Local Administration Journal 15(3) • July – September 2022 • 255 - 278
Received: May 3, 2022 • Revised: June 26, 2022 • Accepted: August 30, 2022
RESEARCH ARTICLE

Designing Collaborative Capacity Enhancement: A Case of Collaboration in Waste Management in Normal Times and During the COVID-19 Pandemic

Sirinbhattra Sathabhornwong
Department of Public Administration, Faculty of Political Science,
Ubon Ratchathani University, Thailand

Abstract
An increasing amount of waste is a universal issue that matters to many countries in the world including Thailand. Recently, the amount of global waste has tremendously increased due to the COVID-19 pandemic. A key solution to this problem is collaboration in waste management. This study conducted focus group discussions to elicit suggestions for enhancing collaborative capacities for waste management, both in normal times and during the Covid-19 epidemic in Thailand. The study produced the following recommendations: (1) Enhance knowledge, boundary-spanning, policy, and incentive capacity; (2) Determine how best to use existing resources to facilitate collaboration; (3) Define Key Performance Indicators (KPIs) of waste management collaboration; and (4) Create a reporting system and convene a multi-sector forum for monitoring and evaluation of the collaboration.

Keywords
COVID-19, waste management, healthcare waste, collaboration, collaborative capacity

CORRESPONDING AUTHOR
Sirinbhattra Sathabhornwong, Department of Public Administration, Faculty of Political Science, Ubon Ratchathani University, 85 Sathonlamark Road, Warin Chamrap District, Ubon Ratchathani, 34190, Thailand. Email: sirinbhattra.s@ubu.ac.th

Introduction

An increasing amount of waste is an increasingly vital issue for many countries in the world, including Thailand. As a result, waste problems have been declared a national agenda of Thailand since 2014 (Chotthong & Boonyouang, 2021). The government also announced a road map on waste and hazardous waste management in 2014. After that, the national solid waste management master plan (2016 - 2021) and the "Thailand zero waste" action plan (2016 – 2017) were approved by the cabinet in 2016 (Pollution Control Department (PCD), n.d.). To implement these national policies, the Provincial Office of Natural Resources and Environment of Ubon Ratchathani (Ubon) initiated the "*plastic bag and foam box are not welcome in the office*" scheme in 2017. This scheme has been implemented by government agencies in that province to reduce the daily amount of waste and to serve as an example of waste reduction practice for other provinces and society at large. Ubon has encouraged people to use reusable food containers to replace single-use plastic bags and foam boxes (Provincial Office of Natural Resources and Environment Ubon Ratchathani, 2017). Moreover, Ubon has organized the "*Ubon clean city, capital of Isan, big cleaning day, Pracharath (civil state) policy, Ubon Ratchathani Province*" campaign on a regular basis. The campaign is implemented in the following locations: (1) All buildings of government agencies and local administrative organizations (LAO); (2) All main roads, minor roads, and village roads; and (3) All tourist attractions and other public places in Ubon. The activity consists of four tasks as follows (Protected Area Regional Office 9 [Ubon Ratchathani], 2018):

(1) Implement the principle of "5-S" at all buildings of government agencies and LAO in Ubon. The principle of 5-S is derived from five Japanese terms beginning with the letter "s" as follows (American Society for Quality (ASQ), n.d.):

- *Seiri* (Sort): eliminate whatever is not needed by separating needed tools, parts, and instructions from unneeded materials;
- *Seiton* (Organize): organize whatever remains by neatly arranging and identifying parts and tools for ease of use;
- *Seiso* (Cleanliness): clean the work area by conducting a cleanup campaign;
- *Seiketsu* (Standardize): schedule regular cleaning and maintenance by conducting *Seiri*, *Seiton*, and *Seiso* daily;
- *Shitsuke* (Discipline): make 5-S a way of life by forming the habit of always following the first four S.

(2) All government agencies, state enterprises, LAOs, local environment volunteers (LEV), private companies, and citizens of Ubon collaboratively organize the "Big Cleaning Day";

(3) LAOs and LEVs in Ubon organize the "Big Cleaning Day" activity at LAO, markets, all roads, tourist attractions, and other public places at least once a month and report the results of the activity to the provincial governor;

(4) All government agencies, state enterprises, LAOs, LEVs, private companies, and citizens of Ubon collaboratively promote waste reduction and waste separation, reduction of plastic bags and foam boxes, promotion of eco-friendly products and packaging usage, conduct the Big Cleaning Day activity, and conduct other environmental community activities.

In 2019, waste management schemes and activities continued. In addition to this, Ubon has declared that slogan the "*Ubon citizens unite to adopt waste separation*," and there was a kick-off of the waste separation campaign on January 9, 2019. Waste is segregated or separated into four major types:

(1) Organic waste: biodegradable waste, such as food, vegetable, and fruit scraps;

(2) Recyclable waste: waste that can be converted into new products, such as glass, paper, plastics, and metal;

(3) General waste: non-biodegradable and non-recyclable waste, such as chip bags and foam boxes;

(4) Hazardous waste: waste with the potential for harmful effects on human health or the environment, such as aerosol cans, electronics, electrical equipment, etc.

The key organizations that drive the waste separation policy in Ubon are the Regional Environmental Office 12, the Ubon Provincial Health Office, and LAOs (National News Bureau of Thailand (NNT), 2019).

