Investigating the implementation of Indonesian regulation in drinking water supply system

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Abstract. Drinking water is an aspect of development that has an essential function in supporting community welfare because it relates to health, social and economic conditions. Therefore, the urban water system needs good planning, design, and operational infrastructure. This paper aims to identify actors and their roles in the drinking water supply system in Indonesia. Analysis was carried out on laws and regulations related to drinking water through content analysis. The results showed that government capacity in building and administering drinking water supply system was still lacking. In addition, the government shared the responsibilities to enterprises, both owned by the government and by private institutions. Finally, it is necessary to equip and expand laws and regulations to provide drinking water distribution. The critical implication to stop the massive exploitation of groundwater for consumption includes the improvement of drinking water reliability by synergizing and integrating all attempts by various actors in providing drinking water.

1. Introduction

Water is a basic human need that supports the sustainability of life. This is also stated in the goal of Sustainable Development Goals (SDGs) number 6: "Ensure availability and sustainable management of water and sanitation for all." Drinking water is an aspect of development that has a significant function in supporting the level of community welfare because it relates to health, social and economic conditions. The water supply system must be adjusted to the demand factor related to urban growth, both urbanized and depopulated [1]. However, clean water resources are running out through climate change and population increase [2,3]. The climate pattern from year to year may impact water availability to an unequal extent, most notably during the dry season [4]. The need for a drinking water supply must also be balanced with good service.

A drinking water supply system provides clean water for the community by processing raw water sources according to the quality standards. The drinking water supply system uses technical pipelines that connect basic drinking water facilities to the users [5]. The urban water system is concerned with a series of activities in the water cycle that are taking water from the source (groundwater and surface water), purification of water into drinking water, drinking water distribution to users, collection and disposal of waste, and processing the waste [6]. Indonesia's drinking water supply system is carried out by the local water company named Perusahaan Daerah Air Minum (PDAM), the only state-owned enterprise engaged in supplying water for community needs. The tasks performed by PDAM are ranging from collecting, processing, and purifying to distributing clean water to be consumed by the customers.
or users. However, the current service coverage of PDAM remains low. This is due to the various constraints in terms of institutions, technology, budget, and community factors. As a result, the communities that PDAM does not serve have to fulfill their water needs individually. Surface water and groundwater have become a source of water supply for agricultural, municipal, and industrial consumers [7]. The participation of the private sector is needed to cover the limited supply of clean water provided by the government.

As one of the developing countries, Indonesia is starting to use Integrated Water Resources Management (IWRM) as the dominant paradigm for water management. The paradigm urges the government to involve stakeholders in each level of water management. The stakeholders have to be involved in restoring and maintaining the river as a part of sustainable water management [4]. However, responsibility for water management cannot be assigned to one level of government only. Effective governance is formed by diverse relationships and dynamic interactions between individuals and groups at various levels [8].

The urban water system includes planning, design, and operational infrastructure. It is needed to meet the demands of drinking water and sanitation, the control of infiltration and stormwater runoff, and recreational parks and urban ecosystems' maintenance [7]. Regulatory and policy frameworks are essential in shaping urban water governance. They need to be adopted and implemented appropriately by all stakeholders. The main issue faced in policy implementation is the clarity of roles and responsibilities among government institutions to achieve a decentralized government system [9]. A previous study argued that access to improved drinking water is a pressing concern in certain subnational regions of Indonesia. Thus, regular monitoring is needed to track progress towards global and national commitments to ensure universal access to safe and affordable drinking water for all [10].

It is stated that the drinking water supply in an area requires good planning instruments [7]. The availability of natural water sources and the affordability of the community in accessing drinking water must also be considered. Planning also includes regulating the roles of actors and related stakeholders to provide drinking water for the communities. Stakeholder involvement is critical in the planning process because local drinking water is firmly embedded in the environment [5]. Furthermore, water development and management should be based on a participatory approach that involves users, planners, and policymakers at all levels [11]. Berg stated that the principles of regulatory system design are: coherence, creativity, communication, collaboration, consultation, and credibility. These principles are expected to be effective strategies to strengthen governance and engage the public and policymakers [12]. This study aims to identify the roles of actors who may contribute to the drinking water supply system in Indonesia. In addition, it also elucidates the tasks of each actor in accordance with what is stated in the Laws and regulations on drinking water supply in Indonesia.

