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Abundance but Thirsty: Governing Water Supply Provision to Prevent Scarcity in Tanjungpinang City, Indonesia



Junita Monika Pasaribu
S4496620/25419014

Supervisors:
Prof. Dr. Ronald L. Holzhacker &
and Prof. Ir. Djoko Santoso Abi Suroso, Ph.D.

Groningen, The Netherlands
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Author:

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Abstract

Water scarcity has become an issue that occurs in many areas in various countries. Climate change, population growth, land transformation and physical conditions of the land have a significant impact on water scarcity and affect the provision of clean water for the community. However, apart from these factors, water scarcity is mainly caused by water governance failure. Water governance discourse has developed and become influential in resolving water scarcity by looking at how to manage too little or too much water so that people can have an equal right to water. This study identifies the causes of water scarcity and analyses challenges in water governance faced by Tanjungpinang City to find out the gaps and opportunities to improve a better water provision system in the future. This study mainly analyses water governance in the water supply system in Tanjungpinang City. In this case study, semi-structured interviews and document research were conducted to analyze how the water provision is governed in Tanjungpinang to confront water scarcity. This research found that water governance principles have not been optimally implemented to support the fulfilment of clean water needs. Based on the findings, financial constraints, capacity, and monitoring and evaluation are the most significant challenges affecting water governance in Tanjungpinang. By focusing on improving these principles and strengthened by the willingness of the authorities to set it as a priority scale for regional policies, strategies and plans, it is hoped that the community will no longer experience water shortages in the future.

Keywords: *Water Scarcity, Water Governance, Water Provision, Sustainable Development*

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LIST OF ABBREVIATIONS

AMDAL	(Analisis Mengenai Dampak Lingkungan): Environmental Impact Analysis
APBD	(Anggaran Pendapatan Belanja Daerah): Regional Budget Revenues and Expenditures
APBN	(Anggaran Pendapatan Belanja Negara): State Budget and Revenue
BLUD-UPTD SPAM	(Badan Layanan Umum Daerah): Regional Public Service Agency -Regional Technical Implementation Unit for Drinking Water Supply System
BUMD	(Badan Usaha Milik Daerah): Regional-owned company
BUMN	(Badan Usaha Milik Negara): State-owned company
UKL-UPL	(Upaya Pengelolaan Lingkungan - Upaya Pemantauan Lingkungan): Environment Management Efforts and Environment Monitoring Efforts
UPT	(Unit Pelaksana Teknis): Technical Implementation Unit
UPTD	(Unit Pelaksana Teknis Daerah): Regional Technical Implementation Unit
PEN	(Pemulihan Ekonomi Nasional): National Economic Recovery
Perumda	(Perusahaan Umum Daerah): Regional Public Company
Pokja PKP	(Kelompok Kerja Perumahan dan Kawasan Permukiman): Working Group for Housing and Settlement
RISPAM	(Rencana Induk Sistem Penyediaan Air Minum): Drinking Water Supply System Master Plan
SWRO	Sea Water Reverse Osmosis
SPAM	(Sistem Penyediaan Air Minum): Drinking Water Supply System

1. Introduction

Water is essential for life since all living things need water to survive. However, in recent decades, water scarcity has become a concern in science and policy because this issue has influenced nearly one-fifth of the world's society (UNDP, 2006). In general, water scarcity is caused by different conditions, such as climate, economic development, and population growth (Hophmayer-Tokich and Kadiman, 2006). Climate change can cause weather patterns changes and result in extreme weather conditions (UNICEF, 2020). Like many other countries, cities in Indonesia are also very vulnerable to the impacts of climate change, such as prolonged drought, heat waves and heavy rains (USAID, 2017). These events might lead to unpredictable water availability and further exacerbate water scarcity (UN-Water, n.d.). Meanwhile, the economic development and the increase in population have resulted in high demand for water and increased competition between sectors in water use (Steduto et al., 2012) as described by Argo (1999) as "thirsty cities" which confronting by many cities in third world countries. However, another understanding emphasizes that water scarcity is critically happened due to the crisis on how the water is governed (Gupta et al., 2013; Romano and Akhmouch, 2019). The most acute problems of water governance are generally experienced by developing countries. They often experience shrinkage of raw water sources, with minimal priorities for water management infrastructure, as can be seen in inadequate and inefficient piped water supply infrastructure (Argo, 1999) and the fragility of public institutions in managing water resources (Kusumah and Mustofa, 2020).

This study chooses Tanjungpinang City, Indonesia, as a study case as it offers an opportunity to look deeply at their struggle in dealing with water scarcity, especially during the dry season. Water management in Tanjungpinang, like many other cities with archipelagic characteristics, is unique because it is affected by limited surface area, isolation from the mainland, and limited resources in terms of human resources, natural and financial resources (Hophmayer-Tokich and Kadiman, 2006). Although Tanjungpinang has enormous water potential because this area has an equatorial type with double rainfall peaks, the demand for freshwater is greater than the existing supply (Marganiningrum et al., 2020). Marganiningrum et al. (2020) report that, in 2017, the raw water production of regional water companies (Perumda Drinking Water Tirta Kepri) was 3,521,855 m³ / year, and the demand was 7,957,803 m³ / year. The growing water demand is mainly caused by population growth. Although efforts to increase clean water availability have been made through the drinking water supply system (SPAM, which stands for *Sistem Penyediaan Air Minum*), the community is still experiencing water scarcity. To increase water supply through a technical-based solution, a pilot project, and the biggest Sea Water Reverse Osmosis (SWRO) plant in Indonesia has been developed in this city as another option of water resource other than only depending on freshwater. Therefore, attention needs to be expanded, not just efforts to increase water supply but also improve water governance. It is essential to pay attention to how water

is governed because weak water resources management has also exacerbated water availability in this region (Panama, 2020).

As a common-pool resource, a better water management strategy is needed to avoid the crisis in the future, and further ensure all people can access clean water and proper sanitation at an affordable price with equal rights as mandated in the Sustainable Development Goals 6 and 10 (UNDP, 2021). Technical solutions have been proven to have an essential and fundamental role in increasing the water supply. However, this traditional option solves water scarcity partially (Romano and Akhmouch, 2019). Therefore, this study will focus on planning challenges to promote change in clean water provision in Tanjungpinang by analyzing the current water governance according to governmental actors' perspective and how water governance can be improved to manage the risk of current and future water shortage so that the community need for clean water can be fulfilled. The perspective of government actors in water governance is the focus of this study because government plays a critical role in water resource management, as mentioned by Tropp (2007). By improving and strengthening water governance, water scarcity concerns can be grown sustainably and equitably.

2. Research Question

Based on the aforementioned introduction, it is essential to determine current water governance and the potential improvement to cope with water scarcity. Therefore, this study is aimed at answering the following research question:

How can water governance be improved in order to confront the long-term challenges of water scarcity and fulfil the needs of people for clean water in the city of Tanjungpinang?

In order to address this research question, a specific case was chosen that can describe the problem of water governance in providing clean water in Tanjungpinang city. The drinking water provision system is a national strategy to bring policies to the local level involving various levels of government, as it also points out the importance of other actors' involvement. Therefore, to answer the main question above, there are three sub-questions arranged as follows:

1. How does the government attempt to solve the current water scarcity problem?
2. What are the gaps in water governance practice to confront water scarcity in Tanjungpinang?
3. How do governmental actors experience and influence the challenges of water governance in dealing with water scarcity?

3. The Case Study

3.1 General information about Drinking Water Supply System (SPAM)

In water resources management, there is an emphasis on how the water management policy-making mechanism determines the government's overall water management activities (Kusumah and Mustofa, 2020). The 1945 Constitution of the Republic of Indonesia (UUD 1945) article 33 paragraph 3 states that "the earth, water and natural resources contained therein are controlled by the state and used for the greatest prosperity of the people". It means that in Indonesia, water management is an essential domain of public affairs managed by the government. Based on this constitution, a law on water resources management was formed. This law has been amended several times, and recently, the latest law was issued, namely Law Number 17 of 2019 concerning Water Resources. In this law, it is stressed that the state must prioritize the human right to water by harnessing water resources to meet the community's daily needs through the drinking water supply system or the Indonesian terms known as *Sistem Penyediaan Air Minum* (SPAM).

SPAM itself is a national policy and strategy that aims to bring policies to the local level. This program can also be seen as a form of decentralization in water governance, where the local level is mandated to formulate water resources management policies based on national policies by considering the local context. The SPAM is a unit of facilities and infrastructure for supplying drinking water. Based on Law Number 17 of 2019, there are several multi-level government actors involved in this SPAM. In its implementation, SPAM is carried out in an integrated manner with sanitation infrastructure and facilities to protect raw water for household drinking water supply. This integration starts with the formulation of policies and strategies and the stages of implementation, including the planning stages, construction implementation, operation/management, maintenance and rehabilitation, and monitoring and evaluation.

According to Law Number 17 of 2019, the task of the central government is to formulate a national policy on water resources. In the context of SPAM, the central government has the authority to a. developing and managing the inter-provincial SPAM and SPAM for national strategic interests; b. providing technical assistance and technical guidance in the Management of Water Resources to provincial and regency/city governments, and c. supervising the implementation of the duties and authorities of the Water Resources Management of the provincial government and/or regency /city government. Meanwhile, the provincial governments have the authority to formulate provincial water resources management policies following the national policy considering the interests of the surrounding provinces, develop and manage the inter-district/municipal water supply system, provide technical assistance and technical guidance in water resources management to the government regency/city area. On top of that, district/city governments have authority to a. formulating regency/city water resources management policies based on national policies on water resources and provincial

policies on water resources management by considering the surrounding regencies/cities; and b. developing and managing the SPAM in the regency/city area. However, part of the duties and authorities of the central government and/or regional (provincial and regency/city) governments in managing water resources, including one river basin, can be assigned to the water resources manager or operators. This manager can be in the form of a technical implementation unit of the ministry (*Unit Pelayanan Teknis* – UPT)/ regional technical implementation unit (*Unit Pelayanan Teknis Daerah* – UPTD) or a state-owned company (*Badan Usaha Milik Negara* – BUMN) or a regionally owned business entity (*Badan Usaha Milik Daerah* – BUMD) in Water Resources Management field.

Further provisions regarding the use of Water Resources to meet community water needs through the SPAM are regulated in Government Regulation Number 122 of 2015 concerning Drinking Water Supply Systems. As mentioned before that the authorities and duties of the government can be assigned to the operator such as BUMN/BUMD, UPT/UPTD, private business entities, and community groups can also participate in SPAM implementation (Government Regulation Number 122 of 2015; Regulation of Minister Public Works and Housing Number 27 of 2016) as can be seen in Figure 1 below.

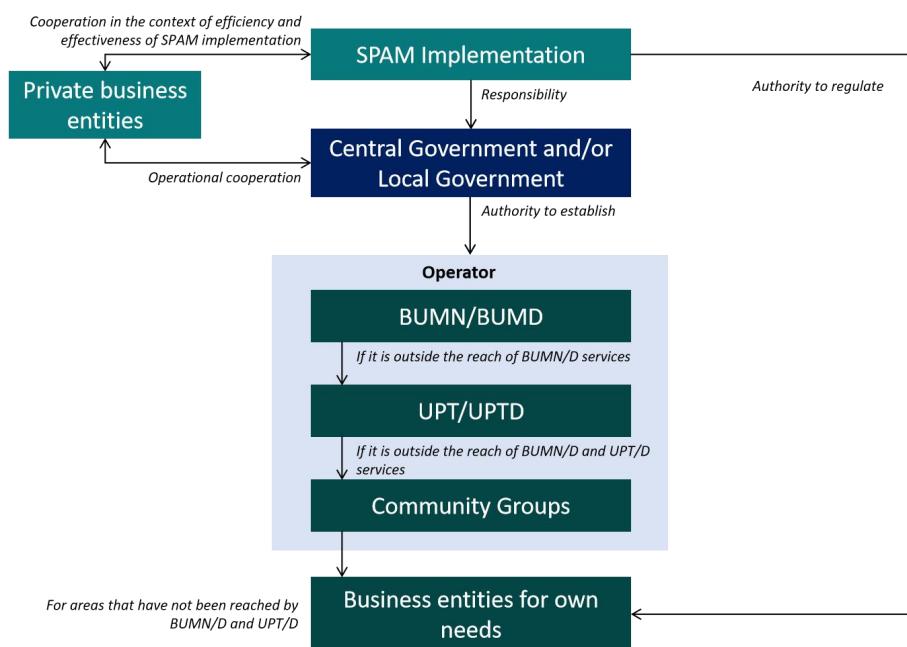


Figure 1. SPAM Implementation Scheme adopted from Ministry of Public Works and Housing (2018)

In the study area, SPAM is administered by a regional-owned company (*Badan Usaha Milik Daerah*/BUMD). BUMD is a business entity whose establishment is initiated by the region through direct investment originating from separated state assets that are specially formed as the operator known as *Perusahaan Daerah Air Minum* (PDAM) or local-government-owned water company. The formation of this PDAM is further

stipulated in a regional regulation in Tanjungpinang city regulated in the Riau Islands Provincial Regulation Number 4 of 2008 concerning the establishment of PDAM Tirta Kepri, Riau Islands Province. According to this regulation, the scope of PDAM in serving the community includes a. build and maintain and operate SPAM; b. conduct sales of drinking water to the public with a distribution system through packaging, piping, tank cars evenly and efficiently; and c. organizing arrangements in the distribution process to consumers equitably and fairly and regardless of ethnicity, religion, and race (Provincial Regulation Number 4 of 2008). However, since 2020 there has been a change in the organizational form of PDAM and hereinafter known as *Perumda Air Minum* (Regional Public Company for Drinking Water) Tirta Kepri. Another operator is known as BLUD-UPTD SPAM which is formed in 2017 through Mayor Regulation of Tanjungpinang Number 18 of 2017 concerning the establishment of the organization and work procedures of the technical implementing unit of the Water Supply System Service at the Public Works and Spatial Planning Office under city level.

3.2 The Case Study: Tanjungpinang City

This research takes place in Tanjungpinang City, which is located in Bintan Island in Riau Island Province of Indonesia. This city is part of one of the national strategic areas in the Riau Islands River basin territory, which is the Indonesian state's gateway to other states (see Figure 2). This national strategic area is intended to accelerate regional development, one of which is efforts to increase and optimize SPAM. As a strategic area, Tanjungpinang City can also be seen from the point of view of its importance as a center of economic growth that functions as a government center, service center, new growth center and tourism activities in the province as a regional icon with Malay cultural nuances. However, the problem of availability and access to clean water is still often complained of by the community until now, which led to the idea to see opportunities for system reform and clean water management to increase the availability and distribution of water to the community. The water scarcity issue in this city is similar to the problems faced by other regions, especially those that have archipelagic characteristics in general, which is the lack of environmental capacity and increased demand for water caused by population and economic growth. Apart from the physical condition of water resources, the inability to meet community needs for water is argued due to a weak water governance.

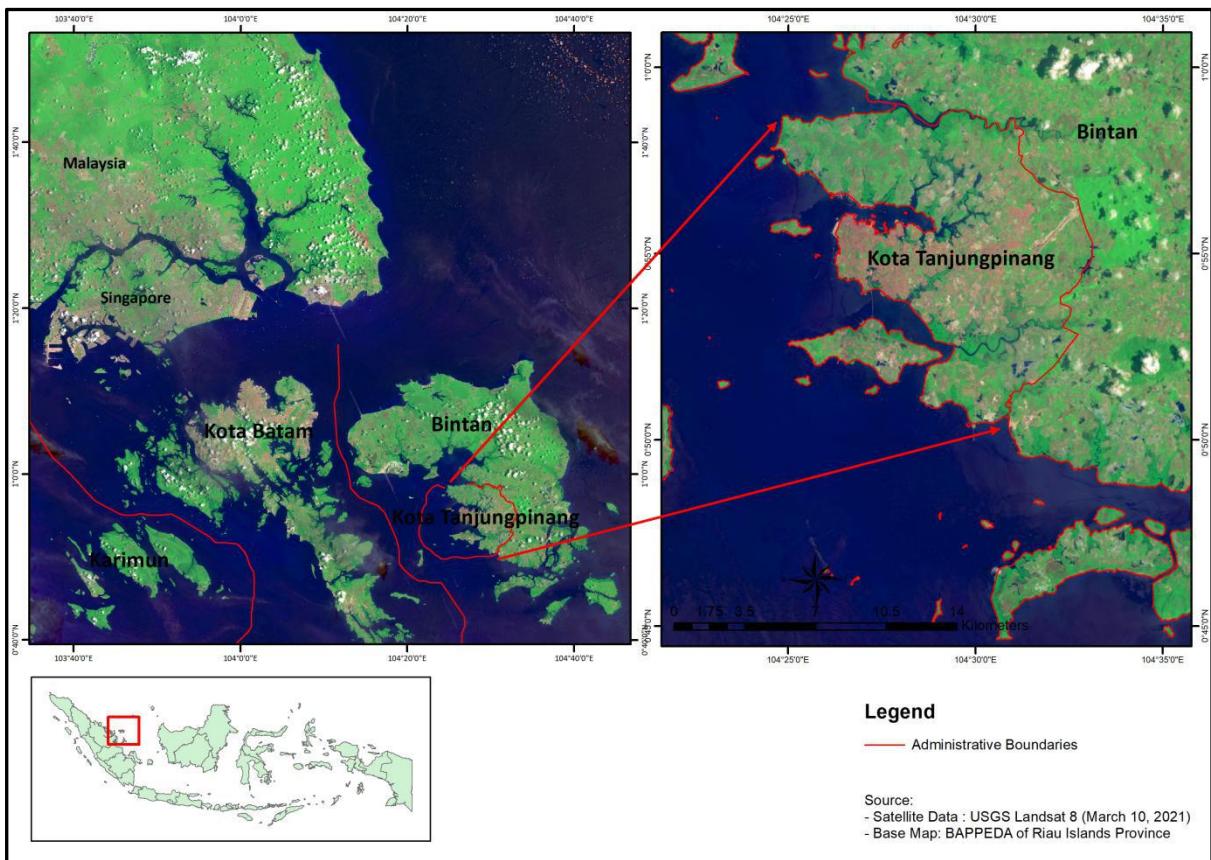


Figure 2. Location of Tanjungpinang City

Source: Author, 2021

4. Scientific and Social Significance

4.1 Scientific relevance

Besides briefly explaining why the water scarcity phenomenon exists, this study aims to understand the city of Tanjungpinang in confronting the issue by diving into their experiences, assessments and practices rooted in local contexts and practical ethics. In conditions where uncertainty dominates the clean water provision, efforts to respond to water scarcity become urgent to take the necessary actions according to the local context. To analyze the reality of providing clean water an understanding demonstrated by Flyvbjerg (1990) with phronesis that describes the knowledge of what to do in certain circumstances is required. This understanding is taken from the rationality of values and relates to specific actions. In this case, the focus that needs to be emphasized is the constraints, practical possibilities, and forms of action that can be adopted as an exploratory process in modern knowledge (*ibid*).