Waste management of Ubon and four of its neighboring provinces (Mukdahan, Yasothon, Sisaket, and Amnat Charoen) is under the supervision of the Regional Environmental Office 12 (Regional Environmental Office 12 Ubon Ratchatani, 2017).

Table 1. Amount of waste in provinces under the supervision of the Regional Environmental Office 12 in 2018

Province	Accumulated Waste in 2017 (tons)	Amount of waste generated in 2018 (tons per day)
Mukdahan	331	335
Yasothon	0	512
Sisaket	0	1,281
Amnat Charoen	840	433
Ubon Ratchathani	3,988	1,801

Source: Adapted from "Results of the management of accumulated solid waste under the road map of 2018", by Regional Environmental Office 12 Ubon Ratchatani, (2018)

Table 1 shows that among five provinces under the supervision of the Regional Environmental Office 12, Ubon Ratchathani had both the highest amount of accumulated waste in 2017 (3,988 tons) and the highest amount of waste generated in 2018 (1,801 tons per day). Furthermore, Ubon Ratchathani has four sanitary landfills, but two of them are not operational due to the opposition of local residents (Table 2).

Table 2. Sanitary landfills in Ubon Ratchathani

No.	Location	Status
1	Ban Nong Paen	Operating
2	Ban Don Pha-Ung	Operating
3	Chaeramae	Not operating
4	Ban Bok	Not operating

Source: Adapted from "Sanitary landfills under the responsibility of Regional Environmental Office 12 Ubon Ratchatani consisting of 5 provinces (Yasothon, Mukdahan, Sisaket, Amnat Charoen, Ubon Ratchathani) totaling 11 landfills", by Regional Environmental Office 12 Ubon Ratchatani (2019)

According to the data provided, problems of Ubon Ratchathani's waste management basically are the large amount of waste and a small number of sanitary landfills. A key solution to these waste management problems is collaboration in waste management. National and provincial policies encourage all sectors to collaborate in waste reduction and waste separation. Research by Sathabhornwong (2019) has found that there are three types of collaborative capacities: knowledge, boundary-spanning, and policy. If implemented, these three policies are likely to make collaboration in waste management successful in terms of solutions to waste management problems and promote collaborative relationships of participating sectors. Therefore, the author has conducted focus group discussions (FGD) with representatives of multiple sectors which collaborate in waste management in Ubon Ratchathani. The objective of the FDG is to solicit suggestions on how best to enhance collaboration for waste management, both in normal (i.e., pre-Covid) times and during the Covid-19 epidemic in Thailand. This article draws from data gathered in the research entitled, "Participatory Action Research (PAR) to Enhance Capacities of the Multi-Sector Collaboration in Solid Waste Management in Ubon Ratchathani Province" (2020-2021). The author of this article is also the author of the research that is mentioned, and this current article has a different scope from the previous one.

Research Objectives

This study has two major objectives as follows:

1. To make suggestions on enhancing collaborative capacities of collaboration in waste management in Ubon Ratchathani Province in normal times;

2. To make suggestions on enhancing collaborative capacities of collaboration in waste management in Ubon Ratchathani Province during the Covid-19 epidemic.

Concepts and Theories

Collaborative Capacity

Collaborative capacity is defined in various ways based on the author's ideas rather than empirical research. This capacity may be defined as the potential of the participating sectors to develop or manage collaboration (Sathabhornwong, 2020). In this context, Thomson and Perry (2006) defined the concepts of administrative capacity and social capacity. They stated that the key to getting things done in a collaborative setting rests in finding the right combination of administrative capacity (through coordination and elements of hierarchy) and social capacity to build relationships. They did not explain administrative capacity and social capacity in detail. However, other authors have later explained elements of administrative capacity and social capacity as follows:

Administrative Capacity

Lodge and Wegerich (2014) defined administrative capacity as the set of skills and competencies expected of public organizations to facilitate and contribute to problem-solving. This capacity covers structural and procedural provisions that enable public organizations to perform functions and embrace capable and skillful individuals to meet the expectations of their chiefs and the public. Based on Lodge and Wegerich's work, there are four subtypes of administrative capacity:

(1) Delivery Capacity

Delivery capacity is defined as the capacity to complete tasks with available resources to ensure that citizens will receive the public services they need. Delivery activities include public service provision and coercive activities, such as policing and tax collection. Furthermore, this capacity is related to the government's power to provide public services, especially when the private sector is not capable of doing so.

(2) Regulatory Capacity

Regulatory capacity is defined as enforcement capacity. It is often related to an oversight function. It entails the presence of regimes combining statements on what is to be achieved, with an apparatus detecting and enforcing compliance. It can be a challenge for cross-organizational collaboration, where there are different regulatory bodies involved.

(3) Coordination Capacity

Coordination capacity is the capacity to bring together and align organizations from different backgrounds for collective purposes. It relies on the abilities of individuals within the organizations to possess the ability to hierarchically impose ways of working together and a non-hierarchical facilitating role or an orchestrating role. This capacity also relates to the ability to deal with difficulties in mediating agreements between organizations, for example, the "boundary spanning" capacity. The boundary-spanning capacity is the capacity to create linkages that integrate and coordinate across organizational boundaries (Beechler et al., 2004)

(4) Analytical Capacity

Analytical capacity is the capacity to inform the government about current developments and future projections. It addresses demands on forecast and intelligence that facilitate policy making under uncertain conditions. This capacity is relevant to how the government ensures transparency and legitimacy of the application of knowledge, how the government deals with alternative sources of information, and how the information is being accessed and disseminated by the government.