2. Methods
2.1 Data source
We used the Laws and regulations on drinking water supply as the data sources in this study to serve as the primary statutory instrument that govern the provision of drinking water supply in Indonesia. We focused on the actors stated in the Laws and regulation and their duties and responsibilities. All laws and regulations were extracted from the government official website [13]. Thus, we used this resource as our primary data source to analyze the coverage of the Laws and regulations in directing the provision of drinking water. The data retrieval process is shown in Fig. 1. A total of 158 Laws and regulations were selected based on their title which contained at least one of the keywords. The keywords “air (water)” was applied to our first search, from which we identified 158 related documents. Next, we coded all actors stated in the documents and their duty and responsibilities. We then applied a second list of keywords, SPAM (Sistem Penyediaan Air Minum), to the all-coding data conducted in the previous coding from the first data.
2.2 Content analysis
The Laws and regulations related to drinking water provision were examined through content analysis to identify the coverage of the Laws and regulations in directing the provision of drinking water. We focus on policy instruments that have been used to govern drinking water. The instruments directly affect the activities conducted in society regarding day-to-day production, distribution, and consumption, such as licensing, limits or encouragement, subsidies, quotas, standards, rules, rates, and taxes [14]. The data conducted were analyzed using the NVivo program. All extracted acts were manually read to identify the actors and their duty and responsibilities following the grounded theory. Our first coding task was to determine the related actors and their duty and responsibilities. Twenty-one actors were identified from the examined Laws and regulations. Then, we examined the first coding results to understand the coverage of the Laws and regulations of drinking water provision, which covers 19 instruments.

3. Results and Discussion

3.1. Results
There are many laws and regulations in Indonesia that regulate water. These regulations and laws are necessary to sort out the regulations and laws that only control the drinking water supply system. Based on the extraction, there are seven regulatory documents in Indonesia regarding the drinking water supply system:

a. Regulation of the Minister of Public Works No. 07/PRT/M/2013 concerning Guidelines for the Issuance of Licenses for the Development of Drinking Water Supply Systems by Business Entities/Enterprises and Communities to Fulfill Their Own Needs
b. Regulation of the Minister of Public Works No. 12/PRT/M/2010 concerning Guidelines for Cooperation in the Development of Drinking Water Supply System

c. Regulation of the Minister of Public Works No. 12/PRT/M/2013 concerning Saving the Use of Water Originating from the Operators of the Drinking Water Supply System in the National Government, Regional Governments, State-Owned Enterprises, and Municipal-Owned Enterprises
d. Regulation of the Minister of Public Works No. 13/PRT/M/2013 concerning National Policies and Strategies for the Development of Drinking Water Supply System
e. Regulation of the Minister of Public Works No. 18/PRT/M/2012 concerning Guidelines for the Implementation of the Development of Drinking Water Supply System
f. Government Regulation No. 122/2015 concerning Drinking Water Supply System
g. Government Regulation Number 16 of 2005 concerning Development of Drinking Water Supply System

The provision of drinking water requires the role of actors in accordance with their responsibilities and capacities. These actors exist at every level, starting from national as the highest level to the community, who are at the lowest level. Based on content analysis through NVivo software, the actors in drinking water supply in Indonesia can be identified from the institution and the actors themselves at every level, as follows:

a. National: National Government, Minister of Public Works, Minister of Internal Affairs, Minister of Environment, Agency for the Improvement of Drinking Water Supply System (BPPSPAM)
b. Provinces: Provincial Government, Governor
c. Municipalities: Municipal Government, Mayor
d. Enterprises: State-Owned Enterprise, Province-Owned Enterprise, Municipal-Owned Enterprise, Village-Owned Enterprise, Private Enterprise, Management, Supervisory Board
e. Public
f. User
g. Construction Service Providers
h. Cooperation Among Governments
i. Cooperation Between Government and Drinking Water Supplier