In scientific terms, this research is expected to contribute to an academic theory on how water can be managed in clean water provision particularly. This discourse is not

entirely new in the academic world, but in the context of Indonesia, a more holistic study of water management is needed to understand the overall picture of the many aspects that influence the provision of clean water. Looking at how cities in third world countries such as Indonesia have weak performance in the water supply sector (Bakker et al., 2006), mixing pragmatic solutions from a technical perspective with a water governance approach becomes very important. This research elaborates on exploring what technical solution has been done in this area and analyzing the barriers and opportunities to improve water governance. The outcome of this study could be helpful as an overview of the actions that need to be taken by decision-makers and all interested parties to solve the problem of the clean water shortage in Tanjungpinang. This study aims to improve water governance to prevent water scarcity from getting worse. Accordingly, it is expected that the future needs of the citizens on water could be provided.

4.2 Social Significance

Since the presence of water affects all aspects of human life, it is appropriate to mention that water is one of the human rights in terms of the right to life (Scanlon, 2004). Initially, the international community proposed treating water as an economic good to reduce inefficient water use so that water resources can be enjoyed by all (Setiawan, 2018). This approach can lead to competition and social conflict due to inequities in water supply and access and will become more severe if water is scarce. The water price becomes expensive when water is approached as an economic good, and accordingly, people with low incomes cannot access the adequate supply of clean water to meet their basic needs (Bluemel, 2004). As awareness grew, water is being recognized as a human right by the international community. The right of human to water can be recognized as a means to achieve other rights, such as the right to life or health (Setiawan, 2018). With the recognition of the right to water as part of human rights, the states are required to make efforts so that people who cannot afford water services can access clean water services (Bluemel, 2004). To guarantee community access to water, the state needs to ensure the availability of water and manage water sustainably as mandated in Sustainable Development Goals. Thus, inequality to water can be reduced.

Therefore, this study also considers the social relevance by finding gaps and opportunities for improving water governance to provide water for all levels of society. Water needs to be managed to meet community needs sustainably to achieve prosperity through policy practices based on environmental sustainability, emphasizing fair and equitable distribution. By improving water governance, competition for scarce water resources can be tackled so that more vulnerable communities such as the poor and marginalized people can obtain equitable water services. Thus, in the future, the people of Tanjungpinang will not experience water scarcity, especially during the dry season. On a broader scale, this report could be used to share knowledge that will provide

information as a comparison and input for decision-makers and other practitioners in other areas to develop sustainable water resources management, especially those in the characteristics of archipelagic areas.

5. Research Design and Methodology

5.1 Research Design

The research design of this study is conducted based on an evaluation of the current condition of water governance in Tanjungpinang. Figure 3 below reveals the structure of this research with the following explanation. Chapter one and Chapter two explain the introduction of the research followed by the research question. Then, the scientific and social significance of this study will be discussed in Chapter three. In Chapter five, elaboration related to the SPAM program will be discussed and followed by explaining the study case, followed by Chapter four specifies the methodology used in this study. Then Chapter six is devoted to diving into a broader theoretical framework. This chapter includes a literature review that explains water governance in dealing with water scarcity by measuring its current condition based on water governance principles and eventually lead to this research's conceptual model. The result will be presented in chapter seven and finalized by answering the research question and reflection on the research process in the concluding section in the last chapter.

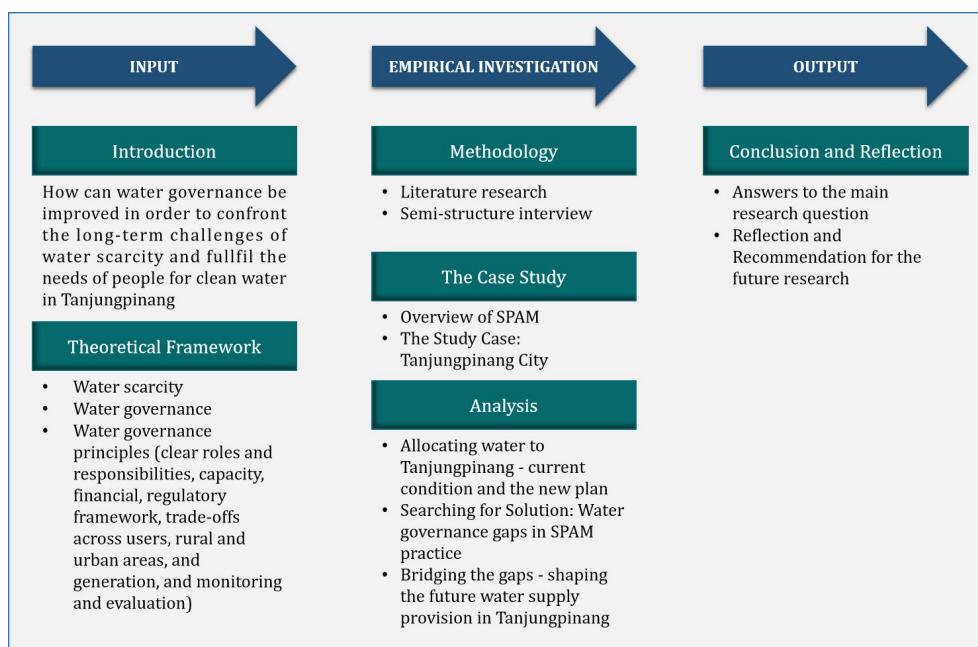


Figure 3. The research design.

5.2 Methodology

This sub-chapter will explain the methodology used in answering the objectives and research questions that have been determined. In this methodology, the study approach of the qualitative case study implemented in this study will be described first. The next step is followed by the analysis unit section, which explains the administrative boundaries of the study area and the time frame for conducting the research, and data collection methods. This section of the methodology ends with an explanation of the data analysis and interpretation method.

a. Research approach: A qualitative case study

In this thesis, a case study research was conducted to comprehend the complexity of water scarcity issues in the study area. A case study allows researchers to discover in-depth information and knowledge that can be learned or drawn from the latest program, circumstance, and activity, at the various levels of respondent such as an individual, group of people, institutions, and organizations (Stake, 1995; Yin, 2003). The case study approach is generally used to understand complex social phenomena. A case study is considered the best approach for this thesis because it allows qualitative analysis (Yin, 2003). The qualitative method could enable the researcher to explore related phenomena within the specific context (Rashid et al., 2019). Therefore, a qualitative approach will be established to investigate the current water governance condition, particularly within the clean water provision context in Tanjungpinang. The data and information will be gathered from various literature, policy documents, and semi-structured interviews.

The initial stage in the case study approach is to select the characteristics of interest to the author. Selected cases may be unique or may represent the problem being researched (Merriam, 2002). The city of Tanjungpinang was chosen to represent one of the archipelagic provinces in Indonesia, which are vulnerable to water scarcity due to the physical characteristics of its small area with a low ability to provide water and vulnerable to climate change. The city of Tanjungpinang itself is the capital of the Riau Islands province, with the second-highest population in this province. Recognizing the limited surface area, climate change and population growth, the government focus is currently more related to technical solutions by developing new reservoirs to meet the water needs of the people of Tanjungpinang. However, there has been no study to support the solution to the water scarcity issue from a water governance perspective which is highlighted in this study.

b. Unit of Analysis

In the case study research, it is crucial to define the boundary of the case (Stake, 1995; Yin, 2003). Therefore, the time frame and spatial boundary should be determined (Yin, 2003). In this thesis, Tanjungpinang is considered as the spatial boundary. The water scarcity phenomenon in Tanjungpinang is still happening, and efforts to meet people's water needs and their water management. Thus, it is essential to define the research time frame of the research. This study was conducted from November 2020 until July 2021, and data were gathered from March 2021 until June 2021.

c. Data Collection

The collection of data and information carried out in this research is divided into three stages. The first stage is the collection of secondary information and data using literature research to obtain theoretical studies related to the concept of water governance in solving water scarcity cases in the context of Tanjungpinang City, relevant stakeholders and a review of legal and regulatory aspects related to the implementation of the water supply system. The second stage is primary data collection which is carried out by conducting interviews with the governmental actors involved in the clean water supply system. The last stage is triangulation to check reliability and validity from written materials compared to interviews. The semi-structured interview and collection of policy documents and other literature will be explained further in this section.

Semi-structured Interview

Semi-structured interviews were conducted for research to gain information based on governmental actors' perspectives. A semi-structured interview is a good strategy for data collection, which combines predetermined but open-end questions and spontaneous questions during the interview process (Flyan, 2005). The relevant governmental actors were chosen at various levels, both directly involved in the clean water provision system and other actors indirectly involved in the system (Appendix 1). In this research, governmental elites are identified based on their roles and capabilities. Several interviewees from the identified actors were selected for interviews to collect information and data, assess water governance indicators that have been determined previously and based on their understanding, and followed by raising follow-up questions to gain a better understanding of governance challenges and issues (see Appendix 3). Due to the Covid-19 pandemic, the interviews were conducted using online conversation (Zoom Meeting and Whatsapp Call). All the conversations during the interviews were recorded, and further were transcribed for analysis purposes. In order to respect ethical and privacy aspects, all interviews were conducted with the prior

informed consent of the stakeholders being interviewed. The author also informs the purpose of the study and ensures confidentiality.

Documents

As part of the steps in the data collection process, a variety of secondary data are collected, including policy documents related to SPAM (See Appendix 2). The author performs substance analysis in the policy document to get general arrangements regarding SPAM implementation administered by governmental agencies. This literature research will also be conducted to narrow down the principles of water governance which are the most challenging in the study area. Based on the arguments proven from the references studied, the principles that have been selected will then become the basis for determining indicators in assessing the condition of existing water governance. The author will further use the information gathered from these documents to cross-check the information obtained from the interviewees.

Table 1. Conceptual operationalization process of the research topic

GENERAL RESEARCH TOPIC	RESEARCH SUB- QUESTIONS	PRINCIPLE	SEMI-STRUCTURED INTERVIEW QUESTION TOPICS
How can water governance be improved in order to confront the long-term challenges of water scarcity and fulfil the needs of people for clean water in the city of Tanjungpinang?	How does the government attempt to solve the current water scarcity problem? What are the gaps in water governance practice to confront water scarcity in Tanjungpinang?	None Roles and Responsibilities Capacity Financial Regulatory Framework Trade-offs between users Monitoring and Evaluation	The current solution to solve the water scarcity issue? Main task or role of agency in SPAM/water resources management Clear rules regarding the allocation and differentiating roles and responsibilities Quality and quantity of staff Continuous capacity building Allocation of funds in SPAM/water resources management Regulation in SPAM/water resources management Good relationship between multi-level government as well as with non-governmental actors Mutual agreement Periodic report of monitoring and evaluation Special task force
	How	do	The influence of governmental

GENERAL RESEARCH TOPIC	RESEARCH SUB-QUESTIONS	PRINCIPLE	SEMI-STRUCTURED INTERVIEW QUESTION TOPICS
	governmental actors experience and influence the challenges of water governance in dealing with water scarcity?		actors in dealing with water scarcity

Note: The questions are not fully formulated in this table, and for the clarity of each question, it can be seen in Appendix 3 for the interview guide and followed by interview questions.

d. Data Analysis and Interpretation

This study uses the content analysis method, which is helped by Atlas.ti software. After the interviews were transcribed, the next step that needs to be done is coding. The transcription of the results of this interview was broken down into several themes, which represent the findings which can also be categorized into previously defined principles based on a theoretical framework (see Table 1). This categorization is valuable for analysis in answering research questions. However, during the coding process, additional codes were found that were useful for analysis. These new formulated codes will further be included as new findings to enrich the analysis.

6. Theoretical Framework and Literature Review

This section aims to elaborate on two main literature review themes: (a) An overview of water scarcity in Section 6.1 and (b) governance and water governance concept in Section 6.2. Section 6.1 discusses water scarcity which is one of the most significant water-related challenges in the world and its general causes. The increase in water demand that has surpassed supply in many regions has forced decision-makers to think about the urgency to establish not just a technical solution but also better and more effective water governance. Thus, water security can be ensured and allocate water resources fairly for all levels of society. Therefore, the governance theory and its works in terms of the water governance concept will be discussed in Section 6.2.

6.1 Understanding water scarcity

Water scarcity is one of the most significant challenges confronted by many regions globally (Jacobson et al., 2013). Water scarcity can be defined as a gap between the availability and demand for fresh water in a particular area under the prevailing institutional arrangements and infrastructure conditions (Steduto et al., 2012). Hence, when the demand for clean water increases, people must look for better skills, techniques, or methods to solve the problem of water scarcity (Manar, 2010). Moreover, UN-Water (n.d.) mentions water scarcity is a scarcity to access water due to the institution's failure to guarantee water supply to the people and scarcity in adequate infrastructure. Water scarcity can be caused by natural phenomena and human-induced (Santos Pereira et al., 2009). Naturally, water scarcity may be influenced by climatic conditions such as low average rainfall rate, droughts, high temperature, and high evaporation, combined with hydrological influence such as low infiltration, flash floods, and low groundwater recharge, short time run-off events, and so on (*ibid*). In general, some areas experience critical water problems due to low levels of rainfall. However, high rainfall does not always guarantee one place to avoid water scarcity (Hophmayer-Tokich and Kadiman, 2006). For example, a city with islands (archipelagic) characteristic like the Tanjungpinang, which lies on the Bintan Island. The fulfilment of clean water as a basic human need is one of the major problems encountered by residents, especially those who live on small islands (Rachmawati, 2015). Islands usually have a relatively limited surface area and limited water storage capacity (Hophmayer-Tokich and Kadiman, 2006). Under normal conditions, the water supply can be sufficient for all year round needs, but in contrast when it is drought. Some areas in this city are also unsuitable for developing surface water resources because of their steep topography and short river channels (Marganingrum et al., 2020). In addition, if the soil types are highly impermeable, it could reduce water absorption and increase runoff and soil erosion (Hophmayer-Tokich and Kadiman, 2006; Máñez et al., 2012).

Limited resources can directly affect the supply of clean water that residents can utilize. However, this physical condition is not the only factor affecting the fulfilment of clean water needs. On the human-made side, climate change and inefficient water management are the main subject to be highlighted (Santos Pereira et al., 2009). As the impact of climate change, the temperature has been increased while rainfall decreased, flood risk intensified, and so on, thus affecting water availability (Máñez et al., 2012). Climate change also has an impact on the Riau Islands Province, including Tanjungpinang. An extreme drought occurred in early 2014, marked by no rain for 45 days (mid-January to late February) (Rachmawati, 2015). This incident was the most prolonged drought ever experienced in this area which caused severe water scarcity. Water scarcity is worsened due to poor water management in conditions where water demand is uncontrolled and competition between users, inequality in water allocation, improper irrigation practice, improper land use management, inadequate infrastructure and management, and poor management institutions (Dalezios et al., 2018).

Managing water, as one form of common-pool resources, has its own challenges potential conflicts in practice. It could be related to the definition of the common-pool resource itself as a system of natural or human-made resources shared by a group of users, and therefore it is difficult, but it is possible to define their users and exclude other users (Ostrom, 1990). Since water is a common good, no one can claim that particular individuals or groups own water and violate other people's rights (Manar, 2010). Therefore, water must be managed with a policy that emphasizes inclusiveness, which opens up opportunities for everyone to participate. This perspective highlights social equity because the opportunity to access water is part of human rights. Besides the conflict between users, the conflict also happens in terms of unclear roles and responsibilities of the actors, inadequate and ineffective water rights regulation, fragmented systems, and so on (Hophmayer-Tokich and Kadiman, 2006; Dalezios et al., 2018). The human-induced cause can be reduced by improving how water is governed for better water management (Jiménez et al., 2020), as stated as the aim of this study. The goal is to fulfil the water needs of all levels of society fairly and equally in the current and future situation.