Grotenbreg and Buuren (2016) have discussed how public organizations employ the concept of administrative capacity in their collaboration. They studied how national and local authorities employed their administrative capacities to succeed in public-private collaboration, such as integrated energy and waterworks. Furthermore, they made distinctions between each subtype of administrative capacity. Delivery capacity could be employed in financial contributions and allowing external actors to use public infrastructure. Analytical capacity could be used in the form of sharing governmental data with private organizations. Coordination capacity could be engaged in the roles of network manager and boundary spanner performed by public organizations. Lastly, regulatory capacity could be performed by adjusting existing rules of public organizations and drawing up new ones for collaboration.

Social Capacity

Lichterman (2009) defined social capacity as the ability of an individual to act as a mutually responsible citizen in organizing public relationships rather than leaving those relationships entirely under the direction of either impersonal market mechanisms or administrative fiats of the state. Examples of such competencies are the ability to talk and act reflectively, ability to coordinate, and ability to engage in problem-solving that involves a variety of socially diverse groups.

When the concept of collaborative capacity is applied in the study of collaboration in waste management in Thailand, Sirinbhattra (2019) suggested six points:

(1) The type of administrative capacity that is the most important for efficient collaboration in waste management is "knowledge capacity." Public organizations need two forms of knowledge: knowledge about collaboration, i.e., how to work constructively with other sectors, and knowledge about waste management technologies;

(2) The second most important administrative capacity is "financial capacity." Therefore, public organizations should have budgets for waste management collaboration. These budgets can come from their organization's budget and government budget allocations;

(3) In terms of a social capacity, the "boundary spanning capacity" is the most important capacity for waste management collaboration. It is the ability of an individual to encourage other individuals to voluntarily participate in collaboration;

(4) The social capacity that is next most important after boundary spanning capacity is the "public participation encouragement capacity." Public participation in waste management collaboration can be encouraged in several ways, for example, by promoting the concept of community-based waste management that requires the involvement of all sectors with the public and presenting potential benefits and innovations of collaboration to the public;

(5) The social capacity that is also important is the "public awareness creation capacity." Public awareness is connected to public participation because public participation is more likely to emerge when all stakeholders have public awareness. It is also relevant to boundary spanning since it can inspire other individuals or organizations to participate in the collaboration. Public organizations can create public awareness of the importance of waste management collaboration, the need for public participation in this collaboration, and the perception that waste is a useful resource – i.e., waste can be transformed to energy, bio-fertilizers, and recyclable and reusable materials;

(6) The last collaborative capacity that is needed for efficient collaboration in waste management is "policy capacity." This is a type of administrative capacity. Public organizations should have policies to support collaboration for waste management. These policies can be government policies and/or policies initiated by the organization. For example, Sirinbhattra (2019) found that some Thai LAO want the government to enforce a national policy on how to perform waste management collaboration at a local government level, while some LAOs need to have their own executive policies and local ordinances to support waste management collaboration and to support systems and management of the collaboration.

Healthcare Waste

Healthcare waste is defined by the World Health Organization (WHO) as the waste generated by healthcare activities. It covers a diverse range of materials, and can be categorized into eight types (World Health Organization (WHO), 2018):

Infectious Waste

Infectious waste is defined as the waste contaminated with blood and other bodily fluids, laboratory cultures and stocks of infectious agents from laboratory work, the waste from patients with infectious conditions;

Pathological Waste

Pathological waste is defined as the waste of human tissues, organs, fluids, body parts, and contaminated animal carcasses;

Sharps Waste

Sharps waste is defined as the waste composed of used sharps, for example, syringes, needles, and disposable scalpels and blades;

Chemical Waste

Chemical waste is defined as the waste that derives from chemicals, for example, solvents and reagents used for laboratory preparations, disinfectants, sterilant, and heavy metals contained in medical devices and batteries;

Pharmaceutical Waste

Pharmaceutical waste is defined as the expired, unused, and contaminated drugs and vaccines;

Cytotoxic Waste

Cytotoxic waste is defined as the waste containing substances with genotoxic properties, such as cytotoxic drugs used in cancer treatment and their metabolites;

Radioactive Waste

Radioactive waste is defined as the products contaminated by radionuclides including radioactive diagnostic material or radio therapeutic materials;

Non-Hazardous or General Waste

Non-Hazardous or General Waste is defined as waste that does not pose any biological, chemical, radioactive or physical hazard to humans.

Waste of Personal Protective Equipment (PPE), such as boots, long-sleeved gowns, heavy-duty gloves, masks, goggles, and face shields, is considered “infectious waste.” Globally,

this type of healthcare waste has increased significantly during the Covid-19 pandemic (WHO, as cited in Das et al., 2021)

Healthcare Waste Management Policies or Measures

Different countries have different policies or measures for managing healthcare waste. Information about the survival period of the Covid-19 virus on different substrates is very important for formulating appropriate measures for healthcare waste management. Covid can survive on a solid surface from a few hours to nine days (Das et al., 2021). Therefore, healthcare waste should be stored at least nine days before disposal.

The WHO has formulated special guidelines to manage healthcare waste as follows (Institute for Global Environmental Strategies [IGES], 2020):

Infectious Waste Management

(1) Using a yellow container with a biohazard symbol. Highly infectious waste should be marked "HIGHLY INFECTIOUS";

(2) Using a leak-proof plastic bag placed in a container. A bag for highly infectious waste should be capable of being autoclaved;

(3) Waste collection should be made when the container is three-quarters full or at least once a day.

