



Water Governance: Case of Clean Water Supply in the City of Makassar

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Abstract. Water is one of the natural resources and essential human needs, so water is the foundation for human health and well-being. Given the importance of water for poverty alleviation, man-health and ecosystems, management of water resources is of paramount importance. Despite the overwhelmingness of these important purposes, many people still face difficulties in accessing services. Therefore, there is a need for water governance that includes the ability to make socially acceptable public policies and mobilize social resources to support them. This paper identifies water management systems from OECD concepts using qualitative methods in Ko-ta Makassar. Provision of clean water is a special concern of every country in the world, including Indonesia. As rapid urban development is accompanied by population growth from year to year, human needs for clean water are also increasing, Makassar as one of the largest and most densely populated cities in Indonesia according to data from the General Employment Service of Makassar City in 2021, the number of people with access to safe drinking water is 1.074.339 out of a total of 1,489.912 people or 72.35%. This shows that more than 1/4 of the population does not have access to clean water. This paper seeks to reveal how clean water sanitation with the concept of water management with water management effectiveness is seen from how the division of tasks and responsibilities, efficiency seen from the planning of work as well as confidence and engagement seen from stakeholder involvement.

Keywords: Water, Water Governance, Clean Water Supply.

1 Introduction

Access to basic water and sanitation services has been recognized as a number of fundamental human rights, and everyone should have equal access to water and hygiene services. Given the importance of water for poverty alleviation, human health and ecosystems, water management is crucial. Despite being part of these vital objectives, many people still face difficulties in accessing basic services [1]. Today, more than 1 billion people lack access to water and more than 2.4 billion people lack access to basic needs. The water crisis is largely caused by human behavior. It is not caused by limited water supply or lack of funding and appropriate technology, although these

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A. R. Cangara et al. (eds.), *Proceedings of the World Conference on Governance and Social Sciences (WCGSS 2023)*, Advances in Social Science, Education and Humanities Research 843,

https://doi.org/10.2991/978-2-38476-236-1_33

are important factors, but rather by major failures in water governance [2]. Mega-trends such as demographic growth, urbanization and climate change are increasingly affecting the availability and quality of water, where most of the population lives and will live in the future (70% by 2050) [3]. By 2050, water demand will increase by 55% compared to 2000, while four billion people will live in water-stressed areas. In addition, 240 million people will lack access to clean water sources, and nearly 1.4 billion people are estimated to lack access to basic sanitation [4].

Water governance relates to the political, social, economic and administrative systems established for the development and management of water resources and the allocation of water services to different groups of society [5]. One of the key challenges in the study of water governance is whether findings from governance monitoring efforts can be integrated into the development of robust water policies, and address the key aspects of water governance playing a critical role in the realization of universal access to water and sanitation. Identifying key issues in water governance management can provide meaningful insights into addressing inequalities in access to water and sanitation. The OECD principles on water governance are grouped into three dimensions (1), Effectiveness of water governance relates to the contribution of governance in defining clear sustainable water policy objectives and targets at different levels of government, to implementing those policy objectives, and to meeting expected goals or targets. (2) Efficiency of water governance relates to the contribution of governance to maximizing the benefits of sustainable water management and well-being at minimal cost to society. (3) Trust and engagement in water governance relates to the contribution of governance to building community trust and ensuring stakeholder inclusiveness through democratic legitimacy and fairness to the wider community [6].

The provision of clean water is a special concern for every country in the world, including Indonesia. The rapid development of cities accompanied by an increase in population from year to year causes the human need for clean water to also increase. This makes the quality of clean water supply and management services very much needed by the community, so that clean water services become a very important component of public services. The level of clean water demand each year depends on population growth. The higher the population growth rate, the more complex the need for clean water. As the city of Makassar continues to grow rapidly and the activities of its population are increasing, the level of community demand for clean water is also increasing. This is a problem for Makassar City because of the high demand for clean water services, but the availability of clean water has not been able to meet all the needs of the community so there are still areas that have not been reached by clean water.