6.2 Water Governance in Dealing with Water Scarcity

Many studies have been conducted that focus on technical and scientific solutions to enhance water supply in solving water scarcity problems such as the use of desalination technology and the use of GIS and remote sensing (Lopez-Gunn and Ramón Llamas, 2008); improving and build new water infrastructures (dam/reservoir) (Steduto et al., 2012); rainfall harvesting (Che-Ani et al., 2009; Cain, 2014), and wastewater reuse (Hamdy and Aly, 2015). However, this technical and scientific solution solve the water problem partially. The root of water scarcity is mainly caused by water governance failure (Romano and Akhmouch, 2019). Looking at the study case, research on water scarcity issues has been carried out by at least two scholars. Santoso (2015) examined water carrying capacity, and Marganeringrum et al. (2020) focus on water quantity and quality, but none of them reveals the water governance issues. The urgency to elaborate water governance is when the water scarcity is linked with the Sustainable Development Goals 6 and 10. These goals are pointed out to reduce the number of people who have limited access to clean water by increasing the water supply at an affordable price with equal rights.

Along with developing the governance paradigm and the crucial importance of environmental issues, the concept of sustainable development today also adopts a governance paradigm (Kusumah and Mustofa, 2020). This paradigm is believed to have the ability to facilitate sustainable development by involving many actors who share responsibility for environmental sustainability. This perspective is also crucial in managing water as a public good which often experiences many obstacles in its equitable distribution (*ibid*). This study then places the water governance paradigm as a

basis on how the government makes policies to provide clean water in Tanjungpinang. Therefore, the solution is not merely focusing on increasing water availability but also on finding the gaps to improve water governance to manage water to meet people's needs without causing environmental damage.

Over the last decade, there is a shifting perspective from the government (state) towards governance (Jordan et al., 2005). In the previous era, solving an environmental problem was more of a top-down approach. Since the water sector is usually fragmented, it requires involvement that is not only from the government side but also coordination and involvement of non-state actors such as private / market, Non-Governmental Organizations (NGOs), citizens, and so on (OECD, 2015). Thus, a governance concept that involves a broad of stakeholders is more needed since each actor has its limitation on capacity, sources, and influence to alter a situation. Jordan (2008) stress that governance is not a synonym of government. Government is more described as the institutions and the activities of the state, while governance enables not just state actors but also non-state actors in societal steering (Lemos and Agrawal, 2006), in which they can share goals (Rosenau, 1992). Moreover, Rhodes (1996) describes governance as a structure that appears in a socio-political system due to the interaction of all actors involved. The governance concept itself has many definitions, and no one definition is universally accepted depend on different perspectives such as political science, international relations, and comparativists (Jordan et al., 2005). Nevertheless, despite the differences, Jordan et al. (2005) state that there are some basic points that are generally agreed upon. First, the state is losing its capacity to steer society; as mentioned by Stoker (1998, p. 26), "governing styles in which the boundaries between and within public and private sectors have blurred". Second, there is growing attention on the importance of multi-level government to introduce new modes of governance (Hooge and Marks, 2003 in Jordan et al., 2005).

Having the definition of the governance concept at hand, we now take a closer look at governance in water. Water governance has a different meaning from water management. Water management is usually linked to the activities to analyze and monitor water resources and what measures can be developed and implemented (Jiménez et al., 2020). Meanwhile, water governance is more related to a social function that regulates the development and management of water resources and services and leads to desirable circumstances. A plethora of water governance definitions has been debated by several authors and international organizations. The Global Water Partnership (2002) states that water governance is "the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society". However, this definition is debatable because it does not have an analytic framework due to its descriptive nature (Araral and Wang, 2013). In addition, there is much literature that reviews water in its relation to finance, politics, policy, law, and management and so on, which leads to complex meanings. Other authors such as Rogers and Hall (2003) argue

that there are overlapping aspects of governance with technical and economic aspects of water, but the governance concept brings us to the political and administrative elements to help solve problems or harness the opportunities. Batchelor (2007) define it more simply as a set of systems that control decision making in developing and managing water resource. On the other hand, Tropp (2007) stresses water governance relates to the evolution that occurs in formal and informal networks, which emphasize dialogue in joint decision making.

Over time, the definition of water governance has developed with a more concrete meaning by the UNDP Water Governance Facility (2013). UNDP (2013) argues that water governance should discuss "principles such as equity and efficiency in water resource and services allocation and distribution, water administration based on catchments, the need for integrated water management approaches and the need to balance water use between socio-economic activities and ecosystems". UNDP also calls for the importance of clear roles and responsibilities of state actors, civil society and the private parties regarding ownership, management and administration of water resources and services. Overall, what is important to note is how the institution operates and how the applicable rules influence political actions and social concerns, both through formal and informal instruments (Kusumah and Mustofa, 2020). The other international organization like the Organization for Economic Co-operation and Development (OECD) (OECD, 2015, p. 5), define water governance as "the set of rules, practices, and processes (formal and informal) through which decisions for the management of water resources and services are taken and implemented, stakeholders articulate their interest and decision-makers are held accountable". The OECD (2015) describes water governance as a means to an end. It means that water governance is good if it can help resolve issues that become the main water challenges, combining top-down and bottom-up processes and at the same time preserving the constructive state and society relationship; and is considered as bad if it failed to respond to needs based on local context (OECD, 2015). The OECD appears to be more practical and analytical, with an analytical framework developed that allows analysis and assessment of water governance performance. From the various definitions of water governance, it can be concluded that the complexity of the relations between actors and the aspects involved in the concept, mainly related to multidimensional aspects, namely social, economic, cultural, and political, that highlights multi actor's engagement, namely government, private sector, and society with interest in resource management. This notion becomes the reason why the water governance concept is essential in dealing with water scarcity in this study since it entails the process in a more holistic way, which considers many aspects beyond technical solutions.

Water governance practices to fulfil the needs of clean water in the various regions in Indonesia have attracted the attention of several scholars to be studied. To meet water needs, the government and the community have implemented adaptation measures to the limited water resources, such as harvesting rainwater and building reverse osmosis

installations in the Kepulauan Seribu in Jakarta (Cahyadi and Hidayat, 2017). The same adaptation is also carried out by people in the Bangka Belitung Islands (Rachmawati, 2015) and Spermonde Archipelago in Sulawesi (Máñez et al., 2012) through harvest rainwater, desalinate seawater, look for new water sources and collect water from other locations or islands. This adaptation needs to be supported by how the water is governed because the adaptation measures carried out are more likely a short-term solution by focusing on increasing water supply in the physical term. However, many cities in Indonesia face challenges in implementing good governance in the provision of clean water.

In many cases, most cities in Indonesia experience financial issues in managing water resources so that they are less able to provide and maintain water infrastructure. Apart from the areas which has been mentioned previously, cities like Semarang (Manar, 2010), Bandung (Rahmasary et al., 2021), and Cirebon and Kuningan District (Rahayu et al., 2019) were also challenged by financial issues. Other issues that significantly affect water resources management are the lack of stakeholder participation, lack of monitoring and evaluation of water resources management, and low stakeholder's capacity (Cahyadi and Hidayat, 2017; Rahayu et al., 2019; Rahmasary et al., 2021). However, the challenges of water governance in fulfilling needs and a fair distribution for the community are also experienced by other developing countries (Bayu et al., 2020). Developing countries often experience difficulties due to a lack of administrative, financial, technical resource capacity and inefficient implementation of existing policies and regulations.

According to the prior governance failures, which were experienced by many places, the author argued that it is crucial to analyze the current condition of water governance in Tanjungpinang city. This study will analyze water governance conditions based on the indicator framework of water governance from OECD. The OECD approach is used because it is developed under the light of context-related perspective. The OECD principles on water governance are established under the notion of "no one-size-fits-all solution" to water challenges (OECD, 2015). Water governance is realized to be highly contextual, and water policy needs to be adapted to different conditions of place and water resources, and governance responses must be able to adapt to the uncertainty of circumstances that may change (OECD, 2015). The OECD principles are sufficient to become the basis for assessing water governance performance. However, developing indicators to analyze water governance performance is necessary to enrich and combine them with other sources. In order to be able to analyze water governance, the key factors which influence the effectiveness of water governance are needed to be found, define who is responsible for doing what part, and understand the indicator framework of the water governance to know what is already there or what is not currently owned or implemented or the most cumbersome.

a. Finding the factors influence the effectiveness of water governance

In general, some factors influence whether water governance can be done effectively or not, both in the current condition and in the future. These factors will differ depending on the conditions of the city, and each city has a different capacity to overcome the challenges. Romano and Akhmouch (2019) explain that based on a survey conducted by the OECD, the factors that affect management or decision-making could come from the internal and external water sectors. Speaking about the internal factors, the water sector usually requires a significant investment to build infrastructure and maintenance purposes (Winpenny, 2015). The cost for maintenance is vital to consider because one day, an infrastructure will experience ageing. Despite the infrastructure and the investment, Romano and Akhmouch (2019) explain that information systems and water flow monitoring could help to increase efficiency and reduce costs related to environmental and financial aspects.

Meanwhile, institutional one is a factor that significantly affects water governance which is considered as the external factor (OECD, 2016). In this part, one needs to figure out the potential influence of laws and regulations on water governance, how the information is shared between stakeholders both vertically and horizontally, ensuring stakeholder inclusiveness, and so on (Romano and Akhmouch, 2019). In addition to these factors, OECD (2016) also explains that climate change and urban growth can also affect water governance. These two conditions can intensify water scarcity and the risks it carries since the availability of water decreases due to climate change while competition between users increases as the population arises. Therefore, it is necessary to find out the main factors affecting water governance.

b. Mapping roles and responsibilities of actors at various government tiers

Since water governance incorporates a different government level in achieving the goals, each role and responsibilities need to be mapped. It is intended to identify potential mismatches, overlaps, gray areas and seek the opportunities in which the system can be improved to achieve better coordination that includes different scales, authorities, and policy domains (OECD, 2016). Therefore, mapping the roles and responsibilities of the central government, provincial government, municipal government, service providers, and other relevant stakeholder is essential and need to be analyzed. OECD (2016) explains that the central government has a prominent role in making water policies and regulatory functions, although when speaking in a decentralized context. Meanwhile, the local government usually has a more operative water function task such as drinking water supply and has an essential role in information/monitoring and evaluation (Romano and Akhmouch, 2019). Therefore, this stage is a critical step to analyze the roles and responsibilities of the actors involved so that the design and implementation of policies in the water sector can be more efficient, effective, and inclusive.

This shared responsibility across different levels of government can also be seen in Indonesia urban water management. In urban water management in Indonesia, there are different government actors and institutions involved, from the national to the local level. Mulyana and Prasojo (2020) refer to the actors as people or institutions at different government tiers who have a role and are directly involved in the urban water domain. Since water issues incorporate various sectors and many factors could affect the sustainability of water resources, the tasks and functions of water provision cannot rely only on the water sector alone. Therefore, it is worth noting that the governmental actors indirectly involved in the water supply provision system are also identified in this study. In Indonesia, several ministries are involved in the water supply provision system both directly and indirectly with particular tasks and functions. These central government actors are the Coordinating Ministry for Economic Affairs (for inter-ministerial coordination), Ministry of National Development Planning (for establishing national policies, planning, and implementation coordination), the Ministry of Public Works and Housing (for water resource utilization and project implementation), the Ministry of Environment and Forestry (for raw water pollution controlling), the Ministry of Health (for drinking water quality standard and monitoring), and the Ministry of Home Affairs (for capacity building and tariff regulation) (Mulyana and Prasojo, 2020). Apart from the involvement of several ministries, local governments from provincial to city / regional level also have significant duties and responsibilities in urban water management. Local government agencies involved in supporting water supply are the Planning, Research and Development Agency, the Public Works and Spatial Planning, the Environment and Forestry Agency, the Housing and Settlement Agency, and the Health Agency (*ibid*). However, the success of water management for water supply cannot be separated from the participation of myriad non-governmental actors such as NGOs, private entities, academia, experts, and community-based organizations (Castán Broto, 2017). The roles of these non-governmental actors are critical in escalating water services and contribute to maintaining water resources. With the multi-sector nature, coordination between actors and institutions is a primary requirement to boost the effectiveness and efficiency of water management to achieve good water status.

c. Indicator framework of water governance

Current interest in water governance has shifted from initially focusing only on monitoring hydrological data towards monitoring data related to policy processes (Jacobson et al., 2013). Jacobson et al. (2013) further explain that the analysis or assessment of water governance is needed to improve the performance of the sector in order to attain the most impact by showing in what part an intervention is most needed. The objective of the assessment could be reviewing and identifying the trends and potential gaps of the multi-level governance, diagnosing the existing problem (*ibid*), and find out what policy frameworks, institutions, and performance are needed to improve (OECD, 2018) as previously described as the scope of this study. To analyze and assess

water governance, indicators are needed. Hofstra (2013) establish a water governance framework known as a three-layer model (see Figure 4).

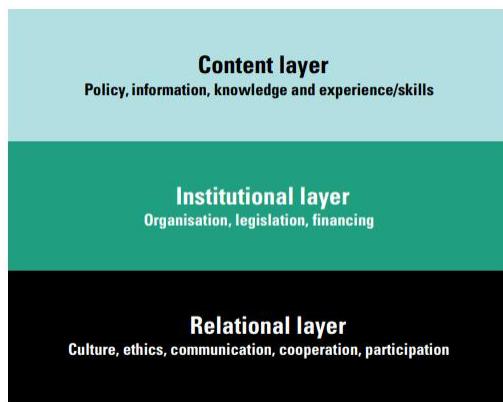


Figure 4. Three-layer model of water governance. Source: Hofstra, 2013

This model emphasizes that good water management encompasses three layers: the content layer, the institutional layer, and the relational layer. The content layer involves the importance of policy, information, knowledge, experience, or skill as essential prerequisites for solving the water-related problem (Hofstra, 2013). However, in many cases, relying merely on the content layer is insufficient to obtain good water status. Therefore, institutional support is needed, such as an adequate organizational framework, instruments (law), and a sound financing structure, to support the success of integrated water resources management (*ibid*). Moreover, to solve persistent water issues successfully, a relational layer is needed. Hofstra (2013) mentions that this layer emphasizes communication and cooperation between various actors, participation between them, and transparency and trust. According to this model, the most explicit foci in assessing water governance are institutional and relational layers. However, the content layer should not be overlooked (Havekes et al., 2013) since policies, information, and good capacity of human resources will always be needed to build a robust system. UNDP (2013) also establish a water governance analysis framework but only focuses on the regulatory aspect.

In 2014, UN-Water formulated the frameworks of water governance. UN-Water focuses on four elements: a. implementing an integrated approach to water management at the local, watershed, and national levels, including participation in the decision-making process; b. providing all services for drinking water, sanitation and hygiene provision that are affordable, accountable, and financially and environmentally sustainable; c. assuring regulatory frameworks are well-established; and d. strengthening knowledge transfer and skills development (UN-Water, 2014). It can be seen that UN-WATER focus only on stakeholder participation, financial, regulatory frameworks and knowledge and skills. In Indonesia, Suyeno et al. (2014) explained that there are four main requirements for the successful implementation of urban clean water service policies by PDAM in Bengkalis Regency, namely communication, resources, standard operating procedures (SOP), and enabling environment. Communication is one element that

determines the success of achieving the goals of the implementation of public policies (*ibid*). Effective implementation will happen if the decision-makers know what they are going to do. Good water provision status can be achieved with the support of resources (human and financial resources), rules in terms of SOP, and a good environment (social, economic, and political conditions).

Regardless of the frameworks mentioned previously, the OECD uses a different way of analysis of water governance. In 2015, the OECD formulated twelve water governance principles at the 7th World Water Forum in April 2015 in South Korea, and these principles have been widely accepted (Havekes et al., 2013). The principles of water governance are derived from broader principles of good governance, namely legitimacy, accountability, transparency, human rights, the rule of law, and inclusiveness, and further is structured under three pillars: effectiveness, efficiency, and trust and engagement (OECD, 2015; Romano and Akhmouch, 2019). Based on these three pillars, twelve principles are developed and known as water governance indicators (Figure 5). The complexity of the water scarcity problem has prompted decision-makers to think of a better approach. Enhancing the ability to face the challenges, government from lower to higher levels needs to cooperate and ensure the meaningful participation of a broad stakeholder (OECD, 2016). Therefore, the shortcoming and limitations could be overcome by noting a more cross-sectoral and integrated system utilizing mutual reinforcing. The explanation related to the principles is based on Havekes et al. (2013) and the OECD (2015).