General Healthcare Waste Management

(1) Using a black container;

(2) Placing a plastic bag inside a container that is disinfected after use;

(3) Waste collection should be made when the container is three-quarters filled or at least once a day.

In addition, waste collectors are directly exposed to contaminated waste and are susceptible to infection. For this reason, all healthcare waste collectors should use PPE, and they should wash their hands with sanitizer or disinfectant after touching the waste (WHO, as cited in Das et al. , 2021).

Healthcare Waste Management Policies or Measures in Thailand

Due to the current Covid-19 epidemic, the amount of infectious waste has increased from sources that operate according to government policies and public assistance on Covid-19 management, such as field hospitals, '*hospitels*' (hotels that were transformed into temporary field hospitals for Covid-19 patients [Thai PBS, n.d.]), vaccine pop-ups, and home isolation (Thammasat University, 2021).

Different provinces have different measures to manage healthcare waste based on capacity, resources, commitment, etc. For example, in Chiang Rai Province, there are measures for healthcare waste separation, storage, and transportation as follows (Institute for Global Environmental Strategies [IGES], 2020):

(1) Separating waste into two types: sharp items and non-sharp items;

(2) Disinfecting and doubling garbage bags;

(3) Designating a specific storage area;

(4) Sending waste from community healthcare facilities to a district healthcare facility once a week;

(5) Having temperature-controlled storage available at the district level;

(6) Transporting healthcare waste by a temperature-controlled vehicle;

(7) Treating healthcare waste within 48 hours after being transported;

(8) Disinfect vehicles and garbage bins daily with Sodium Hypochlorite (NaClO).

Collaboration in Waste Management in Ubon Ratchathani

There has been recent research about collaboration in waste management in Ubon. The authors of those studies explained collaboration in waste management through different concepts, for example, community participation and co-production.

Community Participation in Waste Management

Research by Chotivanich et al (2021) found that communities in Ubon Municipality participated in waste management by reducing, reusing, and recycling waste. For example, residents used fabric totes and reusable containers rather than plastic bags and single-use takeaway containers. They used both sides of pieces of paper and recycled cardboard boxes, and plastic bags. Moreover, they composted organic waste and used products made from recycled materials.

Co-Production in Waste Management

Santhitiwanich (2015) studied the co-production in waste management between LAO, public organizations, communities, and academic institutions in Ubon Ratchathani. Her work found that individuals who participated in the co-production were motivated by tangible benefits, such as higher environmental quality of a community, eligibility for funeral funds, and money received from selling waste. They also received intangible benefits, such as the realization of their full potential at work. That resulted in a self-esteem boost, acquisition of knowledge about the environment, and development of mutual respect among local staff.

Conceptual Framework

Based on concepts and theories in the literature review, the author developed the conceptual framework for this study. First, the author selected three subtypes of collaborative capacity that can make collaboration in waste management efficient: knowledge, boundary-spanning, and policy capacity. These subtypes were the key topics in the FGD about how to enhance collaborative capacities of collaboration in waste management in Ubon Ratchathani in normal times. Next, the same topics were probed but, this time in the context of the Covid-19 epidemic in Thailand.

Research Methodology

Population

The population of this study is composed of all stakeholders that participated in collaboration in waste management in Ubon Ratchathani, such as LAO, communities, academic institutions, the agricultural sector, and the private sector.

Case Selection

The case study for this research is the model of collaboration in waste management in Kaset Sombun Community, Ubon Ratchathani. The author has selected this model because it was created in 2017 and has a history of multiple waste management collaboration activities. Furthermore, Kaset Sombun has won many 'best practice' and 'good practice' awards for waste management at the local and national levels. Therefore, this case is relevant to the research objectives.

Sample

The sample of this study is a group of 20 individuals who are representatives of each sector of the selected case, consisting of representatives of Sansuk Sub-District Municipality, Kaset Sombun Community, Sansuk Municipal School, Kaset Sombun farmers' group, and rice vermicelli factories (Table 3).

Sampling

The selection of participants in this study used purposive sampling. These 20 individuals are representatives of Sansuk Sub-District Municipality, Kaset Sombun Community, Sansuk Municipal School, Kaset Sombun farmers' group, and rice vermicelli factories who have participated in the collaboration in waste management in Kaset Sombun Community since the beginning. They have experience, lessons learned, and informed views about the collaboration that are relevant to the research objectives.

Table 3. Positions and Organizations or Group in the Sample

No.	Position	Organization or Group
1	Director of Division of Public Health and Environmental Promotion	Sansuk Sub-District Municipality
2	Sanitation Technical Officer	Sansuk Sub-District Municipality
3	Public Health Technical Officer	Sansuk Sub-District Municipality
4	General Employee	Sansuk Sub-District Municipality
5	General Employee	Sansuk Sub-District Municipality
6	Village Headman	Kaset Sombun Community
7	Assistant Village Headman	Kaset Sombun Community
8	Assistant Village Headman	Kaset Sombun Community
9	Member of Community Committee	Kaset Sombun Community
10	Member of Community Committee	Kaset Sombun Community
11	Member of Community Committee	Kaset Sombun Community
12	Village Health Volunteer (VHV)	Kaset Sombun Community
13	Village Health Volunteer (VHV)	Kaset Sombun Community
14	Farmer	Kaset Sombun farmer group
15	Farmer	Kaset Sombun farmer group
16	Rice Vermicelli Entrepreneur	Rice Vermicelli Factory
17	Rice Vermicelli Entrepreneur	Rice Vermicelli Factory
18	Rice Vermicelli Entrepreneur	Rice Vermicelli Factory
19	Teacher	Sansuk Municipal School
20	Teacher	Sansuk Municipal School

Source: Author

Research Method

This study collected primary data using FGD with a group of key informants. The research instrument is an FGD topic guide, an outline of key issues, and questions or prompts. The content analysis method is used to process the data from the FGD (Bengtsson, 2016).