After identifying the actors, it is necessary to elucidate each actor's roles or tasks. The actors in the drinking water supply in Indonesia come from different elements, each of which has different roles and tasks. Based on the results of the content analysis, the tasks performed by actors in drinking water supply in Indonesia are ranging from guideline making to technical tasks, as follows:

a. Guideline and Operational Procedure Standard Making
b. Coaching, Facilitation, Training, Technical Assistance
c. Establishment of Drinking-Water Supply Organizer
d. License Approval: Right to use and Right to cultivate
e. Quality Control, Quantity Control, Fare Determination
f. Drinking-Water Supply Operation and Management: Strategy Formulation, Master Plan, Technical Plan, Feasibility Study, Construction
g. Monitoring and Report Evaluation: Making the report, Reviewing the report, Sanction

Through the NVivo software, we connect these two elements (actors and tasks) to summarize their duties and responsibilities. As previously mentioned, stakeholder involvement is critical in the planning process. Therefore, water development and management should be based on a participatory approach that involves users, planners, and policymakers at all levels [5][11]. Detail tasks and the actors in drinking water supply system in Indonesia are explained in the following table.

| Table 1. Actors and their tasks in drinking water supply system in Indonesia |
|-----------------------------------------------|
| **Tasks**                     | **Actors**                                      |
|-----------------------------------------------|
| Guideline                           | - Minister of Public Works                     |
|                                  | - Minister of Internal Affairs                 |
|                                  | - Minister of Environment                      |
| Operational Procedure Standards     | - Minister of Public Works                     |
|                                  | - Minister of Internal Affairs                 |
|                                  | - Minister of Environment                      |
|                                  | - Provincial Government                        |
|                                  | - Governor                                      |
|                                  | - Municipal Government                         |
|                                  | - Mayor                                         |
| Tasks                                      | Actors                                                                 |
|-------------------------------------------|------------------------------------------------------------------------|
| Coaching                                  | - Minister of Public Works  
- Governor  
- Mayor                                           |
| Facilitation                              | - Minister of Public Works  
- BPPSPAM  
- Governor  
- Mayor                                           |
| Training                                  | - Minister of Public Works  
- Governor  
- Mayor  
- Cooperation Among Governments  
- Cooperation Between Government and Drinking Water Supplier |
| Technical assistance                      | - Minister of Public Works  
- Governor  
- Mayor                                           |
| Establishment of Drinking-Water Supply Organizer | - National Government  
- Provincial Government  
- Municipal Government               |
| License Approval                          | - National Government  
- Provincial Government  
- Municipal Government               |
| Right to Use                              | - Public                                                               |
| Right to Cultivate                        | - State-Owned Enterprise  
- Province-Owned Enterprise  
- Municipal-Owned Enterprise  
- Village-Owned Enterprise  
- Private Enterprise                  |
| Quality Control                           | - National Government  
- Provincial Government  
- Municipal Government               |
| Quantity Control                          | - National Government  
- Minister of Public Works  
- Provincial Government  
- Municipal Government               |
| Fare Determination                        | - Minister of Public Works  
- Governor  
- Mayor  
- Management  
- Supervisory Board  
- Users                                      |
| Drinking water supply operation and development | - National Government  
- Provincial Government  
- Municipal Government               |
| Strategy Formulation                      | - National Government  
- Minister of Public Works  
- Provincial Government  
- Public                                      |
| Master Plan                               | - National Government  
- Municipal Government  
- State-Owned Enterprise  
- Province-Owned Enterprise  
- Village-Owned Enterprise  
- Private Enterprise  
- Municipal-Owned Enterprise               |
| Taks                                      | Actors                                                                 |
|-------------------------------------------|------------------------------------------------------------------------|
| Technical Plan                            | - State-Owned Enterprise  
- Province-Owned Enterprise  
- Municipal-Owned Enterprise  
- Private Enterprise  
- Public  
- Construction Service Providers          |
| Feasibility Study                         | - State-Owned Enterprise  
- Province-Owned Enterprise  
- Municipal-Owned Enterprise  
- Private Enterprise  
- Public  
- Construction Service Providers          |
| Construction                              | - Provincial Government  
- Municipal Government  
- State-Owned Enterprise  
- Province-Owned Enterprise  
- Municipal-Owned Enterprise  
- Private Enterprise  
- Public  
- Construction Service Providers          |
| Monitoring and Report Evaluation          | - State-Owned Enterprise  
- Province-Owned Enterprise  
- Municipal-Owned Enterprise  
- Private Enterprise              |
| Making the report                         | - National Government  
- BPPSPAM  
- Provincial Government  
- Municipal Government                      |
| Reviewing the report                      | - National Government  
- BPPSPAM  
- Provincial Government  
- Municipal Government                      |
| Sanction                                  | - National Government  
- Provincial Government  
- Municipal Government                      |