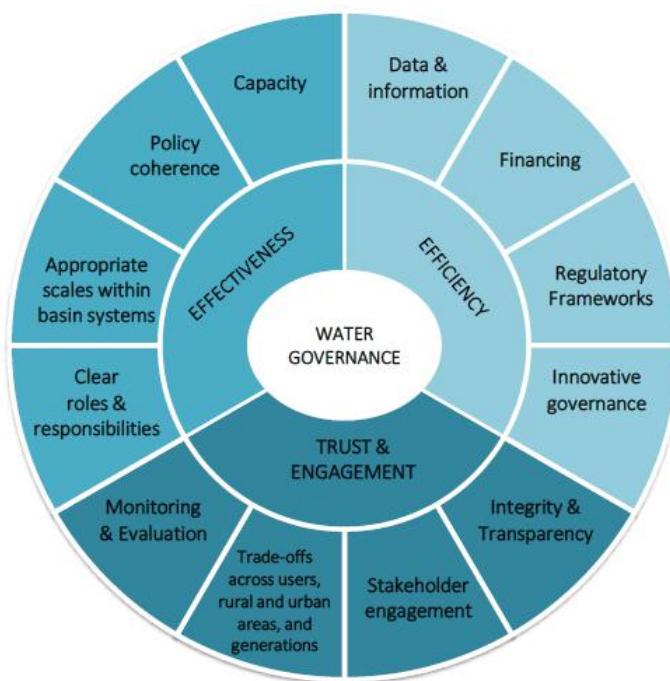


Figure 5. The Organization for Economic Co-operation and Development (OECD) Principles on Water Governance. Source: OECD, 2015

The water governance effectiveness here underlines the contribution of governance to reach clear sustainable water policy goals and objectives at various government levels, implementing those policy objectives, and achieving the expected goals or objectives (OECD, 2015; OECD, 2018). Meanwhile, the efficiency of water governance is more likely related to maximizing the benefits that can be obtained from sustainable water management at an affordable cost to society. The last dimension, trust and engagement, is related to building public trust and ensuring active stakeholder involvement through legitimacy and democratic justice for the wider community (*ibid*). The framework developed by the OECD is actually similar to a three-layer water governance model that has been developed by Hofstra (2013). The frameworks promoted by Hofstra (2013), UN-Water (2014), and what has been implemented by (Suyeno et al., 2014) in their research all are covered in the water governance frameworks developed by the OECD.

In this study, the water governance frameworks developed by the OECD are used as the primary basis for assessing water governance in Tanjungpinang City not because the OECD frameworks are the best approach, but the principles mentioned by other authors have generally been covered in the OECD frameworks. The theoretical basis of other frameworks will be combined with the OECD frameworks to understand and support the determination of further indicators to assess water governance in the study area. This study also does not attempt to assess all water governance principles but only analyses the most challenging in the context of Tanjungpinang. Based on the policy documents and some research, water governance in clean water provision in Tanjungpinang faces issues in six principles, namely: 1) clear roles and responsibilities, 2) capacity, 3) financial, 4) regulatory framework, 5) trade-offs across users, rural and urban areas, and generation, and 6) monitoring and evaluation. The argumentation regarding selecting these six principles is based on literature research findings, which will be elaborated on in more detail in Section 7.1, summarized in Table 3.

Clear roles and Responsibilities

The challenge that is often encountered in water management is how the authorities are responsible for each of their commitments and limited coordination across sectors (Camkin and Neto, 2016). However, coordination in water governance can occur if the stakeholders can act in accordance with the roles and responsibilities assigned to them. Therefore, the role of each stakeholder must be well distinct, and each institution must take responsibility in water policy-making, as well as the implementation of the policy and operational management and regulation (Rogers and Hall, 2003; OECD, 2015; Bos, 2016; Jiménez et al., 2020). This principle is critical to emphasize because unclear roles and responsibilities between stakeholders can paralyze coordination. Lack of clarity in these roles and responsibilities can also have an impact on a sense of trust, and in this situation, cooperation will be challenging to occur (Havekes et al., 2013).

Clarity of roles and responsibilities is essential for regulators to understand and explain their roles more effectively. The regulator's role must be clearly defined regarding its objectives, functions and coordination with other entities (OECD the Governance of Regulators, 2014). This is very important to highlight so that the regulatory framework that is built can function adequately with various other actors knowing each other's roles and goals that complement each other, and there are no overlapping interests which can lead to a negative impact on the effectiveness of water governance. Therefore, the legal and institutional framework must be able to determine the allocation of roles and responsibilities of various governmental actors involved in the affairs of the water supply provision and to avoid conflicts and overlapping interests by establishing effective coordination between them. The challenge related to this principle is evident in the general case in Indonesia. Wieriks (2011) explains that the role of water councils in Indonesia is still disputed, therefore they are not sufficiently part of the policy formulation process. Since their roles are disputed, they cannot act as a connector for the actors who are supposed to participate in water governance.

Capacity

Stakeholders' ability is a critical point to emphasize in water governance since competent stakeholders are needed to carry out their duties (OECD, 2015). Resolving the water scarcity problem is undoubtedly a challenge that sometimes makes decision-makers and water managers not well prepared with skill and knowledge when dealing with governance issues such as managing inclusive participation, conflict mediation, forming partnerships, and so on (Tropp, 2007). Speaking about improving the current condition of water governance, developing the knowledge and capacity of stakeholders is essential to respond to various situations effectively. Knowledge itself is certainly more diverse and involves multidisciplinary because of the complexity of how water is used and regulated (*ibid*). Water governance can run effectively with the availability of people who can bring transformation. It is necessary to increase the capacity of the authorities in charge of the water challenges that must be met as well as the capacity of human resources to carry out activities in the operation of the clean water supply system (Hofstra, 2013; Rahmasary et al., 2019; Suyeno et al., 2014; UN-Water, 2014). Capacity building can also be obtained through interaction between stakeholders with a beneficial exchange of information and expertise between knowledge producers and their target groups (Dilling and Lemos, 2011; Laeni et al., 2019).

Financial

This principle emphasizes the importance of ensuring that the financing arrangements and allocation of government financial resources can meet all the needs in the operation of a clean water supply system efficiently (OECD, 2015). In line with the discussion by

Gupta et al. (2013) which states that a good financial arrangement is required to support water policy measures and financial incentives. Therefore, the solution to confront water scarcity cannot be separated from financial issues since finance is the foundation of the water sector and is a significant component in ensuring the sustainability of water services (Rees et al., 2008). The need for investment in providing clean water for the community is substantial, so governance arrangements are vital. To support the financial, it requires raising funds from various sources such as private sectors (Jiménez et al., 2020).

Indonesia is a middle-income developing country confronting great financial pressure due to the decentralization process. Holzhacker et al. (2016) discuss that this decentralization process can improve policy performance by giving authority to local governments to implement and adjust national objectives and policies according to the local context. The decentralization process has also provided room governments in local level to be able to use the knowledge, expertise, and participation of local citizens to provide democratic input as a form of inclusiveness to increase responsiveness (*ibid*). However, the delegation of authority at the local government level has done thus far without financial decentralization (Rahayu et al., 2019). The impact of the decentralization process on this financial scheme greatly affects small or secondary cities with substantial limited water resources and administrative areas. Meanwhile, not all regions are economically independent and have the financial capacity for regional development, such as water supply. The failure of governance in terms of finances in the decentralization context becomes worse when local government does not have good human capital capacity to manage financial arrangements and corruption of governmental elites (Holzhacker et al., 2016). Kepulauan Seribu Jakarta (Cahyadi and Hidayat, 2017) and Bangka Belitung (Rachmawati, 2015) are the example of cities in Indonesia that is facing governance gap in terms of financial which influence water provision. These cities confront financial problems, which can be seen from the inability of the local government to carry out operations and maintenance of seawater desalination equipment using reverse osmosis technology. Holzhacker et al. (2016) state that Indonesia was in the progress of governance structure reform despite the need for local capacity building. However, when the government does not have sufficient resources, including financial, to be able to manage an issue effectively, public participation will be essential to support water management (Huitema et al., 2009). Public participation here refers to the collaboration between government actors and non-government actors. Therefore, other stakeholders such as private parties can collaborate with the government with its resources to support the implementation of water management.

Regulatory Framework

The regulatory framework is a crucial principle in establishing robust urban governance (Mulyana and Prasojo, 2020). This principle emphasizes that a clear regulatory framework is needed and implemented effectively in the public interest (OECD, 2015). The lack of clarity in regulations can actually lead to the government's weak performance in satisfying the needs of clean water for the community. Thus, it is essential to establish rules that encompass formal legal mechanisms, law enforcement, and other relevant rules to safeguard the implementation and fulfilment of mandates by relevant stakeholders and ensure that obligations, standards, and performance can be maintained (Jiménez et al., 2020). In addition, regulations must also include positive steps for disadvantaged individuals or groups to eliminate disparities and make water services affordable for the poor (de Albuquerque, 2014). Weaknesses in the regulatory framework can have fatal consequences for water governance performance. Take PDAM Yogyakarta as an example. PDAM Yogyakarta has to face long-term debt payments in building a water treatment plant due to mismanagement and inadequate standard operating procedures (Manar, 2010).

The water regulatory framework in Indonesia is still being developed (ADB, 2013). These water laws refer to all laws relating to water, including water resources, groundwater, general regulations regarding water (environment, public health, pollution, and so on) and other water-related issues (Mulyana and Prasojo, 2020). Since its independence, Indonesia has enacted three water laws: Law Number 11 of 1974 on Irrigation, Law Number 7 of 2004 on Water Resources, and Law Number 17 of 2019 on Water Resources. Law Number 17 of 2019 in November 2020 was amended again as set out in Law Number 11 of 2020 concerning Job Creation. The changes in the new water law emphasize local governments from provincial to city/regency and village level to carry out their duties and authorities in accordance with the norms, standards, procedures, and criteria set by the Central Government. Since this Job Creation Act has just been issued, its implications for implementing the duties and authorities of local governments could not be seen thus far. Moreover, the problem of water is a complex problem involving different sectors such as the environment, forestry, health sector, and local governance (Mulyana and Prasojo, 2020), as can be seen in Figure 6. According to these laws, it can be seen that providing water for the people to avoid water scarcity is undoubtedly a shared task. Thus, the integration between these sectors is needed to support SPAM.



Figure 6. Relevant Law to Urban Water Management

Source: Author, 2021 adapted from Mulyana and Prasojo, 2020

Trade-offs across users, rural and urban areas, and generation

The issue related to this principle in Indonesia is more likely related to the decentralization context. The decentralization policy in Indonesia has resulted in local egoism and institutional fragmentation (Holzhacker et al., 2016). This issue often occurs because the regions tend to develop what Firman (2009) mentions as "kingdoms of authority" in implementing water supply development policies, where a city/regency ignores the needs of its adjacent areas (Holzhacker et al., 2016). To avoid this issue, trade-offs between users, rural and urban areas and generations need to be managed to ensure human rights to get water for their daily needs. This notion is in line with the principle rooted in the dimensions of trust and engagement of the water governance framework that promotes fairness and equity.

Furthermore, embedded across all Sustainable Development Goals, a pledge that emphasizes "leaving no one behind" is echoed to empower the vulnerable and marginalized people to act and claim their rights. To leave no one behind, a country or region must fulfill that promise to change their society. The success of an area in fulfilling this promise cannot be achieved if there is the egoism of elites to defend vested interests (UNDP, 2018). Therefore, the leader needs to ensure and strive for inclusiveness through meaningful participation of all levels of society in social, environmental, and economic spheres and reach those left behind. According to OECD (2015), these trade-off issues can be addressed in several ways: 1) encouraging non-discriminatory participation to make joint decisions, 2) allowing local government elites and users to identify and solve barriers, 3) promoting public debate related to the risks and costs it may take on a water supply provision system, and 4) boost evidence-based assessment regarding the consequences that may arise from the distribution of water-related policies. By strengthening coordination between sectors and involving relevant stakeholders, especially vulnerable groups, equity across water users, rural and urban

areas, and generation can be fostered. High community involvement will increase a sense of belonging and responsibility for the sustainability of a program (Cahyadi and Hidayat, 2017; Hofstra, 2013; UN-Water, 2014).

Monitoring and Evaluation

Monitoring and evaluation activity is one of the stages in the planning process and must exist in the implementation of the clean water supply system. This principle can be considered as a reflexive activity of ongoing policies implementation (Loorbach, 2010). Monitoring is an essential activity for water resources management as mentioned by Ostrom (1990) that monitoring must be seen as a routine because "without monitoring, there can be no credible commitment". Ensuring monitoring and evaluation will lead to better water resource management. Therefore OECD (2015) highlighting the importance of regular monitoring and evaluation in water governance and making adjustments if needed for subsequent planning. Therefore, in this principle, it is necessary to emphasize the existence of a particular institution for monitoring and evaluation and the transparent sharing of evaluation results (*ibid*). Restemeyer et al. (2017) also stress that the critical function of this principle to build strong institutions by determining what to monitor, with whom the result is discussed and when the action is taken. Monitoring is different from evaluation, but both are learning and reflexive activity that could enhance the adaptability of water policies. Monitoring refers to the continuous and systematic process of gathering and analyzing data and information to evaluate performance which is helpful in planning and decision making. (Jiménez et al., 2020). Meanwhile, evaluation refers to the exercises that are carried out to assess the achievement or progress of an activity, project, program, strategy, policy, and so on in a systematic manner (*ibid*). This evaluation is intended to determine the link, impact, effectiveness, and sustainability of an intervention. Table 2 below presents the challenge related to water principles in Tanjungpinang followed by the indicators discussed in the literature review.

Table 2. Water governance principles and the indicators

NO.	PRINCIPLE	INDICATORS	MAIN SOURCES
1	Roles and responsibilities	<ul style="list-style-type: none"> • Clear allocation of duties and responsibilities in water sector and other supporting sectors • Fostering cooperation between the authorities responsible for the provision of clean water. 	(Bos, 2016; Hofstra, 2013; Jiménez et al., 2020; OECD, 2015; Rogers and Hall, 2003)
2	Capacity	<ul style="list-style-type: none"> • Availability of human resources with good skills and knowledge, supported by appropriate competencies. 	(Hofstra, 2013; OECD, 2015; Rachmawati, 2015; Rahmasary et al.,

NO.	PRINCIPLE	INDICATORS	MAIN SOURCES
		<ul style="list-style-type: none"> Continuous capacity building 	2019; Suyeno et al., 2014; Tropp, 2007; UN-Water, 2014)
3	Financial	Availability of governance arrangements to help mobilize water finance and other relevant sectors.	(Hofstra, 2013; OECD, 2015; Rees et al., 2008)
4	Regulatory Framework	<ul style="list-style-type: none"> Clear legal or regulatory framework related to the water supply system. Law enforcement of applicable regulations. 	(Hofstra, 2013; Jiménez et al., 2020; OECD, 2015; UN-Water, 2014)
5	Trade-offs across users, rural and urban areas, and generation	<ul style="list-style-type: none"> Relationship between the municipal government, the provincial and national governments regarding the operation of the clean water supply system and water resources management. The relationship between the government and non-government actors 	(Hofstra, 2013; OECD, 2015; UN-Water, 2014)
6	Monitoring and Evaluation	<ul style="list-style-type: none"> Periodic/routine monitoring and evaluation of policies. Special institutions that carry out monitoring and evaluation 	(Jiménez et al., 2020; OECD, 2015; Ostrom, 1990; Restemeyer et al., 2017)

Source: Author analysis, 2021

6.3 Conceptual Model

In fulfilling clean water for the community, assessing water governance is vital. Romano and Akhmouch (2019) mention that "there is no size fits all solution", so the presence of water governance framework can help assess whether water governance is well implemented or need to be improved. This study is approached with governance theory and how governance works in water scarcity issues by looking at the three dimensions of water governance frameworks namely the effectiveness, efficiency, and trust and engagement. Several principles are then derived from these dimensions and then indicators to assess the condition of these principles are built based on several literatures that review water governance practice from various perspectives which has been discussed previously. This study argues that clean water provision in Tanjungpinang can be fulfilled if there is an improvement in water governance. The conceptual model (Figure 7) shows the relationship between six principles that affect the effectiveness of water governance in Tanjungpinang to increase the ability of the city to provide clean water.

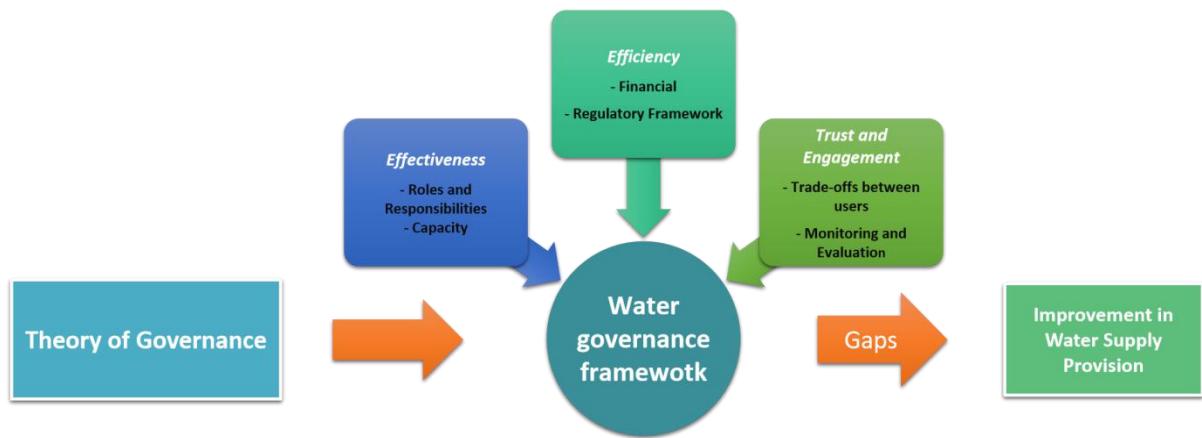


Figure 7. The conceptual model in support of the theoretical framework

Source: Author (2021)

7. Empirical Input and Analysis

After discussing methodology and theory in the previous chapter, this chapter will explain the information obtained from the data to be collected (interviews and information from policy documents and other supporting literature. This chapter will start with the case introduction related to SPAM in Tanjungpinang in Section 7.1. This section also elaborates water governance challenge based on several policy documents. This chapter ends with a discussion of water governance challenges in SPAM practice in Section 7.2.