Research Results

The research results are presented in two major sections: suggestions on waste management collaboration in Ubon Ratchathani in normal (i.e., pre-Covid) times, and suggestions on waste management collaboration in Ubon Ratchathani during the Covid-19 epidemic.

Suggestions on Waste Management Collaboration in Ubon in Normal Times

The content analysis of the data collected from the FGD shows that suggestions on waste management collaboration in Ubon in normal times can be categorized into two main groups as follows:

(1) Suggestions about Ways to Enhance Capacities of Collaboration in Waste Management in Ubon in Normal Times

The following four suggestions are the results of the first research objective.

(1.1) Suggestions on How to Enhance Knowledge Capacity

Establishing a "learning center committee." This committee is expected to have a workplace for organizing meetings, sharing knowledge and experiences, and displaying photos, documents, or other products of the collaboration to the public. Furthermore, this committee is eligible to apply for training or workshop grants from public organizations, such as LAO, provincial government agencies, and national government agencies.

Conducting community surveys to understand strengths, weaknesses, and other relevant issues of waste management, such as personnel, budgets, and equipment. The survey data will help the collaborating entities to formulate schemes or projects appropriate to the community.

(1.2) Suggestions on How to Enhance Boundary-Spanning Capacity

Organizing meetings and training to address the advantages and benefits of collaboration in waste management to the public.

Hosting a regular community waste management competition and giving awards to the winners. This will motivate individuals and their organizations to participate in the collaboration.

(1.3) Suggestions on How to Enhance Policy Capacity

Government agencies and LAO should formulate public policies on government support (financial, personnel, equipment, and technician support) for community waste management collaboration.

Government agencies and LAO should formulate public policies on an extension of waste management collaboration from the community level to the provincial level.

(1.4) Suggestions on How to Enhance Other Subtypes of Collaborative Capacities

FGD participants suggested that the collaboration should enhance the "incentive capacity," i.e., the capacity to incentivize or give incentives to individuals and organizations who participate in the collaboration. They suggested the following ways to enhance this collaborative capacity:

- Setting up a waste management group or club in the community
- Reducing waste collection charges of households who participate in the collaboration
- Giving compliments to individuals and groups or organizations who participate in the collaboration

(2) Other Suggestions for Collaboration in Waste Management in Ubon in Normal Times

Apart from suggestions about collaborative capacity, the FGD has raised other suggestions as follows:

(2.1) Suggestions on Activities of the Collaboration

The FGD has suggested foundational activities of waste management collaboration for other communities as follows:

Disseminating the information about waste reduction and separation policies and the need for collaboration of all sectors to publicize these policies to the community through a public address (PA) system.

Village Health Volunteers (VHVs) should go door-to-door to educate people in the community about proper waste reduction and separation.

(2.2) Suggestions on Task Delegation of the Collaboration

Tasks of the collaboration should be delegated officially by setting up seven working groups as follows:

(1) Services and cooperation
(2) Premises
(3) Public relations
(4) Academic
(5) Financial and accounting
(6) Monitoring and evaluation
(7) Advisory

(2.3) Suggestions on Problem Management of the Collaboration

Lessons learned from the implementation of collaboration in waste management in Kaset Sombun Community reflect the following problems:

- Public organizations and LAO could not give government support (financial, personnel, equipment, and technician support) continuously because their organizations needed to use their resources to accomplish their core tasks.
- The collaboration has not disseminated information about activities or schemes of the collaboration to the younger generation in the community systematically. As a result, there is likely to be less or no continuity of the collaboration in the future.
- The FGD has given suggestions for responding to these problems as follows:
- The director of the Division of Public Health and Environmental Promotion, Sansuk Sub-District Municipality, stated the following:

> "The community that is the implementation area of the collaboration in waste management should report problems that occur in a village's annual development plan before submitting the plan to an LAO so that the LAO will be informed about these problems. The LAOs will reference these problems in a local development plan as the basis for budget and other resources to solve the problems. The LAO will organize meetings with all sectors to brainstorm solutions together." (Director of Division of Public Health and Environmental Promotion, Sansuk Sub-District Municipality, FGD interview, June 11, 2021)

There should be campaigns to inform students at educational institutions in the community about the collaboration in waste management of the community. These campaigns should be fun and attractive for youth participation.

(2.4) Suggestions on Key Performance Indicators (KPIs) of the Collaboration

The FGD suggested two KPIs to assess the success of collaboration in waste management:

(1) Number of households that can do proper waste separation by themselves, such as recycling organic waste, hazardous waste, and general waste, before sending each type of waste to a proper waste management process or disposal by an LAO or other relevant organization.