Based on data from the Makassar City Public Works Office in 2021, the number of people in Makassar City who have access to protected drinking water is 1,074,339 out of a total of 1,489,912 people or 72.35%. This shows that more than $\frac{1}{4}$ of the population does not have access to clean water. The provision of clean water in Makassar City is divided into piped and non-piped systems. One of the problems that occurs in Untia Village. The area located on the coast makes the area low in water quality from dug wells which is the main source of water for the people of Untia Vil-

lage, and since the entry of industry into Untia Village the problem has increased, this happens because PDAM only has one pipe. Meanwhile, industrial machines are very large. Since then, the people of Untia Village have had difficulty accessing clean water. Therefore, water governance is needed, which includes the ability to create socially acceptable public policies and mobilize social resources to support them. Water policy in its formulation process should aim to develop sustainable water resources and for this to be implemented by stakeholders, in this case the government, must move to create a concept, program or policy in overcoming problems in providing clean water in water scarce areas.

2 Literatur Review

Water is a primary natural resource and a basic human need. Moreover, water also plays an important role in sustainable development, including poverty alleviation. [7]. The use and abuse of this increasingly precious water resource has increased dramatically over the decades. Eventually, it reached a point where water shortages, water quality degradation and damage to aquatic ecosystems impacted economic and social development prospects, political stability and ecosystems integrity [8]. The rapid development of cities accompanied by an increase in population from year to year causes the human need for clean water to also increase because clean water is a basic need that is very important for human survival in fulfilling daily activities. This makes the quality of clean water supply and management services very much needed by the community, so that clean water services become a very important component of public service.

Indonesia is one of the world's emerging market economies that has experienced rapid urbanization over the past few decades [9]. In 2018, BPS data showed that the achievement of access to safe drinking water was 88%, while access to proper sanitation was 75%. From this data, there are still 32 million people who do not have access to proper drinking water and 67 million people who do not have access to proper sanitation [10]. Water governance is widely recognized as an important factor in sustainable development [11]., Therefore, water governance has previously been included in the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs). Despite the enormous amount of attention given to the provision of safe and affordable drinking water, hundreds of millions of people around the world still lack access to such water [12]. Significant investment is required to renew and improve infrastructure. Investments in water supply and sanitation alone will require USD 6.7 trillion by 2030 and this amount could triple by 2050 if infrastructure investments are made in broader water-related infrastructure [6].

Some studies on water management are beginning to turn to the concept of water governance. Effective, efficient and inclusive water governance aims to improve air security and ensure access to safe drinking water and sanitation for all, while responding to the impacts of environmental and economic objectives and social. Assessing the performance of water management systems can help identify gaps and priorities, needs and responses, with the ultimate goal of delivering better water policies for better lives. Governance is key to addressing water challenges and transforming water

management under the increasing pressure of competing water uses and climate change. Diverse water governance regimes have evolved in different countries and regions to govern the development and management of water resources and the provision of water services [13].

One of the challenges in water governance today is how to adequately allocate water for multiple competing uses, especially in energy production. Therefore, various decision-making institutions related to policy setting guarantee to ensure sustainable water supply [14-23]. The OECD (Organization for Economic Co-operation and Development) defines water governance as "a set of administrative systems, with a primary focus on formal institutions (laws, official policies) and informal institutions (power relationships and practices) as well as organizational structure and efficiency" [15]. In other words, or more simply, water governance is the set of systems that control decision-making with respect to water resources development, operation and management. Water governance is therefore more concerned with the manner in which decisions are made (i.e. how, by whom and under what conditions decisions are made) than with the decisions themselves [16].

The OECD Principles on Water Governance provide 12 must-haves for efficient, effective and inclusive air management. The OECD Council meeting in May 2015 between the OECD Regional Development Policy Committee and Ministers produced a framework to guide better air policies and reforms. The principles apply to all air management functions (e.g. water supply, sanitation, flood protection, air quality, air quantity, rainwater and stormwater); air uses (e.g. household, industry, agriculture, energy and environment); and types of air management ownership, resources and assets (e.g. public, private, mixed) [2].