7.1 The Challenges of SPAM Practice in Tanjungpinang

a. Allocating water to Tanjungpinang - current condition and the new plan

Strategic issues regarding water scarcity in terms of clean water supply system were identified based on the policy document of Water Resources Management Pattern for River Basin Territory of Riau Islands as stated in the Decree of the Minister of Public Works and Housing No. 526 / KPTS / M / 2018, Regional Water Supply System Development Master Plan of Bintan Island 2019 issued by the provincial government, Water Supply System Development Master Plan of Tanjungpinang City 2014 issued by the Tanjungpinang City government, and information obtained during the interviews. Water scarcity in Tanjungpinang is very sensitive to regional characteristics with limited surface areas, increased demand for water due to population growth, regional development, and environmental degradation in the watershed, which leads to decreasing river and reservoir discharge. These driving factors are deemed to affect the effectiveness of services in the provision of clean water. Therefore, water sources must

be managed in an integrated and careful manner by preserving the environment to provide benefits to the community.

However, Tanjungpinang's water supply system is very fragmented. Currently, PERUMDA Drinking Water Tirta Kepri, which served through the formal water supply system through the piped network, only reaches 42.19% (service area map can be seen in Appendix 4) of the city's inhabitants in 2020. The inhabitants who have not been served through the PERUMDA Drinking Water Tirta Kepri pipeline network use various water sources such as private/communal dug wells, drilled wells, tank cars, bottled water vendors to meet their daily water needs.

The inability of PERUMDA Drinking Water Tirta Kepri in serving the entire community in Tanjungpinang can be seen from the failure to increase water availability to keep pace with the increase in water demand. The rise in water demand is reflected in the increase in population from year to year, with a population growth rate of 1.3% per year (BPS Tanjungpinang, 2020). In addition, the water loss rate of PERUMDA Drinking Water Tirta Kepri pipeline reached 40% because the condition of most of the pipelines had exceeded the economic age (the average was 20 years and above), hence they could not function optimally. In fact, if the pipe leakage can be solved, the percentage of city dwellers who can access clean water can be doubled from the current condition. In fulfilling the community's water needs, the government is currently utilizing two reservoirs, namely Sungai Pulai and Sungai Gesek reservoir, with each capacity of 280 lt/sec and 100 lt/sec, respectively. These reservoirs are located on the border of the administrative area of Tanjungpinang City and Bintan Regency. Based on projection data, Tanjungpinang city water demand will reach 670 lt/sec in 2025. However, the capacity of the two reservoirs was reduced due to uncontrolled land conversion in the protected forest area surrounding the reservoirs into settlements and plantations (UH, 18-05-2021; DA, 03-06-2021). The problem of protecting the forest itself has not been resolved until now, which will be discussed later on in the next subsection regarding governance issues.

To accelerate the fulfilment of water demand in Tanjungpinang, the government has made strategies and efforts to utilize sea water with desalination technology by building a pilot project and the largest Sea Water Reverse Osmosis (SWRO) plant in Indonesia, known as the Batu Hitam SWRO with a capacity of $2 \times 25 \text{ m}^3/\text{sec}$. This SWRO plant has completed in 2015 and officially operated in 2018. The City Government of Tanjungpinang manages this infrastructure through the BLUD-UPTD SPAM (regional technical service unit for drinking water) and in 2020 has served 2,069 household connections spread across three zones - Tanjungpinang Kota District, Cambodia District and Tanjung Unggat District. Outside these zones cannot be served because there is no distribution pipeline network. If this SWRO plan can operate optimally, it can distribute water to customers of up to 6,000 household connections. In addition to the Batu Hitam SWRO, another SWRO was built on Penyengat Island with a capacity of 2 lt/sec with a depot system. In addition to SWRO, BLUD-UPTD SPAM serves the people through six

drinking water supply systems in the core area of a sub-district area (SPAM IKK) (see Appendix 5). The system used in SPAM is usually a borehole system. This SPAM management will be handed over to the community or local government to be managed independently with guidance from the BLUD-UPTD SPAM.

Reflecting on the slow pace of achieving access to clean water for the community, the government made a new plan as stated in the Regional Water Supply System Development Master Plan of Bintan Island 2019. As an urgent program of Regional SPAM of Bintan Island (Figure 8), to pursue increased water demand and develop service areas, the provincial government, in collaboration with the central government, city government of Tanjungpinang and the district government of Bintan, built a new reservoir, namely Embung DAS Kawal, with capacity around 200 m³/sec.

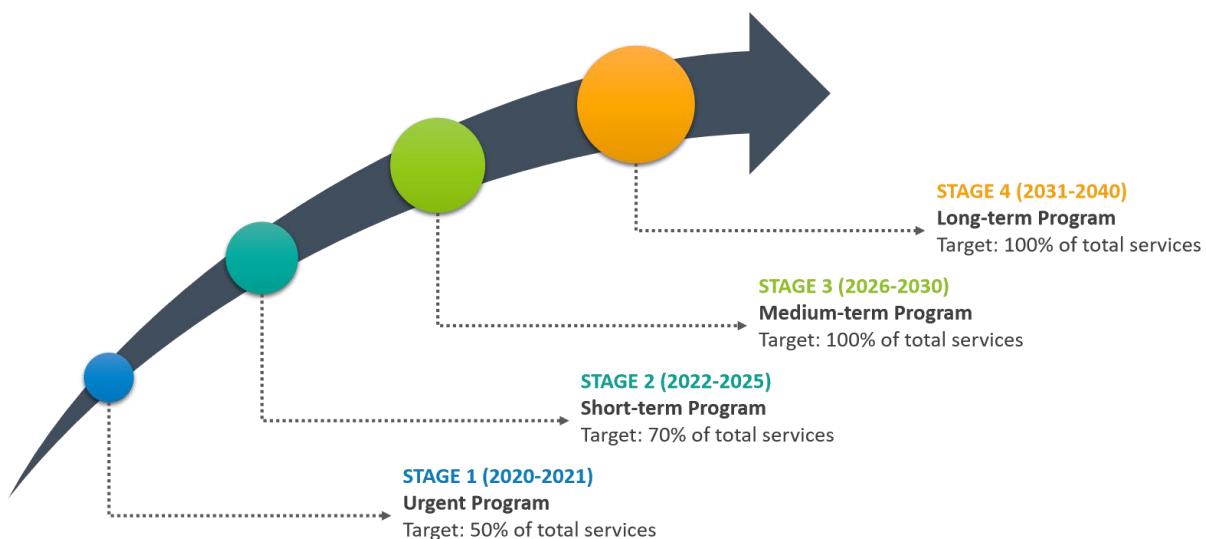


Figure 8. Phases of program and service targets for the development of regional water supply provision system of Bintan Island

Source: Author analysis, 2021 based on Regional RISPAM of Bintan Island, 2019

This reservoir is located in Bintan Regency (see Figure 9), which will be interconnected to the Sungai Geseck reservoir to meet water needs in Tanjung Pinang. The Embung DAS Kawal itself was completed in 2019 but cannot be utilized now because the construction of the transmission pipeline is delayed due to incomplete readiness criteria and plan to be realized in 2022. This system will also be supported by Busung Regional SPAM with capacity around 500 m³/sec planned for 2026-2040. With the construction of new infrastructure that becomes a source of raw water that Perumda Drinking Water Tirta Kepri can utilize, it is expected that its services can reach 24,707 household connections or 50% of total inhabitants at the end of 2021. However, it seems that the fulfillment of clean water needs has not been achieved according to the target.

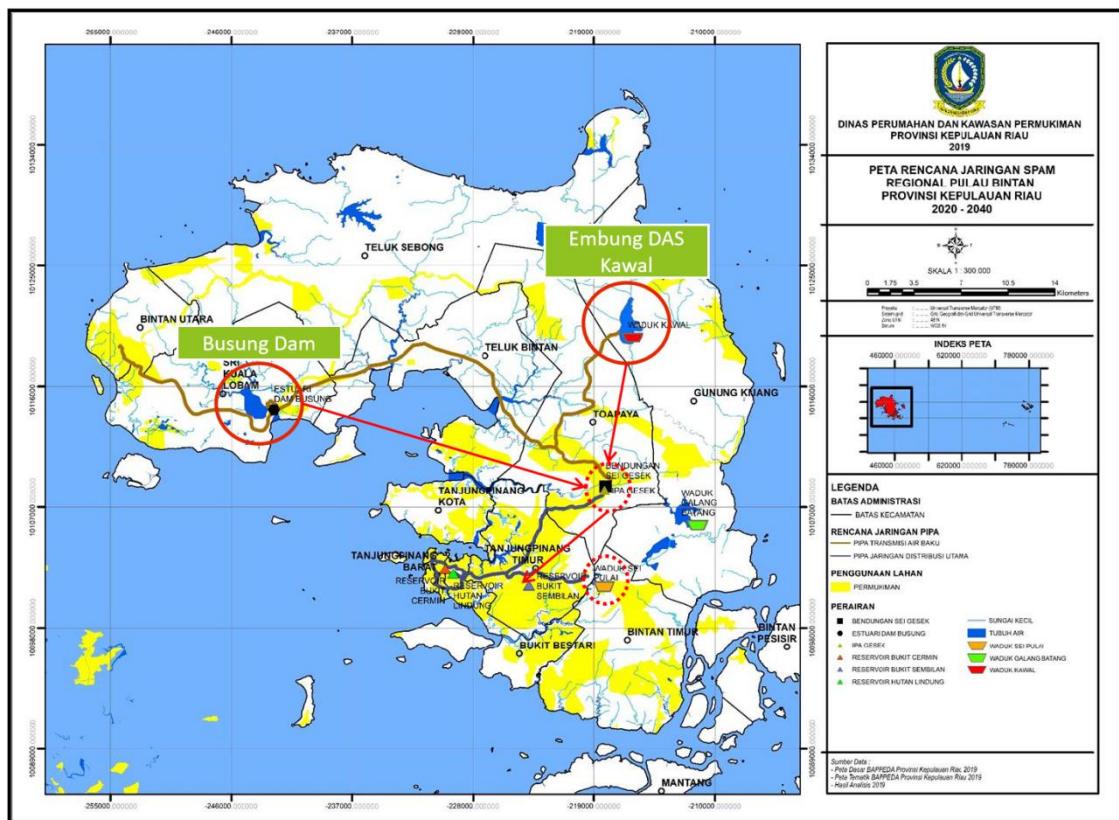


Figure 9. Development of service areas (zonation) for Regional SPAM of Bintan Island in 2020 – 2040

Source: Regional RISPAM of Bintan Island, 2019

In the water governance domain, it is important to highlight the integration of the system from managing water resources to the stage where water is distributed to the community. In addition, the balance of water use between socio-economic and ecosystem activities needs to be considered in managing water. Therefore, to preserve the availability of raw water that meets the quality and quantity, it is necessary to make efforts so that the raw water source for the Regional SPAM of Bintan Island can continue to be used sustainably in the future. In the plan document of Regional RISPAM of Bintan Island 2019, several policies for securing raw water sources are discussed in order to achieve more integrated and sustainable management. This policy emphasizes work program recommendations that promote the development and arrangement of upstream areas by increasing efforts to protect and preserve raw water sources, increase efforts to preserve raw water and increase efforts to manage land and raw water. This effort can be achieved by maintaining water catchment areas and maintaining the continuity of water catchment functions based on regional spatial plans and water resources management plans by maintaining the forest area. This is also in line with the need to emphasize the boundaries of the conservation area and the area for the use of raw water sources as a reference for the preparation or amendment of regional spatial plans and the integrated development of raw water, clean water, and sanitation. The strategy in this policy is also related to the development and

management of the use of raw water for drinking water and sanitation. This strategy aims to increase efforts to optimize raw water supply services, increase the efficiency of water use between uses, and increase efforts to develop water resources.

To sum up, it can be seen that in the new strategies, the government try to take a closer look at the issue not only by increasing water supply but also system integration from upstream to downstream because the water scarcity issue cannot be left only to the water sector alone. Developing a new plan without integrating it with other sectors will only repeat the past failures in water resource management as reflected in the environmental degradation surrounding existing reservoirs. Accordingly, in the next section, the issue on how water is governed will be discussed to see a more holistic picture based on document plans and will be linked with the personal perspective of the interviewees regarding the water governance issues and what other factors could influence it in the last part of this chapter.

b. Water governance challenges in Tanjungpinang elaborated from policy documents

As previously explained, the government has made efforts to increase water supply, but the performance to fulfil water needs for the city inhabitants has not been optimal. As is generally experienced by other regions in Indonesia (Bakker, 2006), weak governance has been identified as one of the key reasons for the poor performance of the water supply sector in Tanjungpinang. Therefore, in this part, problems that hinder water governance performance in the case study are identified from several document plans (see Appendix 2 for document plan list) and another source within the water sector, specifically related to SPAM. Based on literature research, water governance issues in Tanjungpinang in current SPAM implementation are identified in six principles which are interrelated to and influence each other, as shown in Table 3.

Table 3. Water governance challenges in SPAM practice in Tanjungpinang

NO.	PRINCIPLE	REMARKS	MAIN SOURCES
1	Roles and responsibilities	<ul style="list-style-type: none"> ● Perumda Drinking Water Tirta Kepri does not have full rights to manage water resources properly because several agencies have the same task. ● Lack of coordination 	Public Works and Spatial Planning Strategic Plans of Tanjungpinang City 2018-2023 Indra (2017)
2	Capacity	Insufficient human resources both in terms of quantity and quality in providing services.	Public Works and Spatial Planning Strategic Plans 2018-2023; RISPAM of Tanjungpinang City (2014)

3	Financial	<ul style="list-style-type: none"> • Lack of budget availability • Long-term debt 	Public Works and Spatial Planning Strategic Plans 2018-2023; RISPAM of Tanjungpinang City (2014)
4	Regulatory Framework	<ul style="list-style-type: none"> • Laws/regulations change rapidly. • Lack of clarity on systems, work procedures, operating systems, especially those related to finance. 	Public Works and Spatial Planning Strategic Plans 2018-2023; RISPAM of Tanjungpinang City (2014)
5	Trade-offs across users, rural and urban areas, and generation	<ul style="list-style-type: none"> • Lack of synergy and coordination between agencies and internal coordination. • Lack of community involvement in the process of planning, implementing, and monitoring water resources management. 	Decree of the Minister of Public Works and Housing No. 526 / KPTS / M / 2018, 2018; Public Works and Spatial Planning Strategic Plans 2018-2023
6	Monitoring and Evaluation	Perumda Drinking Water Tirta Kepri does not have a special division for operational supervision and control.	RISPAM of Tanjungpinang City (2014)

Source: Author analysis, 2021

The first water governance challenge that Tanjungpinang faces is related to the clarity of roles and responsibilities, which is reflected for at least two cases. First, according to Public Works and Spatial Planning Strategic Plans of Tanjungpinang City 2018-2023, the problem of clean water supply is still unsolved because the internal mechanisms and coordination in the Public Works and Spatial Planning Agency at the city level are not yet optimal. Weak coordination is argued due to a lack of clarity on the roles and responsibilities of each division. Second, in carrying out efforts to conserve water resources, Perumda Drinking Water Tirta Kepri collaborates with various parties such as the Public Works and Public Housing Agency, the Environment and Forestry Agency, and River Basin Organization Sumatera IV or Balai Wilayah Sungai Sumatera IV (BWS Sumatera IV) (Indra, 2017). This cooperation is carried out because Perumda Drinking Water Tirta Kepri does not have full rights and authority to conserve water resources because water resources management is delegated to several actors, as previously mentioned. Meanwhile, Perumda Drinking Water Tirta Kepri has made efforts to maintain and treat the remaining water before it is returned to nature so that the environment in the water source is always maintained. However, efforts to conserve water resources between the Tanjungpinang city governments are not optimal due to a lack of synergy and coordination. In addition, the forest management authority should be at the provincial level.

The poor performance of the water supply system in Tanjung Pinang is also related to its resources, both in terms of the capacity of governmental actors to confront the complexity of water scarcity issue and financial resources as has been a long history and slow change when it comes to human resource capacity. Indeed, the water utility case in Indonesia is often associated conventionally with low levels of education (World Bank, 1997b). Lack of staff skills has reduced the efficiency and productivity of water resource management agencies in Indonesia. In addition, local governments are usually unwilling or unable to ask drinking water companies to improve performance, for example, through measurable performance targets (Bakker et al., 2008). The limited capacity of governmental actors is evident from the need for technical assistance from the central government in preparing a master plan for the drinking water supply system in the administrative area of Tanjungpinang City, which the Tanjungpinang City government must prepare. In the master plan document for the drinking water supply system of Tanjungpinang City, it is also discussed in detail that the quality of human resources in the engineering realm, management and finance, technology, marketing, and management of facilities is inadequate. Consequently, SPAM management has not met the applicable standards, lacks transparency and accountability, limited finance for maintaining drinking water facilities and infrastructure and solving problems based solely on existing knowledge and experience. This lack of human resource capacity has contributed to the weak management of SPAM.