(2) Number of collaborative waste management activities or schemes in the community, for example, recyclable waste bank project, recyclable waste "Pha Pa" Buddhist robe offering ceremony, and community recyclable waste flea market project.

(2.5) Suggestions on Monitoring and Evaluation of the Collaboration

- Monitoring the implementation of the collaboration in waste management continuously, for example, setting up a quarterly online report system for reporting the implementation results of the collaboration.
- Organizing a multi-sector forum continuously, at least one forum a year, in order to discuss problems or challenges of the collaboration, brainstorm solutions, and develop guidelines for improvement in collaboration.
- Setting up a committee to evaluate the implementation of the collaboration using the KPI that all sectors have agreed to.

Suggestions on Waste Management Collaboration in Ubon during the Covid-19 Epidemic

The content analysis of the data collected from the FGD produced suggestions on waste management collaboration in Ubon during the Covid-19 Epidemic can also be categorized into two main groups as follows:

(1) Suggestions about Ways to Enhance Collaborative Capacities of Collaboration in Waste Management in Ubon during the Covid-19 Epidemic

These suggestions are results of the second research objective. There are four suggestions as follows:

(1.1) Suggestions on How to Enhance Knowledge Capacity

The FGD suggested that the community can make video clips about how to turn waste into products or fertilizers. The women's development group of Kaset Sombun Community has made products from recyclable waste for a couple of years. These products include, bags made of drinking straws, flower vases made from cardboard, and plant pots made of cement and old clothes. They have made video clips to teach individuals in other sectors to make products from waste materials. Moreover, Kaset Sombun Community has produced biofertilizers from organic waste for many years. These fertilizers can increase plant growth and improve soil health as well. The community has been educated on the production process of biofertilizers by Sansuk Sub-District Municipality. They have improved the formula to make fertilizers meet the conditions of community areas. Now, they have consolidated their wisdom into a video clip for interested individuals in other sectors to produce biofertilizers from organic waste. For example, they demonstrate the production of organic waste from rice vermicelli factories.

(1.2) Suggestions on How to Enhance Boundary-Spanning Capacity

To encourage other individuals and organizations to participate in collaboration in waste management, there should be explanations of how certain waste management activities benefit the community. This can be done via social media (e.g., Facebook or Twitter) of participating organizations, such as public organizations, LAOs, academic institutions, private companies, and community groups, and group communication applications (e.g., LINE or Slack) of those organizations.

(1.3) Suggestions on How to Enhance Policy Capacity

The FGD suggested that academic institutions and private companies or factories formulate policies that support collaboration in waste management during the Covid-19 epidemic as follows:

- Academic institutions should have a policy to offer on-line courses about waste separation and reusing waste materials, as well as sharing other waste management knowledge with students and parents.
- Private companies or factories should have the policy to sell products via online platforms and use recyclable packaging materials or other eco-friendly packaging materials, for example, cellulose packaging that is made from wood or cotton.

(1.4) Suggestions on How to Enhance Incentive Capacity

The FGD suggested that public organizations and LAOs organize an online competition about collaborative waste management, for example, an online competition on "collaborative waste management strategies." Awards for organizations or individuals who are winners can be money, trophies, or certificates. Moreover, their works should be presented to the public via social media and communication applications.

(2) Other Suggestions for Collaboration in Waste Management in Ubon during the Covid-19 Epidemic

Aside from suggestions about collaborative capacity, the FGD has raised additional suggestions:

(2.1) Suggestions on Activities of the Collaboration

All participants of the FGD agreed that the main focus of activities should be how to properly manage healthcare waste generated during the Covid-19 epidemic. Healthcare waste in this context is waste from PPE, especially used face masks (single-use medical or surgical masks). The FGD has suggested the process of face mask waste management as follows:

(1) Individuals discard used face masks in closed plastic bags before placing those bags in general waste bins, not recyclable waste bins, to protect waste collectors from touching viral-contaminated surfaces;

(2) LAOs send their garbage trucks to receive waste from communities;

(3) LAOs segregate used face masks from other types of waste and then send those masks to Tambon (Sub-District) Health Promoting Hospitals (THPH) in their area;

(4) THPH properly dispose of used face masks by incineration.

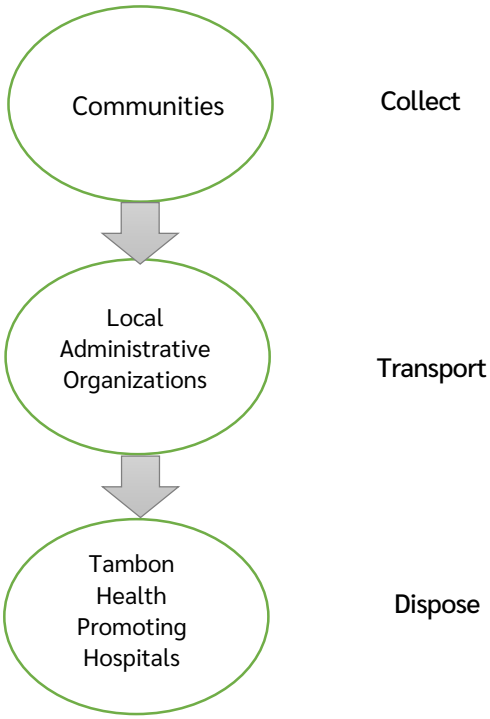

Figure 1. Diagram Process of Face Mask Waste Management

Source: Author

(2.2) Suggestions on Task Delegation of the Collaboration

The FGD suggested the delegation of tasks to each sector as follows:

- LAOs collect infectious waste and other types of waste from communities. The LAOs should provide waste bins labeled "infectious waste." These bins should be placed at community halls. When the bins are full, the communities must make appointments with the LAOs to collect infectious waste, which is then transported to the THPH to dispose of by incineration.
- Communities disseminate information on infectious waste management guidelines via a public address system (PA system), social media, and

communication applications. Moreover, the communities should report problems about infectious waste management to LAO and other relevant organizations as soon as possible.