- a. Effectiveness which includes clear roles & responsibilities. Appropriate scale within the river basin system, coherent policies, and capacity.
- b. Efficiency includes data and information, financing, innovative regulatory and governance frameworks
- c. Trust and Engagement includes Monitoring and evaluation, Trade offs across all user areas in villages and cities, Stakeholder engagement, Integrity and transparency

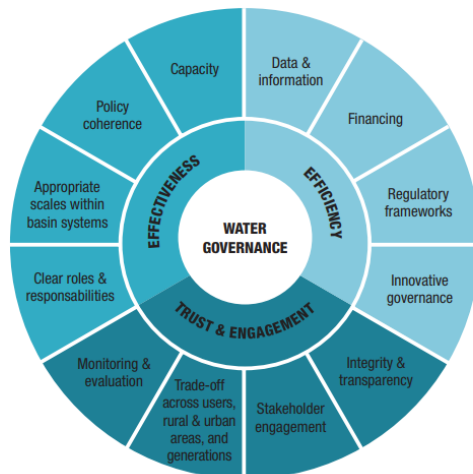


Fig. 1 OECD Principles on Water Governance

3 Research Method

The scope of the research was conducted in Makassar City with a case study in Untia Village, which is one of the villages in Biringkanaya Sub-district. The area of Kelurahan Untia is 2.89 km² with a population of 2,589 people and is located at an altitude of 1 meter above sea level which is a coastal area. Untia is bordered by Maros Regency, Marusu Sub-district to the north, Bulurokeng Village, Biringkanaya Sub-district to the east, Bira Village, Tamalanrea Sub-district to the south, and the Makassar Strait to the west. Untia urban village, which is a coastal area, has experienced clean water shortages for many years. This condition is caused by the tidal movement of sea water which causes sea water to mix with fresh water so that the water quality in Untia Village becomes brackish/salty. As well as the influx of industries around the Untia Village area that use water on a large scale and only use one pipe flow with the community coming from the PDAM, Untia Village as a coastal area has limited water resources, this is due to seawater intrusion which causes the water quality in the area to become poor and salty due to the mixing of seawater elements and the disruption of groundwater quality. Due to poor environmental sanitation coupled with privatization and industrial use of water, the community in Untia Village has to buy clean water to meet their daily needs at a cost of Rp500,000 - Rp800,000 per month [17].

The type of research used in this paper is descriptive research with a qualitative approach. Data collection techniques are carried out by triangulation (combined), data analysis is inductive / qualitative, and qualitative research results emphasize meaning rather than generalization [18]. This descriptive qualitative research aims to describe using primary data and secondary data obtained through data collection by means of observation, interviews, and documentation. The data will be analyzed using the proposed steps, namely: data collection, data reduction, data presentation, and verification and confirmation [19]



Fig. 2 Map of Untia Village

4 Result and discussion

Water governance encompasses how to apply allocative politics and regulations in the management of water and other natural resources and broadly includes the formal and informal institutions through which authority is exercised. A relatively new term or way of discussing this combination of formal and informal institutions is distributed governance [8]. In Indonesia, there is a policy in the Regulation of the Minister of Public Works No. 18/PRT/M/2007, regarding the master plan for the development of the Drinking Water Supply System (SPAM), which is a long-term plan (15-20 years), part or the initial stage of clean water development. In the concept of water governance initiated by the OECD, there are Effectiveness, Efficiency and Trust and Involvement.

4.1 Concept of Effectiveness

How to determine goals and objectives in sustainable policies for the government and implement these goals so that these goals or objectives can be expected. One of the sub-concepts of effectiveness is clear roles and responsibilities [2].

4.1.1 Clear Roles and Responsibilities

The division of tasks is an effort to create good quality work. The right division of tasks or work must be able to describe: (1) Identification of work or position, by giving the name of the position; (2) The existence of a relationship of duties and responsibilities, with details of duties and responsibilities; (3) Standards of authority or position, there are achievements that must be achieved; (4) The description of work requirements must be clear; (5) In the job includes its main functions and duties; (6) There is an explanation of the beginning and end of the task. Well defined tasks and positions will result in effective work [24]. The division of tasks is carried out by the Public Works Office as stated in Makassar Mayor Regulation No. 84 of 2016 concerning the position, organizational structure, duties and functions and work procedures of the Public Works Office, Fourth Section Article 14, namely the Sanitation and Clean Water Section.