Regarding financial resources, the capacity building of the responsible authorities is impeded due to limited regional budgets. Budget constraints also result in limited services for distributing clean water for the community and the construction of new infrastructure or maintenance. The need for a budget to implement service activities to the community is substantial, including operational costs for repairing old pipes. Accordingly, a significant investment is needed so that the capacity for clean water production can be increased. In addition, Perumda Drinking Water Tirta Kepri has difficulty settling long-term debt due to insufficient cash balance.

The following pressure that affects water demand fulfilment in Tanjungpinang is a problem related to the regulatory framework. Indeed, the rules and regulations will continuously be evolved and renewed in accordance with the dynamic change of the country's development. As mentioned in the previous chapter, the Water Law in Indonesia has been amended several times until the issuance of Law No.17 of 2019 concerning water resources and is still undergoing amendments to the articles containing the duties and authorities of local governments as mentioned in the Law No. 11 of 2020 on Job Creation. However, this change in the laws and regulations turns out to be difficult for local governments to keep up with the existing changes (Public Works and Spatial Planning Strategic Plans 2018-2023). This gap is argued to be related to the capacity and readiness of governmental actors to follow the dynamics of changes in regulations. In addition, the clean water supply provision issue is also affected by the

lack of clarity in systems and procedures, work procedures, standard operating systems, particularly related to the financial (RISPAM of Tanjungpinang City, 2014).

Looking at the success of the water provision further, the role of the community and other stakeholders in the implementation of SPAM and water resource management is a critical point for attention. This aspect is closely related to the water governance principle, emphasizing well-managed trade-offs across users, rural and urban areas, and generations. According to the problems mentioned in the policy document of the Decree of the Minister of Public Works and Housing No. 526 / KPTS / M / 2018, community involvement in Tanjungpinang in planning, implementing, and monitoring water resources management activities, such as in making decisions related to water resources management and implementation of water resources management construction is limited. Meanwhile, this principle is fundamental considering the sustainable development goals that emphasize equality and the participation of all groups in society, including the vulnerable and marginalized groups. Therefore, it is essential to pay attention to non-discriminatory participation in making decisions to fulfil the rights and needs of the community for water. The inclusive principle by ensuring public participation at every level will encourage mutual commitment between interested parties and trust in government programs. Since the administrative area of Tanjungpinang City is limited, the potential of exchanges with the surrounding area is possible when there is a water crisis. For this reason, coordination between stakeholders is crucial, including the surrounding area.

All principles in water governance and the efforts made to provide water for people cannot be separated from reflexive activities as continuous learning in controlling and improving water governance performance. Loorbach (2010) mention that this reflexive activity can take the form of monitoring and evaluation. However, it seems that Tanjungpinang City needs to immediately improve its performance because based on the RISPAM of Tanjungpinang City, it is stated that Perumda Drinking Water Tirta Kepri has no special division for operational monitoring and control. The issue of insufficient monitoring and evaluation by other regional apparatus organizations regarding policies with local governments related to the implementation of water resources management. Meanwhile, the results of monitoring and evaluation are essential for building strong institutions and increasing public trust in their service.

To sum, the experience in current clean water provision systems thus far was still less integrated with each other even though within the scope of the water sector in different government tiers. Issues related to the six principles of water governance above have proven to have hampered the achievement of the target to meet the needs of clean water for the city dwellers. Whereas speaking about this water scarcity problem, it is vital to look at a bigger scale that includes all stakeholders involved either directly or indirectly in the system at all stages. In this regard, the issues regarding water governance principles in this policy document need to be strengthened further with what the actors experience in practice based on their perspectives, not only within water sectors but

also from those governmental actors that are not directly related to the clean water provision system.

7.2 Searching for Solution: Water governance gaps in SPAM practice

After discussing the problem of principles related to water governance, in this sub-chapter, the perspectives of governmental actors, both those in the water sector at different levels and other sectors that indirectly support the implementation of SPAM, are discussed to see how their experiences and influence in SPAM practice. What is planned in the policy document is certainly not easy to implement in practice because the actors confront possible barriers. Some gaps on how water is governed in SPAM practice within the study case are discussed as follows.

Role and Responsibilities

Government intervention in clean water supply provision in Indonesia, especially in Tanjungpinang City, is substantial. The government is involved not only in regulation and monitoring but also in the operation of the clean water distribution system. In other words, the governmental actors become the essential parties in securing the long-term availability of clean water. In general, the central government plays an essential role in policymaking. Meanwhile, local governments play a role in more operative matters such as the provision of drinking water. As the concept of multi-level governance also captures the involvement of different tiers of government elites, the competencies are not only monopolized by the central government but also shared among actors at different levels (Marks, 1996 in Purbo et al., 2020), as reflected in Tanjungpinang case. Based on the finding from the literature and interviews, several actors in different levels of government are involved in supporting the implementation of SPAM from the raw water production stage to the distribution of clean water as well as environmental conservation, which challenge the success of the programs.

To support water provision in Tanjungpinang, there are two central governmental actors involved, namely River Basin Management Agency Sumatera IV (BWSS IV) and Watershed and Protected Forest Management Center (BPDASHL) of Riau Islands. These two actors are under two different ministries (Ministry of Public Works and Housing and Ministry of Environment and Forestry) assigned at the local level. At the provincial level, there are the Department of Housing and Settlement Areas and Environment and Forestry Agency involved in the system, with the Planning, Research and Development Agency act as coordinator of SPAM at the provincial level. At the city level, SPAM implementation is coordinated by BAPPEDA Tanjungpinang. Other actors who are involved are Public Work and Housing Agency, Environmental Agency, and Health Agency. Meanwhile, the distribution of water is handled by Perumda Drinking Water

Tirta Kepri and BLUD-UPTD SPAM as operators. In general, their tasks related to SPAM implementation and water resource management can be seen in Table 4.

Table 4. List of agencies involved in water resources management in supporting SPAM

LEVEL	ACTOR	MAIN TASKS
National	River Basin Management Agency Sumatera IV (BWS Sumatera IV) <i>(River Basin Management Agency under the Ministry of Public Work and Housing)</i>	Water resources infrastructure development, operation, and maintenance
	Watershed and Protected Forest Management Center (BPDASHL Kepulauan Riau) <i>(Watershed Management Center under the Ministry of Environmental and Forestry)</i>	Forest, water and land rehabilitation and conservation in the watershed areas and protected forest <i>(Not directly related to SPAM)</i>
Provincial	Planning, Research and Development Agency (BARENLTBANG)	Coordinator and facilitator of SPAM implementation at the provincial level
	Department of Housing and Settlement Areas (PERKIM)	Development of SPAM
	Environmental and Forestry Agency (DLHK)	Monitoring quality of raw water and conservation of water resources <i>(Not directly related to SPAM)</i>
Municipal	Development Planning, Research and Development Agency (BAPPEDA)	Coordinator and facilitator of SPAM implementation at the city level.
	Environmental Agency (DLH)	Monitoring quality of raw water <i>(Not directly related to SPAM)</i>
	Health Agency (DK)	Water quality standards and monitoring of drinking water
Operators	Perumda Drinking Water Tirta <i>(Under Economic Bureau at the provincial level)</i>	Water management, provision, and distribution to the community.
	BLUD UPTD SPAM <i>(Under Public Work and Housing Agency at city level)</i>	Water management, control, and clean water service to the community outside of Perumda Drinking Water Tirta Kepri services.

Source: Author analysis collected from various sources and interviews, 2021

Based on the respondent's experience, the division of tasks from the raw water management process to the distribution of clean water is clear, and there is no overlap between the central government and local governments. The allocation of roles and responsibilities of all governmental actors directly involved in the drinking water supply system is determined according to the respective regulations from the central, provincial, and city levels. It has been clearly formulated start from policymaking to set priorities and strategic planning, policy implementation, operational management and regulation and enforcement (such as tariffs settings, standards, and so on) (UH, 18-05-21). Governmental actors who are not directly involved in the system also clearly distinguish duties and responsibilities. For example, there is no overlap in land and

water conservation in the form of rehabilitation of protected forest areas around the catchment area of the reservoir, as stated by the Head of Section for Community Empowerment in Environment and Forestry Agency of Riau Islands Province:

"There is no overlapping of tasks between DLHK and BPDASHL Kepulauan Riau which both have a role for land and water conservation, but these agencies work together in synergy in carrying out their duties" (HPS, 18-05-2021).

Perumda Drinking Water Tirta Kepri conveyed the same opinion. The operator's involvement in managing water sources is no longer a problem. However, clarity in roles and responsibilities is not supported by good cooperation between governmental actors who are not directly involved in the system, such as DLHK at the provincial level and DLH at the city level. BDJ (17-05-2021) explained that there is only information sharing through the local bureaucracy forum or *forum OPD* related to their respective programs and activities to avoid overlap roles and responsibilities (Indonesia: OPD, which stands for Organisasi Perangkat Daerah).

Meanwhile, at the operator level, because two operators are serving the Tanjungpinang area, namely Perumda Drinking Water Tirta Kepri and BLUD-UPTD SPAM, it was found that there were intersects of clean water distribution service areas. This service intersection occurs because there is no agreement on the service area between the two operators. However, this has not caused problems, yet that complicate each other's performance due to good communication between the two operators (HJ, 26-05-2021; TW, 31-05-2021). Perumda Drinking Water Tirta Kepri itself, as the largest operator, can only serve 42.19% of the population due in 2020 to limited water availability. Therefore, the goal is how more people can obtain clean water, one of which is through BLUD UPTD SPAM service, which produces clean water from seawater desalination and artesian wells. In addition, piped water from Perumda Drinking Water Tirta Kepri often experienced a cut-off for a certain period, making the water supplied by the BLUD-UPTD SPAM is preferred over Perumda in specific locations.

To sum up, in contrast with previously mentioned in the policy documents, the roles and responsibilities gap has now started to experience improvement. However, it can be seen that coordination at various levels has been well established. However, the cooperation agreement that regulates the share of financing, limits, and risks in a long series of efforts to increase the supply of clean water between the various tiers of government is only for infrastructure development activities such as reservoir construction, water management installations, distribution networks and SWRO plants. Agreements were not found in other activities such as land and water conservation. The cooperation that takes place thus far was only by inviting other agencies to participate in reforestation activities. However, it is suggested to have an agreement that set the priority of conservation sites because there will be at least two positive impacts. First, the catchment area could be recovered faster because of the integration in land

conservation. Second, consequently, the ability of the land to store water will be higher so that water availability can be increased. This agreement needs to be promoted at various stages to accelerate the resolution of water scarcity problems.

Capacity

The ability of responsible governmental elites to confront the complexity of the clean water provision challenge must be met to be able to carry out their duties starting from the planning, technical, financial, and institutional capacities both in terms of quantity and quality. For this reason, the recruitment of government officials must be in accordance with their competencies and promoting capacity building for water-related professionals to strengthen capacity institutions are indispensable. In practice, the issue related to the lack of capacity of responsible authorities and the lack of continuous capacity building is experienced by most governmental agencies at the local level. At the central government level, such as BWS Sumatra IV and BPDASHL, it can be said that it has not been fulfilled from a quantity perspective, but it can be said that the quality of human resources has been fulfilled. In addition, the central government has a continuous capacity building program carried out every year for various fields according to the needs as mentioned by the Commitments Making Official of Raw Water of BWS Sumatera IV:

"BWS Sumatera IV deserves to be used as a pilot among 34 River Basin Centers in Indonesia because young professionals with an excellent technical classification potential according to their field. In terms of quality, it is good, but the adequacy ratio in terms of quantity is still insufficient. The Minister of Public Works and Housing itself is very aware in the field of Human Resource development, and we have a Human Resource Development Board (BPSDM)" (HP, 04-06-2021).

However, in contrast, a much different situation is found at the local level. The capacity gap is one of the main issues experienced by stakeholders that affect their respective performance. Some respondents, such as BARENLTBANG and DLHK, argue that they have some staff with reliable capabilities, but it is still not sufficient in terms of quantity. Especially forest management units under the authority of DLHK, really need a high number of officers to secure the forest in all regencies and cities in the Riau Islands Province. As explained in the previous section, the reduced capacity of the reservoir was caused by the illegal conversion of protected forest areas into residential areas and plantations. The need for securing the protected forest area in the catchment area around the reservoir has been submitted annually by the PERKIM to maintain the reservoir capacity. However, this issue seems to be considered unimportant (DA, 03-06-21). The reason is related to the previous principle, namely that the task of the forestry division is the optional or discretionary function of local government, and therefore it is

often overlooked (HN, 02-06-21). It also affects the urgency of increasing the number of staff for securing forest areas.

Nevertheless, the finding uncovers that the lack of budget also affects recruiting new staff recruitment and reducing their chance to join capacity building programs to enhance their soft skills and knowledge for governmental actors at the provincial and city levels. At the operator level, they have an adequate number of human resources. However, capacity building is still explicitly needed to understand how SWRO plants with high technology work. The two operators have also made plans for staff selection with competencies following the work and institutional strengthening and soft capacity through education and certification in various fields of science such as finance, technical, distribution, production, IT and customer relations.

Financial Gap – Rethinking private sector involvement?

In this case, the financial gap found at all levels of government. The central government is trying to provide a budget for regional development, especially in national strategic areas like Tanjungpinang. However, the central government has a limited budget, so the central government set a scale of priorities and project readiness criteria to select areas that need to be prioritized in the development process (HP, 04-06-2021). For example, to build an interconnection of the Embung DAS Kawal to the Sungai Gesek Reservoir to meet the needs of clean water in Tanjungpinang city, the local government must prepare environmental permits and environmental documents as the readiness criteria requirements. Another source of the budget that supports the performance of the central government in infrastructure development can be obtained from foreign loans (HS, 19-05-2021). However, it is entirely different from the financial resources owned by the regions, both at the provincial and city levels, with the regional budget revenues and expenditures, hereinafter referred to as APBD (in Indonesia stands for *Anggaran Pendapatan dan Belanja Daerah*), which are generally limited. Limitations on budget owned by each agency have a significant impact on water availability in Tanjungpinang. Especially since the Covid-19 pandemic since 2019 until now, there has been a budget refocusing because the government has taken other strategic steps such as the National Economic Recovery (PEN – *Pemulihan Ekonomi Nasional*). It could be argued as a dilemma when the government prioritises people who lost their job due to the Covid-19 Pandemic rather than other affairs. However, at least the central government is still considering efforts to accelerate the fulfilment of Tanjungpinang City's clean water needs and still budgeting funds to construct the transmission pipe or main distribution network to be built in 2022.

Considering other governmental actors' performance, lack of budget indeed makes fewer locations monitored for water quality, forest areas that can be secured and locations that can be reforested. Consequently, the increase in water supply, both in terms of quantity and quality, cannot keep up with the speed of increasing demand, and

more and more people cannot reach clean water. Even though both already have their revenue at the provider level, they still need support from the APBD.

"Although the BLUD-UPTD SPAM already has its own revenue, at this time, it still needs support from APBD to carry out its services. Therefore, the strategy taken is to manage operational time because of the problem of expensive electricity costs and adjust the number of services to the amount of production so that there is not too much difference between total production and income" (HJ, 26-05-21).

Health Agency also experiences this issue. Due to lack of budget, the Health Agency at the provincial level cannot monitor water quality, so this task is carried out entirely by the Tanjungpinang city government. At the operator level, like many other Perumda providers in Indonesia, the long-term debt of Perumda Drinking Water Tirta Kepri to the Ministry of Finance since 1996 was resolved in 2017 with the debt elimination policy and was charged to the respective regional governments, in this case, the provincial government. In response to this funding gap problem, the government can provide room for the private sector and encourage them to invest and participate in Public-Private Partnership (PPP) (UH, 18-05-2021). In Indonesia, this form of cooperation is known as Public and Business Entity Cooperation (KPB), which stands for *Kerjasama Pemerintah dan Badan Usaha*). KPB can be defined as a collaboration between the Government and Business Entities to build or provide the infrastructure for public interest by referring to the specifications previously determined by the Minister/Head of Institution/Head of Region/BUMN/BUMD. Business entities can partially or fully support the resource they have for this collaboration by considering the distribution of risk between the parties involved. However, to date, the budget used to build reservoirs and carry out the duties of each agency comes from the state and regional revenue budgets, which are limited. This KPB collaboration can be an option to accelerate efforts to distribute water fairly to the community according to its urgency. However, budget allocation is also related to the priorities of local leaders. Currently, another priority of the Governor of Riau Islands Province is constructing the bridge of Batam-Bintan that will connect two main islands in this province and constructing the Bintan Regional SPAM (HP, 04-06-2021; HPS, 18-05-2021). The impact felt by other governmental actors, notably those indirectly involved in the SPAM, is reducing the agency's budget. Eventually, the targets of their activity cannot be achieved as planned (HPS, 18-05-2021).

Regulatory Framework

Based on the argumentation of all respondents, basically, a good water management regulatory framework is implemented and enforced effectively for the public interest, both in terms of SPAM implementation and water resources management and land conservation regulations that are indirectly related to SPAM, as has been mentioned in the previous Chapter. Meanwhile, the existence of Law No. 11/2020 regarding Job Creation has changed several other laws within the water management domain, including Law No. 23/2014 on Local Government, Law No.17/2019 on Water Resources, Law No.41/1999 on Forestry, Law no. 32 of 2009 concerning Environmental Protection and Management, and Law no. 36 of 2009 concerning Health. However, the impact of changing the law with the existence of Law No. 11/2020 regarding Job Creation has not been felt by the relevant stakeholders in general because there is no technical guidance yet to the local government level and the derivative Regulation of Omnibus Law on Job Creation has not been issued from the previously mentioned law.