- Other sectors, including the private sector, the agricultural sector, and academic institutions, should implement infectious waste management as planned.

(2.3) Suggestions on Problem Management of the Collaboration

A member of the Community Committee, Kaset Sombun Community stated that, during outbreaks of Covid-19, the collaboration could not include on-site waste management activities due to the risk of transmission of Covid-19. Moreover, waste management during the Covid-19 epidemic has more complicated processes. This is why some individuals or organizations do not participate in collaborative waste management.

To deal with these problems, the FGD had these suggestions:

- Individuals and organizations who participated in the collaboration must reduce face-to-face meetings and other risky activities; interpersonal interactions can be made through online channels. For example, participants can share information or knowledge about waste management via social media and communication applications.
- LAOs should give incentives to households or organizations that properly manage infectious waste. For example, the reduction of waste collection charges during the Covid-19 pandemic.

(2.4) Suggestions on KPI of the Collaboration

A member of the Kaset Sombun Community Committee suggested that the KPIs of the collaboration should be created by LAOs and relevant public organizations because that requires expertise in policy making. The Director of the Division of Public Health and Environmental Promotion, Sansuk Sub-District Municipality, responded to this suggestion by saying that Covid-19 is an emerging infectious disease. Thus, the LAO and public organizations do not have much information and knowledge about this new pathogen. Therefore, LAO need to collect relevant data, for example, on waste generation behaviors and lifestyle changes during the Covid-19 epidemic, before creating new KPIs.

(2.5) Suggestions on Monitoring and Evaluation of the Collaboration

The FGD participants agreed that, during the Covid-19 epidemic, each sector should monitor the implementation of the collaboration in waste management and report the progress and problems which occur via an online reporting system every three months.

Conclusions and Discussion

This study has developed a set of suggestions to enhance collaborative capacities for waste management, both during normal (i.e., pre-Covid) times and during the Covid-19 epidemic. The main findings further the knowledge of research on collaborative capacity in waste management in Thailand by Sirinbhattra (2019). First, to enhance each subtype of collaborative capacity for waste management in normal times, the following is recommended:

(1) Knowledge capacity: establishing a learning center committee to share knowledge and experience between participating sectors, conducting community surveys to better understand waste management issues of the targeted areas, and formulate waste management projects appropriate to each community;

(2) Boundary-spanning capacity: organizing meetings and trainings to address benefits of the collaboration to the public, and hosting a community waste management competition regularly to motivate individuals and organizations to participate in the collaboration; and

(3) Policy capacity: requesting government agencies and LAO to formulate public policies on government support for community waste management collaboration and extend waste management collaboration from the community to the provincial level.

In addition to this, the study has developed suggestions to enhance a new subtype of collaborative capacity, the "incentive capacity," by setting up a waste management club in a community, reducing waste collection charges of households who participate in the collaboration, and giving compliments to individuals and organizations who participate in the collaboration. Moreover, the study showed how to use existing resources that all communities in Thailand have to facilitate collaboration, such as PA systems and VHVs. The study also suggested KPIs of waste management collaboration, such as the number of households that can properly implement waste separation at home and the number of collaborative waste management activities or schemes. Lastly, the study suggested that the collaboration should include an online report system and a multi-sector forum to monitor and evaluate the collaboration.

The suggestions on the enhancement of collaborative capacities and relevant issues have also been applied to collaboration in waste management in Ubon during the Covid-19 epidemic. The major difference is that, during disease outbreaks, collaborative activities need to be organized via on-line platforms to reduce risk of Covid-19 transmission between participants. Furthermore, the suggestions on community healthcare waste management guidelines support the argument of the Institute for Global Environmental Strategies (IGES) (2020), in that, different provinces have different measures to manage healthcare waste based on their capacity, resources, commitment, and other factors. However, the issue that has not been included in these healthcare waste management guidelines is the survival period of the Coronavirus (up to nine days) (Das, et al., 2021). Therefore, some guidelines on the treatment of waste to be stored in a

period of nine days and the handling of nine-day waste can be added to cover all significant treatment of Covid-19 waste.

Recommendations for Future Research

This study has limitations since the findings only support a set of suggestions to enhance collaborative capacities for waste management. In other words, these recommendations have not yet been implemented in a community-led waste management collaboration in Ubon Ratchathani because the prevalence of Covid-19 during the period of implementation was still high, and just a small number of residents were vaccinated. Now, most Thais are vaccinated. Accordingly, the author recommends carrying out a future study as a form of Participatory Action Research (PAR) or an action research study by implementing these suggestions in one or more communities. The findings of such future research will help improve waste management collaboration practices and benefit the participating communities. The four other provinces under the supervision of the Regional Environmental Office 12: Mukdahan, Yasothon, Sisaket, and Amnat Charoen, could be the subject of collaborative capacity research.