Source: Author’s Data Coding, 2021

3.1.1. Discussion
This study develops an understanding of how the Indonesian government provides drinking water for the community by analyzing the tasks of each actor directed in the laws and regulations with a content analysis approach. Only a few Laws and regulations related to drinking water supply were identified in the Indonesian Laws and regulations list. The results show that the instruments for drinking water supply are in a prominent position than instruments for its distribution. Only 3 of 19 instruments are identified for drinking water distribution: guideline, standard operational procedure, and master plan. Although it is said that the government has the responsibility to make sure that all Indonesian citizens can have access to drinking water, the fulfilment of this responsibility for the community to be covered by the drinking water system is depended on the implementation of the master plan. However, the lack of government capacity to build and administer the drinking water supply system has made the government share the responsibilities to enterprises both owned by the government and by private institutions in the implementation. In addition, the community in a group, as long as it fulfills what is required in the laws and regulations, can also become government's partners to build and administer the drinking water
supply. Although the partnership scheme has accelerated the implementation of the master plan, the different capacities and characters of the partners have become another challenge. As a profit-oriented enterprise, the government does not have a bargaining position for the area of services. It looks like an answer to why the drinking water system still has blank spot areas. Another challenge is that the quality of service conducted by various actors is context-specific. However, minimal qualities have been set, and the governments can conduct technical assistance and training.

Furthermore, there is a tendency for subjectivity in the decision-making process. It happens when the instrument implementation needs to be approved or decided by the minister, the governor, or the mayor in person instead of the government. It creates a chance to widen the gap of reliability among areas in providing drinking water. In Berg's project document, it is stated that in terms of water policy related to water resource management and services, there are multi-level governance gaps: policy gap, administrative gap, information gap, capacity gap, funding gap, objective gap, and accountability gap[12].

Location and time are two factors influencing the condition of water reliability. In terms of geographic distribution, to make sure of the demands of equal drinking water accessibility there is a provision of water supply and distribution. This is in line with what Cosgrove & Loucks said that demand is influenced by population growth and increased per capita water consumption in growing urban, domestic, and industrial water sectors [15]. Our study confirms that focusing on supply with little attention to distribution in providing drinking water creates a blank spot area and a gap in its services. In terms of environmental degradation, those two conditions lead to the exploitation of groundwater, which creates other problems. In recent, groundwater use has become a common phenomenon in surface water-limited areas, such as urban areas, due to its year-round availability and relatively free of charge. This phenomenon is expected to continue to grow significantly in the future, although an apparent cause of groundwater depletion and its negative impacts have been acknowledged.

4. Conclusion
In summary, our research findings have presented how Indonesian Laws and regulations direct the provision of drinking water supply. Considering the different characters of actors involved and different water availability conditions, it is necessary to equip and expand the Laws and regulations to the provision of drinking water distribution. The critical implication to stop the massive exploitation of groundwater for consumption includes the improvement of drinking water reliability by synergizing and integrating all attempts by various actors in providing drinking water. This would ensure that the drinking water system would be in the same bargaining position as groundwater. One limitation of this study is that it only focuses on the study of Laws and regulation– document study. It would be preferable if further research could be conducted to analyze the practices.

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