The impact that can only be felt in the current SPAM development is the delay of the construction of the Embung DAS Kawal interconnection pipe to the Sungai Gesek Reservoir because there are readiness criteria that have not been met by the local government which must be submitted to the Ministry of Public Works and Housing in order to continue the development process. One of the readiness criteria that must be met is environmental documents and permits. With Law no. 11/2020 concerning Job Creation which changes the articles in the Environment and Forestry sector, namely Law no. 32 of 2009 concerning Environmental Protection and Management, making all environmental documents in the form of AMDAL and UKL-UPL are under the authority of the central government until there is a derivative of the Law as stated by Head of Section for Development of Drinking Water Supply System:

"Based on the information we have obtained from the DLHK, all applications for environmental permits are currently on hold until new regulations are issued as derivatives of the law. Currently, this rule change has hampered the construction of the transmission pipeline because the Ministry of Public Works and Housing requires environmental documents, which is one of the readiness criteria that we have not been able to fulfil at this time." (DA, 03-06-2021).

For internal regulation issues concerning clarity on systems and procedures, work procedures, operating systems, especially those related to finance, the operator of Perumda Drinking Water Tirta Kepri has begun to settle. To conclude, the regulatory framework gap, as mentioned in the previous sub-chapter, seems to have some improvements even though changes to the law caused a slight delay in developing the new water supply provision system.

Trade-offs between users, rural and urban areas, and generations

Responding to the ambitions echoed in all the Sustainable Development Goals that emphasize "leaving no one behind", the regional government of the Riau Islands Province makes cooperation in the development of new infrastructure for water supply. Due to the limited administrative area and Tanjungpinang itself only has one source of raw water located on the border of Bintan Regency, the Bintan Regency government provides an opportunity to share its water source to be used in meeting the needs of clean water in Tanjungpinang City. The urgency to regulate trade-offs between regions is because the population of Tanjungpinang is more than those in Bintan Regency. In addition, the city of Tanjungpinang is the capital of the Riau Islands Province. It can be said that there is no local egoism because of the willingness of the Bintan Regency government to help provide clean water in Tanjungpinang. Based on the interviewee, the Embung DAS Kawal construction in the administrative area of Bintan Regency will be fully utilized for the inhabitants of Tanjungpinang (UH, 18-05-2021; DA, 03-06-2021). DA (03-06-2021) states that for now, there is no conflict between communities (users) even though if it is viewed from the percentage of access to clean water services provided by Perumda Drinking Water Tirta Kepri to the people of Tanjungpinang (37.03%), it is more significant than in Bintan Regency itself (12.54%) (Regional RISPAM of Bintan Island, 2019). However, it is necessary to think about how the impact of this service inequality will be in the future. The current problem is that Tanjungpinang City's government does not yet contribute to this collaboration.

"Tanjungpinang is the one who needs water the most, but until now, the government of Tanjungpinang City has not been able to provide land for the booster reservoir. The next problem is the inclusion of capital in network expansion. If Perumda Drinking Water Tirta Kepri manages this network and the capital arrangement also comes from the provincial government, then there are no contributions from Tanjungpinang." (DA, 03-06-2021).

This issue must be raised during the Memorandum of Understanding (MoU) discussion involving the central government, relevant agencies at the provincial and district/city levels. In order to involve other stakeholders, including the community, this issue will also be discussed along with public consultations to discuss the expectations and interests of the community and what needs to be improved from the Regional RISPAM of Bintan Island document (DA, 03-06-2021). Non-governmental actors' involvement, such as private parties, NGOs, academia, experts, and the community, seems more towards disseminating programs and activities during the planning process. However, the implementation of SPAM itself dominated by governmental actors (UH, 18-05-21). The involvement of other stakeholders in the planning stages is crucial, primarily to accommodate their interests and to avoid conflicts in the future. Potential conflicts between users in the future may come from the tourism sector in Bintan Regency, which is currently in demand for water allocation for the Trikora Tourist Area.

Meanwhile, the calculation of water needs in the Regional RISPAM of Bintan Island document does not cover the needs of tourism areas, so the master plan document

needs to be reviewed whether it can still meet the projections for the next 5-10 years and which users will be prioritized (HP, 04-06-2021). In addressing these problems, the government plan to promote the public debate on the risks and costs associated with water supply provision issues for the new SPAM development to raise awareness to contribute to water supply sustainability. Another potential issue is that the private sector (e.g., tourism and industries) only build the reservoir and utilize it for their business purposes. They only share a limited amount of water with the inhabitants near their location. In fact, the reservoir actually has sufficient capacity to be accessed by more people.

To sum, since the institutional heritage of Southern countries generally has more influenced by (former) authoritarian regimes, the emphasis on this principle is believed to have the ability to facilitate more inclusive participation. This case shows that the collective action between the central, provincial and city/district governments in providing equitable services and managing water resources has been established by allocating water to the city that has struggled to provide clean water for their own due to their limitations. However, inclusiveness towards all water users needs to be considered. Notably, when pointing out the sustainability of water use for future generations, awareness is needed from all parties to protect the environment jointly.

Monitoring and Evaluation

Most Indonesia's drinking water sector monitoring efforts are still carried out at the program or project level with limited coordination across sectors (Assessment, 2015). Decentralization and the new responsibilities of local governments to provide water services are still challenging because of the low capacity to monitor and use data for planning and evaluation purposes regularly. The same challenge reflects in the Tanjungpinang case in implementing monitoring and evaluation activities related to the water supply provision system due to budget constraints, especially for monitoring community-based SPAM activities in hard-to-reach areas (DA, 03-06-21). For the monitoring and evaluation of SPAM itself, there is a special division namely the Working Group for Housing and Settlement (*Pokja PKP – Kelompok Kerja Perumahan Dan Kawasan Permukiman*), which includes drinking water which is still newly formed and is in program planning. This working group functions to conduct regular, coordinated annual reviews for the sector, involving several key government agencies related to water and sanitation.

In general, monitoring and evaluation activities for other stakeholders have been carried out periodically and reported to the provincial/central government. However, in contrast to the operator levels such as BLUD-UPTD SPAM, this monitoring and evaluation activity has not been carried out yet because this organization was only established in 2019, so this organization structure still needs to be developed (HJ, 26-05-2021). Reflecting on the experience of monitoring and evaluation activities by

supporting stakeholders, namely DLHK, monitoring and evaluation are not used as evaluation materials. The trend is that data and information collection is not used as a lesson learn and planning for the future (BDJ, 17-05-2021). In fact, monitoring and evaluation will be very valuable to support future changes by making adjustments when needed. Existing problem identification has been carried out in the field, but the tendency to establish cross-sectoral coordination was not followed by management control yet. Monitoring and evaluation must be fostered at all government tiers to increase the commitment and credibility of stakeholders in performing their duties, especially in supporting the water supply provision so that water scarcity can be avoided, and more people can benefit from clean water.

7.3 Bridging the gaps - shaping the future water supply provision in Tanjungpinang

After the gaps in current water governance were found and become the foci of improvements to future water governance in the clean water supply system in Tanjungpinang, several things that can influence the success of its future improvement need to be considered. First, the government needs to prioritize not just building infrastructure to increase water supply but also to sustain it by protecting the surrounding area. Therefore, improving water governance performance by securing resources both in financial and human resources should be done for all agencies involved directly and indirectly in SPAM by highlighting multi-level governance. If alterations are not made immediately, it will be too late to fulfil the community's clean water needs because the rate of land degradation is higher than its recovery. This change depends on the local leader's policy (Governor and/or Mayor) to place the issue on how this water scarcity is governed priority scale for regional policies, strategies, and plans. As explained in the theoretical framework, water governance can run effectively with the availability of people who can bring transformation to a better state.

Second, a strong commitment is needed, especially for local government to accept and manage infrastructures built by the central government. Because previously, the Sea Water Reverse Osmosis plant operation should be under the authority of the provincial level. Nevertheless, due to Governor's change, the new Governor refuses to continue that duty and shift it to the city level. The central government considers that the local government is not committed enough to receive and manage the infrastructure as stipulated in the previous agreement. A strong commitment is also needed in law enforcement on spatial planning to control land use to avoid illegal land conversion, especially in catchment areas surrounding the reservoirs. Lastly, the collaboration prospect between all stakeholders, both governmental and non-governmental actors, is absolutely essential to concern. Leaving the problem to the government alone will not solve the water scarcity issue entirely. As highlighted in the governance concept, each

actor has his own limitations in terms of capacity, sources, and influence to alter the situation, and therefore all relevant actors need to build collaboration between them.

8. Conclusion: Looking for a Pathway to Reform

This study has examined the water governance performance of clean water provision in Tanjungpinang, Indonesia. This study begins with the argument that efforts to fulfil clean water in Tanjungpinang have not been optimal due to weak governance that involves the water sector and other government actors in supporting clean water provision. This chapter bridges the findings based on empirical research with the literature review and theoretical framework. These findings will be formulated to answer the three sub-research questions; What are the gaps in water governance practice to confront water scarcity in Tanjungpinang? How are the governmental actors experience and influence the challenge of water governance in dealing with water scarcity? This chapter ends with an explanation of the main question of this research on how these findings contribute to improving water governance to address the long-term challenges of water scarcity.

8.1 Findings

As a recall, to assess how water is governed in terms of clean water provision practice, there are six water governance principles which were analyzed: 1) clear roles and responsibilities, 2) capacity, 3) financial, 4) regulatory framework, 5) trade-offs between users; and 6) monitoring and evaluation representing the components of effectiveness, efficiency and trust and engagement. These principles studied represent the overall dimensions of water governance, namely effectiveness, efficiency, and trust and engagement. In general, these three dimensions have critical points which prove that water governance performance in the clean water supply system in Tanjungpinang is still relatively weak. Even though there are some improvements in the clear differentiation of roles and responsibilities between the governmental actors involved and clarity in the regulatory framework, several factors can influence the success of this water governance in the future. These factors will then be discussed at the end of these findings.

a. Effectiveness

The water governance dimension discusses how governance determines the goals and targets of sustainable water policies in various government tiers, how to implement these goals, and what must be done to achieve the expected targets. In the governance domain, there is increasing attention to the importance of multi-level governance (Hooge and Marks, 2003 in Jordan et al., 2005), and therefore it is imperative to pay

attention to the clarity of their roles and responsibilities to avoid conflicts and overlapping roles they play. Looking at the principles of water governance that carry effectiveness, as mentioned by Rogers and Hall (2003) and Boss (2016), clear roles and responsibilities must foster coordination. The roles and responsibilities of each stakeholder have been clearly regulated for all appropriate levels of government. In accordance with the governance paradigm itself, there is a shift of responsibility from the central government to local governments in the clean water supply system so that the implementation of the system can better facilitate local needs. It can be seen that when the central government plays a role in infrastructure development, the provincial government is more of a facilitator and coordinator and the city government takes a role at the stage of distributing water to the community.

However, after roles and responsibilities are clearly divided, it is advisable to have well-developed coordination across sectors and at different levels of government supported by mutual agreements to strengthen the cooperative relationship between them. The evidence in the case study area, the mutual agreement, is only found in the context of the water sector in water infrastructure development. There are no other agreements related to other supporting sectors such as the environment and forestry sectors to maintain and secure protected forest areas surrounding the reservoirs. However, relying solely on clear roles and responsibilities is argued that it cannot guarantee the effectiveness of water governance if it is not supported by the ability of responsible authorities, the performance of each stakeholder will be hampered. This capacity issue has become a challenge, especially at the provincial and city government levels. Holzhacker et al. (2016) highlighted that, in general, governance structure reform in Indonesia is in the progress of improvement, but in this case study, the provincial and city governments need local capacity building. However, limited financial resources have become a barrier in scaling up the development of responsible governmental actors through institutionalized capacity building. Meanwhile, capacity building of the authority in charge of water challenges is needed to carry out activities in the operation of the clean water supply system (Hofstra, 2013; Rahmasary et al., 2019; Suyeno et al., 2014; UN-Water, 2014).

b. Efficiency

The regulatory framework is one of the keys to increasing efficiency in shaping urban water governance (Mulyana and Prasojo, 2020). In this study, no complex problems related to the regulatory framework were found. The lack of clarity in internal rules for the operator level, which used to be a problem in carrying out their duties, has now shown an improvement. As Jimenez et al. (2020) mentioned in the theoretical framework section that the importance of establishing rules that include formal legal mechanisms and other rules to ensure the implementation and fulfilment of duties and responsibilities by relevant stakeholders seems to have some improvements over time.

The rules that are developed and implemented facilitate the stakeholders to carry out their duties. The challenges faced with the enactment of Law No. 11/2021 regarding Job Creation thus far is the postponement of the granting of environmental permits for a while until the derivative of the Law is issued. The impact is the delay in the construction of interconnection between reservoirs. However, the principle that most influences stakeholders' performance in both the water and supporting sectors is financial arrangement issues. Rees et al. (2008) has previously mentioned that finance is the foundation in the water sector and is a significant point that affects the sustainability of water services. If the central government has a limited budget but can still build infrastructures on a priority scale, in contrast with local governments, they have limited financial resources that may hinder their performance in carrying out their duties. This issue is related to the decentralized system in Indonesia, where the delegation of tasks to local governments is not followed by financial decentralization, as stressed by Rahayu et al. (2019).

However, the budget seems to be prioritized for the development of water supply infrastructure, hence other elements are often neglected, such as the lack of budget to carry out monitoring and evaluation activities and increasing staff capacity both in terms of quantity and quality for coming challenges. Financial problems are also found in all governmental actors who are indirectly involved in the system from upstream to downstream, which are interrelated to the long-term water supply provision. If we only build infrastructure without paying attention to environmental protection, it will hamper the sustainability of the water supply. Consequently, when the water runs dry, the infrastructure will lose its function to provide water to the people. The government could make a mutual agreement between stakeholders involved related to cost, risk, and limitation of project implementation and water resource management to address this issue. Another potential solution is not just relying on the governmental budget but also provide room for private parties' support, as mentioned by Jiménez et al. (2020), to accelerate the fulfilment of water needs for the community and ensure optimal services. Financing should be comprehensively able to handle problems at all stages of the water management cycle for water provision.

c. Trust and Engagement

Managing trade-offs is one of the critical targets for increasing trust and engagement in water governance. As noted by the OECD (2015), several ways to manage trade-offs can be addressed by promoting non-discriminatory participation in decision-making, empowering local authorities and users to identify and address barriers, and promoting public debate about risks and costs. The government has made efforts to overcome this problem by asking for cooperation between Tanjungpinang City and Bintan Regency in distributing raw water sources to be allocated to Tanjungpinang, considering the limitations of the Tanjungpinang area in providing large land for rainwater storage in

the form of reservoirs. In this case, the tendency of local egoism (Holzhacker et al., 2016) and the kingdom of authority (Firman, 2009) from a decentralized government system can be overcome by establishing good relations and cooperation between administrative boundaries.

As emphasized in the concept of governance and what is faced in the sustainable development goal to "leaving no one behind" itself, the involvement of all stakeholders, including vulnerable and marginalized groups, is essential to be emphasized to ensure and strive for inclusiveness. The involvement of non-governmental actors in this system is generally only in the initial stage of the planning process. Reflecting on the water governance concept as stressed by Tropp (2007), it is crucial to assert dialogue in the joint decision-making process. Therefore, for the new Regional RISPAM of Bintan Island, to encourage public debate, the government has planned to establish a public consultation to invite the public to give their opinions and interests to develop a new clean water supply system. However, it is not enough just to participate in the initial planning but also in other stages. The participation of non-governmental actors, especially the community, is also substantial in environmental protection to avoid further forest degradation surround the water resources. Therefore, community awareness on environmental protection needs to be increased to cooperate in harmony with the government program. This participation is also needed to increase the sense of belonging and responsibility for the sustainability of the water supply provision (Cahyadi and Hidayat, 2017; Hofstra, 2013; UN-Water, 2014). Therefore, resolving environmental degradation cannot be left to the government itself but requires support from all parties to work together.

To stimulate other parties to cooperate with the government in overcoming water scarcity, public trust in the government's performance needs to be increased. Increasing public trust in the government's performance can be enhanced by routine monitoring and evaluation activities. Reports on monitoring and evaluation activities themselves have been carried out by the relevant agencies, except for one operator at the city level. The absence of monitoring and evaluation reports is due to the absence of a particular department that handles these activities, and this organization is still newly formed and is still being developed and perfected. Meanwhile, specific division is needed to handle monitoring and evaluation as mentioned by OECD (2015). Ostrom (1990) stated that monitoring and evaluation should be carried out regularly to increase the commitment and credibility of the government. In addition, as a learning and capacity building for the regions in the future, the government should use monitoring and evaluation for various sectors, starting from planning, budgeting, and support for targeting implementation.