Funding

This research project was supported by Ubon Ratchathani University Research Fund. Opinions in this research report are those of the researcher, and the sponsor may not necessarily agree.

References

American Society for Quality (ASQ). (n.d.). *What are the five S's (5S) of lean*? Retrieved from https://asq.org/quality-resources/lean/five-s-tutorial

Beechler, S., Sondergaard, M., Miller, E., & Bird, A. (2004) Boundary spanning. In H. Lane, M. Maznevski, M. Mendenhall, & J. McNett (Eds.), *The Handbook of Global Management: A Guide to Managing Complexity* (pp. 121-133). Malden, MA: Blackwell Publishing.

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *Nursing Plus Open, 2*, 8-14. doi.org/10.1016/j.npls.2016.01.001

Chotivanich, P., Phorncharoen, I. & Tankaeo, A. (2021). Waste Management Behaviors and Waste Management Approaches with Community Participation in Ubon Ratchathani City Municipality, Ubon Ratchathani Province. *UBRU International Journal Ubon Ratchathani Rajabhat University, 1*(2), 37-48.

Chotthong, B. & Boonyouang, S. (2021). *Energy waste, what is a Solution? Thailand Environment Institute Foundation (TEI)*. Retrieved from https://www.tei.or.th/en /blog_detail.php?blog_id=77

Das, A. K., Islam, N., Billah, M. & Sarker, A. (2021). COVID-19 Epidemic and Healthcare Solid Waste Management Strategy – A mini-review. *Science of The Total Environment, 778*(146220), 1-8. doi.org/10.1016/j.scitotenv. 2021.146220

Grotenbreg, S. & Buuren, A. V. (2016). Realizing Innovative Public Waterworks: Aligning Administrative Capacities in Collaborative Innovation Processes. *Journal of Cleaner Production, 171*(2018), S45-S55. doi: 10.1016/j./jclepro.2016.08.128.

Institute for Global Environmental Strategies (IGES). (2020). *Waste Management During the Covid-19 epidemic: From Response to Recovery. United Nations Environment Programme (UNEP)*. Retrieved from https://wedocs.unep.org/bitstream/handle/ 20.500.11822/33416/WMC19.pdf ?

Lichterman, P. (2009). Social Capacity and the Styles of Group Life. *American Behavioral Scientist, 52*(6), 846-866.

Lodge, D. & Wegerich, K. (2014). Administrative capacity. In Hertie School of Governance (Ed.), *The Governance Report 2014* (pp. 151-170). Oxford: Oxford University Press.

National News Bureau of Thailand (NNT). (2019). *Ubon Ratchathani Province promotes the "waste separation" campaign driving waste management towards a clean province*. Retrieved from http://thainews.prd.go.th/th/news/print_news/TCATG190103185705792 (in Thai)

Pollution Control Department (PCD). (n.d.). *Municipal solid waste management policy in Thailand. United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).* Retrieved from https://www.unescap.org/sites/default /files/ PCD_ MSWM%20policy.pdf

Protected Area Regional Office 9 (Ubon Ratchathani). (2018). "*Ubon Clean City, Capital of Isan, big cleaning day, Pracharath (civil state) policy, Ubon Ratchathani Province" scheme*. Retrieved from https://www.dnp9.com/dnp9/web1/web/edoc/Q8a32bFf4SMB.pdf (in Thai)

Provincial Office of Natural Resources and Environment Ubon Ratchathani. (2017). *Ubon Ratchathani provincial governor led civil servants in promoting the plastic bag and foam box are not welcome in the office scheme*. Retrieved from http://ubonratchathani.mnre.go.th/th/news/detail/5654 (in Thai)

Regional Environmental Office 12, Ubon Ratchatani. (2017). *Ubon Ratchani History*. Retrieved from http://www.mnre.go.th/reo12/th/about (in Thai)

Regional Environmental Office 12, Ubon Ratchatani. (2018). *Results of the management of accumulated solid waste under the road map of 2018*. Retrieved from http://www.mnre.go.th/ckeditor/upload/files/id164/pdf/Roadmap2561.pdf (in Thai)

Sathabhornwong, S. (2019). *The Relationship between Thai Local Administrative Organisations' Collaborative Capacities and Outcomes: The Case of Waste Management* (Doctoral dissertation, University of Birmingham, Birmingham, United Kingdom). Retrieved from https://etheses.bham.ac.uk/id/eprint/9440/

Sathabhornwong, S. (2020). Collaborative Capacities for Successful Collaboration: The Case of Thai Local Administrative Organization's Waste management. *Local Administration Journal*, *13*(2), 103–136.

Thai PBS. (n.d.). Q: *What is hospitel*? Retrieved from https://Covid19.thaipbs.or.th/faq/ ?post= 25645 (in Thai)

Thammasat University. (2021*). Infectious waste: Challenges in COVID-19 epidemic*. Retrieved from https://tu.ac.th/en/thammasat-080964-infectious-waste-challenges-in-Covid19? fbclid=IwAR30OVCqzPmeV3JF505F8dtVvzYbVwoqrRh44eq1AzJMf_CJsNW7L-a4VE

Thomson, A. M. & Perry, J. L. (2006). Collaboration Processes: Inside the Black Box. *Public Administration Review*, *December 2006* (Special Issue), 20-32.

World Health Organization (WHO). (2018). *Healthcare Waste*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/healthcare-waste