changing rules; however, is not easy and takes time. In practice, adjusting some variables in an action arena can be more easily and more rapidly achieved. This study; therefore, recommends obligating all actors to thoroughly communicate with their partners as good understanding among actors, especially with regards to individual needs and limitations, is crucial to collaboration and improvements to cooperation intensity in the future.

- Because Thai government organizations evaluated their performance twice a year, the satisfaction of their partners with communication should be used as a performance criterion. As van Karnenbeek and Janssen-Jansen (2018) explained, informal rules are "the rules that are shaped by norms and behavior". Therefore, when actors communicate intensively, they gradually become accustomed to this behavior, which slowly becomes the norm for them. Consequently, intensive communication during collaboration in a policy process can serve as the rules that drive the actions of government organizations in the future.

8.4 Research contributions

8.4.1 Theoretical contributions

- The modified analytical framework for policy capacity

- The five levels of cooperation intensity and the internal structure of ideal situations

- The alternative evaluative criteria

8.4.2 Practical contributions

- Identification of sufficient and insufficient policy capacity of Thai government organizations

- Identification of the key obstacles caused by the internal structure of current situations

- Identification of the main rules constraining actors to work corporately with others

8.5 Research limitations

Addressing the limitations of this dissertation, it is noted that:

- Findings were obtained from an ex-post analysis characterized by a limited number of variables and constraints. The informants are limited to only government staff from the focused organizations.

- The proposed analytical framework and concepts in this study are designed with the focus on the analysis of government organizations rather than various actors from different sectors.

- The proposed classification of cooperation intensity is a simplified one; in reality, cooperation does not occur as systematically and linearly as described in this research. The establishment of cooperation can proceed backward, combined, or be disregarded altogether.

It is hoped; however, that the lessons learned from the case study and the recommendations will benefit future research on policy development and implementation, especially on the next revision of AEDP 2015.

8.6 Recommendation for future research

Considering the limitations of this dissertation, future research is suggested to examine actors in a more variety. Actors from local people, private sectors, and NGOs should be added to the study to generate a more complex situation which is more realistic. Then, the range of exogenous variables can be increased. The rules-in-use referred by different groups of actor should be examined deeper and wider to improve a better understanding in impacts of rules constraining actors in the action arena.

As the IAD framework is flexible and can be combined with various concepts and analytical techniques, other analytical approaches should be adjusted to examine particular case studies in a more specific way.

Moreover, different patterns of interactions in the policy development and implementation process should be studied, for example, negotiation, ignorance, or communication among actors should be studied under different action arena conditions for better understanding in institutional impacts that constraint the successful of the policy process.

APPENDIX A

Semi-constructed Interview Questions for Interviewees from the *MoEN*

A. Please introduce yourself and explain your involvements and contributions in the AEDP 2015 development and implementation.

B. Please describe the background, conditions, and assumptions when AEDP 2015 and EFW targets were drafted and formulated.

C. Please explain the processes and procedures used to develop and implement AEDP 2015 and EFW targets, including the difficulties, limitations, problems, and challenges facing during the processes.

D. Who are the main relevant government organizations involving in policy development? What are their roles, involvements, and contributions? How they interacted, cooperated, and supported the development of AEDP 2015?

E. How are the current situations in implementing AEDP 2015 and EFW targets?

F. Do you think that the targets under AEDP 2015, especially EFW targets, were set appropriately and why?

G. What are the factors, conditions, or limitations that can restraint the success of AEDP 2015 and EFW targets? What should be done or provide for better support for AEDP 2015?

H. Will the AEDP 2015 be revised? When and what are the reasons? What are the likelihoods of the revision?

APPENDIX B

Semi-constructed Interview Questions for Interviewees from the *MoNRE* and *MoI*

A. Please introduce yourself and explain your involvements and contributions in the AEDP 2015 development and implementation.

B. What you have done to support and cooperate with the MoEN and other organizations in order to serve the AEDP 2015? What are the processes or procedures that you used when working with other organizations?

C. Please explain your roles, responsibilities, authorities, and duties for EFW management. What are the limitations, constraints, and challenges facing currently? How were the problems solved or managed? What supports that should be provided?

D. As an organization who manage and control MSW which is the key resource for EFW production, what are your opinions about AEDP 2015, especially EFW targets? Why? How you can support or cooperate with the MoEN for the success of your policy and AEDP 2015?

E. What do you think about the consistency and integration between your policy and AEDP 2015? Are there any points to improve?

F. What are the factors, conditions, or limitations that can restraint the success of AEDP 2015 and EFW targets? What should be done or provide for better support for AEDP 2015? How can you support the plan?

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ACKNOWLEDGEMENT

My deepest appreciation is for Professor Tsunemi Watanabe, who supported and supervised me throughout my doctoral study at Kochi University of Technology. He did not only teach me how to do research but also how to see everything positively. I would like to thank for his valuable advice, powerful encouragements, and patience. My study would have not been this far without him.

With my great honor to Professor Kotani Koji, Associate Professor Nakagawa Yoshinoya, Professor Nasu Seigo, and Associate Professor Tajima Masaki for supporting me as my research examination committees. I would like to thank for your valuable time, comments, and suggestions.

I would like to extend my thanks to the Royal Thai Government for giving me an opportunity to join HIPPS program. I did not only know good friends, but also gain connections that help me for the expert interviews.

Many thanks for Assistant Professor Tassanee Prueksasit for your supports and cares since I was undergrad student until now in every possible way.

Many thanks to Wachirawan Nonthakanok, Benjawan Kamsri, and Patthapol Thirakulnanchai for your care, friendship, encouragements, and supports. You are always by my side, cheer me up, and listen to me.

Many thanks to Assistant Professor Napat Rujeerapaiboon and Dr. Kulyanee Jongjairuksa for your encouragement, care, and friendship that helped me overcome tiredness and disappointment.

Many thanks to my colleagues from the Ministry of Labour and Phelps Dodge International Thailand Limited for your friendship, support, and care. For me, you are more than my colleagues, but sisters and brothers.

Many thanks are extended to all of my friends both Thai and Japanese and my laboratory mates both undergrads and postgrads. You make my life here colorful and

meaningful. Thank you very much for your warm supports, unforgettable memories and beautiful friendships.

Thank you for all the happiness and sadness, hopefulness and hopelessness, fulfillment and disappointment, strength and weakness, good days and bad days, compliment and criticism, pressure and effort, tiredness and patience, right decision and mistake, tear, smile, and laughter that passed into my doctoral student life and made me grow up.

Finally, special big thanks for my family, my fiancée and his family for your support, encouragement, patience, trust, and love. You are the wind underneath my wings.