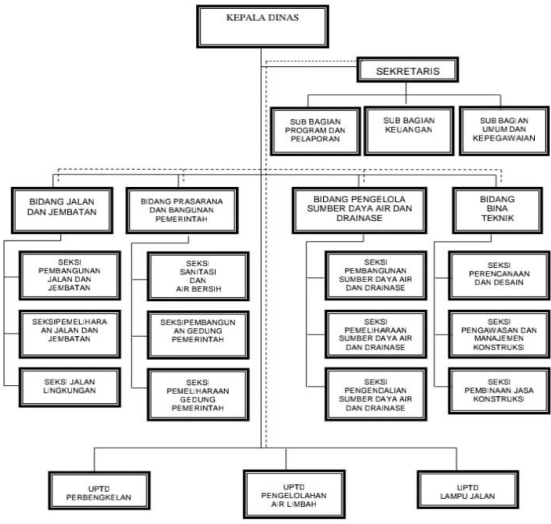


Fig. 3 Organizational structure of the Public Employment Service of the City of Makassar

The main task of the Head of the Public Works Office is to assist the mayor in carrying out Government Affairs in the field of public works which are the authority of the Region and the Assistance Duties assigned to the Region, the main task of the Secretariat of the Public Works Office is to coordinate the implementation of tasks, guidance and administrative services to all organizational units within the service, the main task of the Planning and Reporting Subdivision is to prepare materials for coordination and preparation of work program plans, monitoring and evaluation and reporting on the implementation of service programs and activities, the main task of the Finance Subdivision is to carry out financial administration and accounting, the main task of the General and Personnel Subdivision is to carry out general affairs, correspondence administration, household affairs, public relations, documentation and inventory of goods and personnel administration, the main task of the Road and Bridge Division is to compile, implement and coordinate development policies, maintenance of roads and bridges and environmental roads, the Main Task of the Government Infrastructure and Building Division is to compile, implement and coordinate government infrastructure and building policies, the Main Task of Water Resources and Drainage Management is to compile, implement and coordinate policies for the maintenance, development and control of water resources and drainage, the Main Task of the Bina Teknik Division: namely compiling, implementing and coordinating planning and design policies, supervision and construction management and fostering construction services.

The Makassar City Public Works Office also coordinates between BPSAM and PDAM Makassar City in the construction of clean water facilities such as the construction of boreholes, the addition of water discharge and also piping networks carried out together with PDAM. There is no master plan for the Drinking Water Supply System (SPAM) which is a guideline for district / city governments in providing clean

water in their respective regions. Therefore, the Makassar City Public Works Office will immediately make a master plan for a more planned and integrated provision of clean water through piping networks and non-piping networks in areas prone to clean water. The conclusion of this division of tasks has been described completely in accordance with the main tasks and functions of each device in the Makassar City Public Works Office, it is hoped that this clear division of tasks can be implemented.

4.2 Concept of Efficiency

How to manage water in maximizing water management for community welfare. One of the concepts is by setting a framework or initial planning [2].

4.2.1 Framework Planning

Planning activities are things that are determined to realize the goals to be achieved. In addition, in planning there is a process or stages to achieve a goal. Planning is a process of modernization of a comprehensive change from traditional or pre-modern society to a form of technological mastery and changes in the social organization of society by improving economic welfare and political stabilization as it happened in the western world [20].

Activities generally carried out by the Public Works Office at this stage are preparing Work and Budget Plan (RKA) materials and Budget Implementation Documents (DPA), and collecting data through collecting, updating and storing data related to housing and settlements that are prone to clean water), In the implementation of planning, it must have a mature plan and have been thought together in order to build an organization so that it can run and last long. Likewise, the Makassar City Public Works Office must carry out planning in order to develop and carry out activities that have been determined.