Based on the previously discussed, it can be concluded that Tanjungpinang is still weak in managing water to provide clean water. Several principles such as capacity, financial, trade-offs between users, and monitoring and evaluation are water governance gaps that need to be addressed to improve conditions for sustainable water management in the future. However, there have been improvements in two other water governance

principles, such as clear roles and responsibilities and regulatory framework, even though strengthening the cooperation is still very much needed. Like generally cities in middle-income countries and regions with archipelagic characteristics, Tanjungpinang also experiences the same governance gap, especially in terms of resource limitations, both in terms of financial arrangements and human resources capacity as stated by Hophmayer-Tokich and Kadiman (2006). So far, infrastructure development to meet the need for clean water can still be carried out periodically, for example, by constructing SWRO plants and new dams and reservoirs, but this effort depends on the central government's support in terms of financial arrangements. Because Tanjungpinang is one of the national strategic areas, Tanjungpinang can be prioritized in regional development, including the provision of clean water. However, all those gaps and opportunities are influenced by how the local leader's willingness to respond and put the water scarcity issue on the priority scale in carrying out the vision and mission of the regional government. The determination of this priority scale should be seen from the water sector lens and all related actors aside from the water sector. The local government's commitment to accepting and managing the infrastructure built by the central government is also needed to ensure the system's sustainability in accordance with what is stipulated in the mutual agreement. Changing local leaders' issues should not affect the sustainability of infrastructure management provided to the regions. In the end, these two points will be carried out better if supported by collaboration between relevant stakeholders to accelerate the resolution of clean water scarcity in Tanjungpinang.

8.2 Answering the research questions

To continue to the conclusion, the main research is now answered.

How can water governance be improved in order to confront the long-term challenges of water scarcity and fulfil the needs of people for clean water in the city of Tanjungpinang?

The first thing to note is that the water scarcity case in Tanjungpinang is similar to other areas with archipelagic characteristics. The limited surface area, limited resources in terms of human and capital resources, and isolation from the mainland make Tanjungpinang must be independent in meeting its own water needs. However, in general, the city, which is located on Bintan Island, is quite lucky because it has high surface water potential due to high rainfall that leads the solution to build reservoirs such as reservoirs. However, due to its limited area, Tanjungpinang City is very dependent on Bintan Regency in providing land for dam construction. To manage water that is actually abundant and ensure that people get clean water at this time and in the future, the concept of governance in the clean water supply system needs to be considered since this concept is a central issue of sustainability.

This study analyzed whether current water governance can be improved. From all the principles assessed, the clarity of roles and responsibilities of all governmental actors has provided room for easier cross-sector coordination both in horizontal and vertical coordination. Interviewees argue that the existing regulatory framework has facilitated the implementation of the work of each agency. Improvements for internal rules, procedures, operating systems for water providers have been proven to have improved. It shows that there is a change in governance towards a better condition. Likewise, the effort to manage trade-offs between users is evident in the study case and over the Bintan Island as a region which has been formulated in the Development Master Plan for Regional Water Supply System of Bintan to reduce local egoism and support areas experiencing difficulties in supplying water supplies clean water. Albeit the improvements, it is too early to judge that the government has managed trade-offs between users in a good way because there is an urgency to increase community awareness in protecting the environment to ensure the sustainability of clean water supply for future generations. It is also important to note the uncertainties and potential future conflicts with other users, such as the tourism and industry sectors, that need to be considered in the early stages of planning the new reservoir and dam.

Based on the findings, it is evident that the most cumbersome challenge lies more heavily in allocating resources, both capacity of responsible actors and financial arrangements, trade-offs between users, and monitoring and evaluation activity. These principles are proven to be interrelated to each other. For example, regional limitations in increasing their human resource capacity are very sensitive to budget availability. Meanwhile, local government and water providers urgently need technical assistance and capacity building to enhance local government capacity for sustainable water supply systems, either water services through pipe networks or non-pipe. At the same time, monitoring and evaluation activities can also be used to boost local capacity to confront the uncertainty of future challenges by utilizing the results of monitoring and evaluation as a reflexive activity. These issues are considered as gaps that need to be improved in water governance practices in the clean water supply provision in Tanjungpinang. Reforms in these principles need to be carried out by finding the most appropriate strategy according to the local context to increase investment and financing frameworks. However, it can be concluded that setting financial arrangements cannot only be prioritized in infrastructure development to operationalization to produce products as clean water which is distributed to the community but must look at a broader and holistic scale that involves outside the water sector.

However, this budget allocation arrangement has proven to be very influential on the priority scale of local leader both at the provincial level and at the city level for to the sector with less priority. In addition, local government commitment both at provincial and city levels is also needed in collaboration with the central government. The lack of local commitment in SWRO plants management previously became a critical note for the central government to tighten regional commitments. To confront the long-term

challenges of the water scarcity itself, collaboration between all stakeholders, including the community, is essential to work together towards a better clean water provision system.

8.2 Reflection and Recommendation for Further Research

This study has some limitations, one of them is that this study does not examine all the principles that are carried out in the concept of water governance. However, only selected principles or the most challenging principles based on the policy document were chosen. In the planning period of the referenced policy document, there is a possibility of changes in problems related to the water supply provision system. What was identified based on the policy document could have already been resolved by the time this research was conducted. However, the possibility of problems arising regarding other water governance principles during a certain planning period cannot be avoided and is actually essential to assess. Due to time constraints and not allowing the author to obtain more comprehensive data due to the Covid-19 pandemic, the author can only collect data and information through online conversation with stakeholders involved in SPAM practice and those who indirectly support SPAM practice. While conducting the online interview, the author did ask questions related to water governance according to the interviewees' understanding and experience, apart from questions related to the principles formulated by the author previously. However, due to the limitations of online communication and limited time provided by the interviewees, only a little other information was obtained, which were more related to the commitment of the provincial and city leaders and the priority scale in addressing the water scarcity problem. Therefore, it is worth researching further research for more details to get information and a more holistic picture of water supply provision practice in Tanjungpinang, according to the current context.

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Appendices

Appendix 1. List of government agencies involved in interviews.

NO.	INITIAL/CO DE	AGENCY	DATE OF INTERVIEW
1	BDJ	Head of Environmental Pollution and Degradation Control in Environment and Forestry Agency of Riau Islands Province	17-05-2021
2	UH	Head of sub-sector of Economy, Water Resources, Infrastructure and Region in Planning, Research and Development Agency (BARENLTBANG) of Riau Islands Province	18-05-2021
3	HPS	Head of Section for Community Empowerment in Environment and Forestry Agency of Riau Islands Province	18-05-2021
4	HS	Head of Infrastructure and Regional Development in Development Planning, Research and Development Agency (BAPPEDA) of Tanjungpinang City	19-05-2021
5	OL	Staff of Health Agency of Riau Islands Province	24-05-2021
6	HJ	Head of BLUD UPTD SPAM	26-05-2021
7	TW	Head of Engineering in Perumda Drinking Water Tirta Kepri	31-05-2021
8	HN	Head of Planning Subdivision in Watershed Management Center (BPDAS) Kepulauan Riau	02-06-2021
9	DA	Head of Section for Development of Drinking Water Supply System in Housing and Settlement Office of Riau Islands Province	03-06-2021
10	HP	Commitments Making Official of Raw Water in River Basin Organization (BWS) Sumatera IV	04-06-2021

Appendix 2. List of Policy Documents

LIST OF POLICY DOCUMENTS
Development Master Plan for Water Supply System of Tanjungpinang City, 2014 <i>(RISPAM Kota Tanjungpinang)</i>
Development Master Plan for Regional Water Supply System of Bintan, 2019 <i>(RISPAM Regional Pulau Bintan)</i>
Water Resources Management Pattern for River Basin Territory of Riau Islands, 2018 (<i>Pola Pengelolaan Sumber Daya Air Wilayah Sungai Kepulauan Riau</i>) (Decree of the Minister of Public Works and Housing No. 526 / KPTS / M / 2018)
Public Works and Spatial Planning Strategic Plans of Riau Islands Province (2016-2021) (<i>Rencana Strategis Dinas Pekerjaan Umum, Penataan Ruang dan Pertanahan Provinsi Kepulauan Riau Tahun 2016 - 2021</i>)

Public Works and Spatial Planning Strategic Plans of Tanjungpinang City 2018-2023 (*Renstra Pekerjaan Umum dan Penataan Ruang Pemerintah Kota Tanjungpinang Tahun 2018-2023*)

Appendix 3. Interview Guide

Research Title: Abundance but Thirsty: Governing Water Supply Provision to Prevent Scarcity in Tanjungpinang City, Indonesia

General Information of Interviewee:

Government Agency detail:

Date of Interviewee: .../.../2021

Name of Interviewee:

Prefer to be mentioned anonymous:

Yes No

Agree with recording interview:

Yes No

Duration of interview: minute

Introduction:

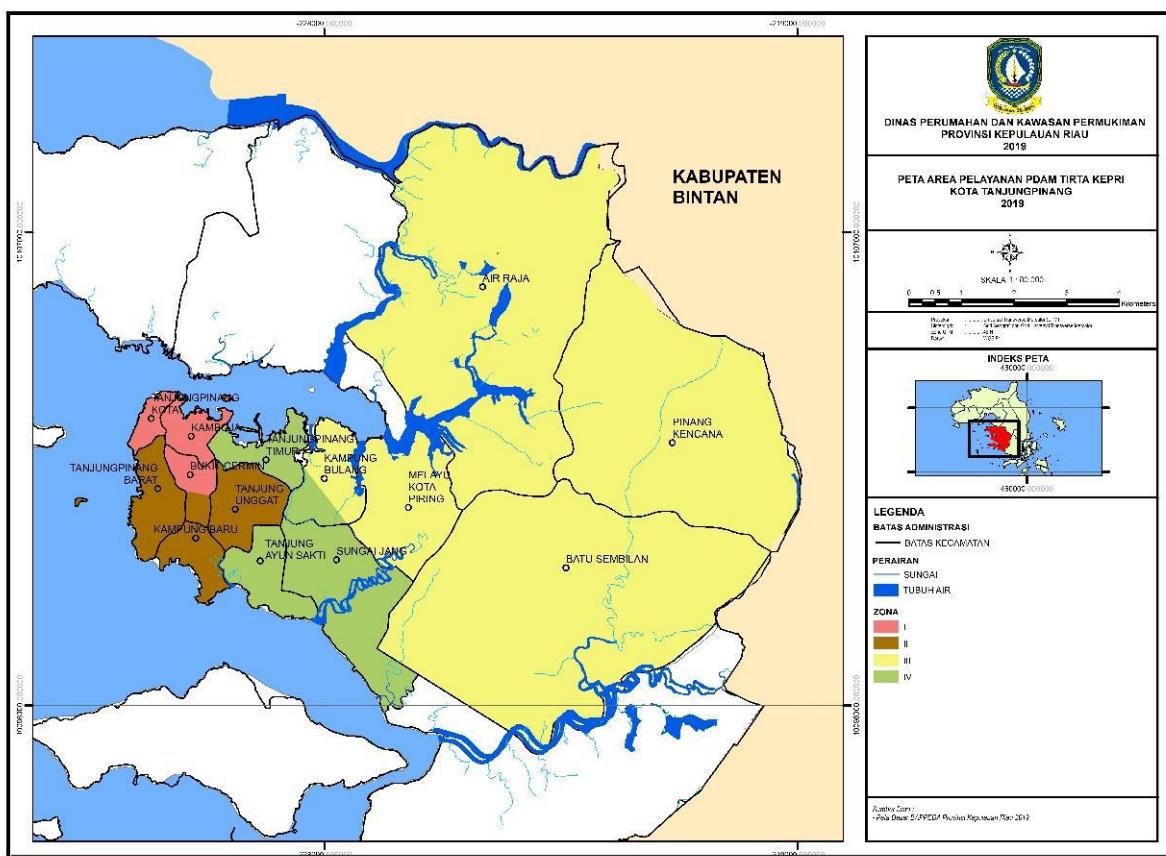
1. Explain the interviewer's background: Master double degree student at RUG and ITB.
2. Explaining the research objectives: analyzing current water governance in dealing with water scarcity in Tanjungpinang City.
3. Explain the causes of water scarcity and the principles of water governance that need to be assessed.
4. Based on these topics some preliminary questions are formulated. If necessary, follow-up questions are addressed for additional information if needed.
5. Ask if you have any previous questions.
6. Ask if the informant would like to introduce himself: what is his background and what is his relevance to the case of water supply provision and or in general in water resource management in dealing with water scarcity in Tanjungpinang.

LIST OF QUESTIONS

	QUESTIONS	POTENTIAL FOLLOW-UP QUESTIONS
Section 1 - General Information		
Driving factors	What are the factors causing water scarcity in Tanjungpinang?	How significant is the role of these factors?
Section 2 - Water Governance		
What is your experience with water governance challenges/dilemmas in terms of water supply provision system?		
Roles and Responsibilities	What is your main duty or role/agency in SPAM?	Are there clear rules regarding allocation and differentiating roles and responsibilities?
	How is the cooperation between the authorities responsible for the provision of clean water?	Is there a mutual agreement between the provincial government and the city government regarding the financing, limitations and risks in the project implementation?
Capacity	Is the number and quality of staff with the necessary knowledge and skills adequate?	
	Is education and training of water professionals carried out on an ongoing basis to strengthen the capacity of water institutions?	
Financial	Is there an allocation of funds available to finance SPAM/water resources management?	Is there transparency in the use of funds for the management of the clean water system?
		How does your agency deal with financial problems to carry out tasks?
Regulatory Framework	Are there regulations regarding the clean water supply system consisting of piped and non-piped networks?	What are the implications of Law No. 11/2020 concerning Job Creation on the performance of local

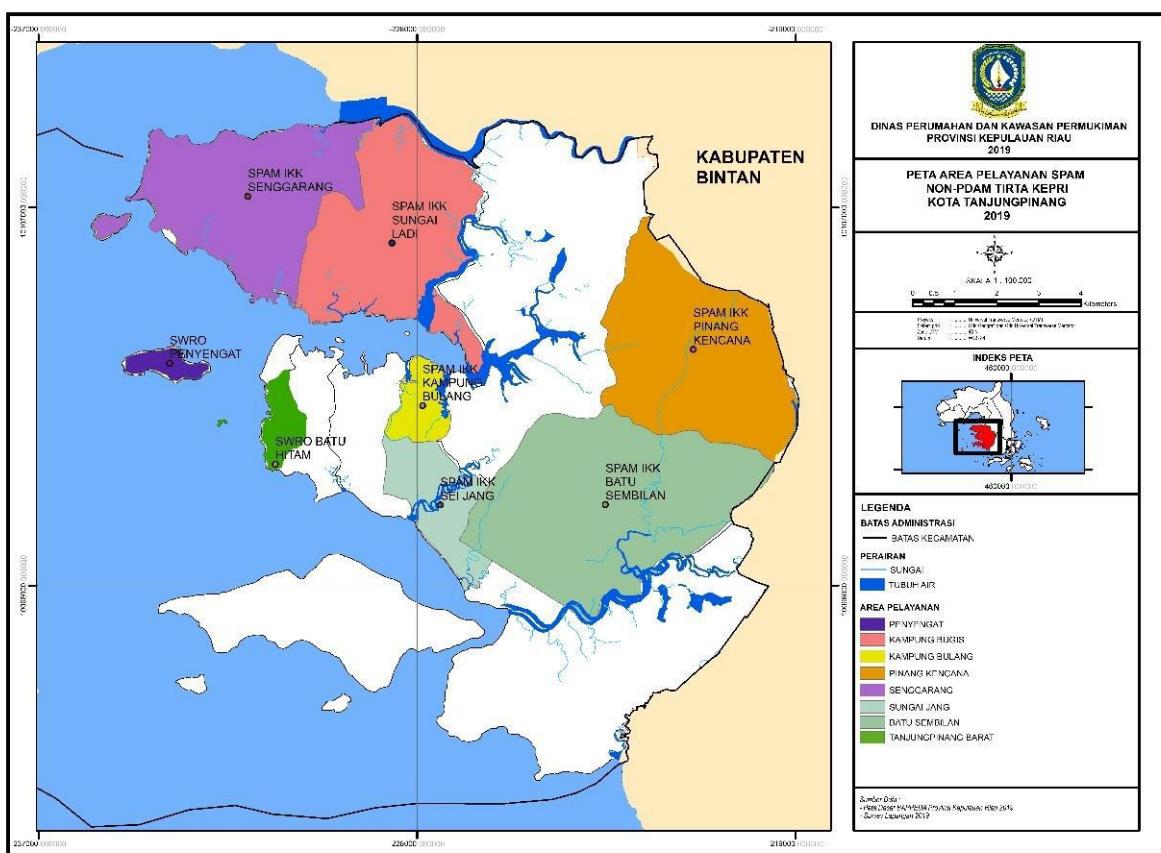
		governments?
	Are there rules on water resources management which consist of conservation, utilization, and control of the destructive power of water resources?	
Trade-offs across users, rural and urban areas, and generation	How is the cooperation between the provincial government and the central government? How is the cooperation between the city government and the provincial government?	
	Is there cooperation between the local government and private business entities including academics, research and development institutions, and NGOs and communities?	Is there a program of assistance to the community related to raising awareness of issues related to clean water and water use practices?
Monitoring and Evaluation	Have monitoring and evaluation activities been carried out periodically? Is there a special task force that conducts monitoring and evaluation?	Is the report on the results of monitoring of project implementation submitted to the provincial/central government?

Appendix 4. Perumda Drinking Water Tirta Kepri Service Area Map



Source: Regional RISPAM of Bintan Island, 2019

Appendix 5. BLUD-UPTD SPAM Service Area Map



Source: Regional RISPAM of Bintan Island, 2019