Table 1. Work Plan/Activities and Funding for the Clean Water Sector of the Public Works Office

Plan Year 2023			
Activity Program	Activity Indicator	Outcomes	Budget
SPAM Management	Number of Drinking Water Supply Systems (SPAM) in the area of Makassar City managed and developed.	49.84%	15.373.967.900
SPAM Supervision	Number of Consultations Supervision Build-up/Extension/Expansion/spam repairs.	1 Doc	1.355.817.500
Pipeline construction in the city area	SPAM Capacity of a specific theme or non-urban SPAM that is awakened.	1,2 liters/second	6.660.772.200
SPAM Upgrade	Increased Capacity of NIC/Urban or Thematic SPAM.	1.2 liters/second	4.437.517.200
SPAM Expansion	Amount of Additional Home Connections served through the use of Idlie Capacity with	200 SR	707.900.600

	the addition of network per-pipa to Specific Thematic SPAM.		
HR Development	The number of SPAM Maintenance Institutions has increased its performance.	2 Organization of SPA	143.461.000
SPAM Maintenance	Number of units of SPAM that have been operated and ined	5 units	2.068.499.400

Based on the data above, the Makassar City Public Works Office that planning activities in the field of clean water has been carried out by the Public Works Office by preparing work plans, preparing budgets, and collecting data on areas served by clean water. In addition, the Makassar City Public Works Office has carried out planning every year through survey activities because of the many incoming letters related to proposals from residents or local governments who say their areas are difficult to clean water, therefore data collection in areas prone to clean water through survey activities is a form of follow-up to proposals from the community and local government related to areas prone to clean water. For example, in untia village, the planning for the construction of clean water facilities was initially the Head of the Village wrote a letter to the Public Works Office by submitting a request for clean water facilities to be built. After that, the Public Works Office conducted a survey to the location and planned the construction of clean water facilities. The presence of Pamsimas which is a program from the government in the form of equipment but access is still far from residents' homes so the provision of water through Pamsimas is still very limited, because the system also uses a drilling system and there is a drilling limit of only about 100 meters underground so the tool is still difficult to get clean water so that the results are still salty and the pipes are also damaged so they are no longer used. In conclusion, work planning has been carried out through the construction of infrastructure, but the drilling system carried out is still difficult to get clean water because of the discharge so that the results are not optimal.

Table 2. Data on Areas Served by Clean Water in Makassar City

No	Subdistrict / Village	Number of households	Total Population 2022	SR	PU Data		
					%SR	SOUL	%L SOUL PU
1	Ujung Tanah	10,701	37,002	82	1	407	1
2	Kep.Sangkarrang	4,334	14,744	1,197	27.62	4,985	33.81
3	Tallo	43,555	147,831	1,937	4.45	6,682	4.52
4	Bontoala	16,894	55,804	135	0.80	550	0.99
5	Wajo	9,890	30,051	-	-	-	-
6	Ujung Pandang	7,934	25,006	75	0.95	272	1.09
7	Makassar	25,597	82,761	479	1.87	2,194	2.65
8	Mamajang	17,802	58,073	465	2.61	1,577	2.72
9	Mariso	17,915	58,716	524	2.92	2,416	4.11
10	Tamalate	56,943	186,428	2,210	3.88	10,826	5.81

11	Rappocini	45,545	150,346	387	0.85	1,916	1.27
12	Panakkukang	43,860	144,232	631	1.44	3,077	2.13
13	Manggala	45,324	156,110	558	1.23	2,619	1.68
14	Tamalanrea	31,785	104,114	835	2.63	3,642	3.50
15	Biringkanaya	63,305	212,591	1,378	2.18	6,377	3
	Untia	681	2,437	122	17.91	297	12.19

Based on the table above, the Makassar City Public Works Office has conducted surveys in several sub-districts in Makassar City by collecting data on the population served by clean water, one of which is in untia village with the availability of 122 house pipe connections, although it is still low from the target because it is only 17.91% of 681 families. In conclusion, the Makassar City Public Works Office has carried out planning activities in the field of clean water through the preparation of work plans, preparation of activity budgets, and data collection related to areas prone to clean water. As is known, the planning process in the field of clean water is also aimed at the interests of the community by following up on letters of request from the community or local government to build clean water facilities in areas experiencing clean water shortages.

It should be noted that every institution needs planning to develop or run an organization so that it can run well. The planning that will be carried out must be formulated carefully and as well as possible because planning can help organizations in every activity that will be carried out, be it control, maintenance or development.

4.3 Concept Trust and engagement

How water governance contributes to building public trust and ensuring stakeholder inclusiveness through democratic legitimacy and justice for the wider community, one concept is stakeholder engagement [2].

4.3.1 Stakeholder Engagement

Stakeholder engagement is a process that can align the interests of the organization and stakeholders, this is important because stakeholder participation is one of the aspects that determine the progress of the organization [21]. Stakeholder engagement can also be interpreted as trust-based collaboration between individuals and/or social institutions with different goals that can only be achieved together [22]. One of the stakeholders in clean water management in Indonesia is the Regional Drinking Water Company (PDAM). In accordance with the rules of Regional Regulation No. 7 of 2019 concerning Regional Drinking Water Companies of Makassar City Article 46 Paragraph (1) Companies can carry out Cooperation with other parties and Paragraph (2) Cooperation as referred to in paragraph (1) is carried out with the principle of mutual benefit and protects the interests of the Regional Government, the community and the cooperating parties.

With the existence of the Regional Drinking Water Company (PDAM) which is a BUMD company as a provider of clean water supply in urban areas through water tank trucks provided in areas prone to clean water which is expected to improve public services by providing clean water. Specifically in Untia Village, PDAM Makassar City provides and distributes water tank cars which are carried out about three times a week with a division per block such as today block A tomorrow B until all of them get a week to meet the clean water needs of the Untia Village community or usually also from residents directly who call the driver who usually brings us water here. In conclusion, there is assistance from the Makassar City PDAM to overcome the scarcity of clean water in Untia Village through clean water tank trucks provided by the Makassar City PDAM, therefore, assistance and cooperation with the Makassar City PDAM is needed for the availability of clean water access that reaches the entire population in Makassar City.



Fig. 3 Documentation of PDAM Makassar City distributing clean water in Untia Village (source: Instagram Social Media of PDAM Makassar City, 2022)

5 Conclusion

This section provides a conclusion and review of water governance with the case of water supply in Makassar city. This study provides ideas on the concept of water governance, of which there are three, namely the concept of effectiveness as determining goals and objectives in sustainable policies for the government and implementing these goals so that the goals or objectives can be expected. Although there is already a division of tasks from each device in the Public Works Office, it cannot be said that

the division of tasks can be fully successful due to geographical factors and documents governing the master plan of the water supply system. Therefore, it is important to procure a Clean Water Supply System (SPAM) master plan document to be used as a government guideline in providing clean water, especially in Makassar City. The second concept is efficiency, how is water governance in maximizing water management for the welfare of the community seen from the planning, programs and budget allocations that have been prepared by the Makassar City Public Works Office, although it has been implemented through the pamsimas program in Untia Village but the results have not been maximized as well as the survey of areas prone to clean water. The third concept is trust and engagement to build public trust and ensure stakeholder inclusiveness through democratic legitimacy and justice for the wider community through stakeholder engagement where PDAM is present to assist the performance of the Public Works Office by serving clean water supply, especially in clean water prone areas such as Untia Village with clean water trucks. The OECD concept of water governance in the provision of clean water in Makassar city has not been fully tested with its indicators, but it is able to provide a little picture of water governance in Makassar city through the effectiveness of the division of tasks and responsibilities, the efficiency of work planning and trust and involvement through stakeholder engagement. Ultimately, effective, efficient and inclusive water governance aims to improve water security and ensure access to safe drinking water and sanitation for all, while addressing environmental, economic and social objectives. Assessing the performance of water governance systems can help identify gaps and priorities, needs and responses, with the ultimate goal of delivering better water policies for better lives.

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