Short Review on River Basin Management in Ternate City; Recommendation

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Abstract— **Institutional for water and watershed management are essentially social structures that are always evolving and changing in accordance with social and ecological dynamics. The shape and direction of socioecological change are strongly reliant on the dynamics of interaction between social and ecosystem components. In line with the location and function of the management agency, a process of knowledge dissemination is required for institutional growth. It is time to forsake the formal and absolute top-down management style and progressively include bottom-up management. As an established multi-sectoral forum, the National/Provincial Water Resources Council and/or TKPSDA are stakeholders whose roles and duties must be strengthened. Through a literature analysis, this study evaluates existing research on the difficulties underlying the implementation of river basin management. It is also possible to draw conclusions about the approaches that may be employed to tackle difficulties with river basin management. This research employs observation, literature review, focus group discussion, and in-depth interviews with community members and stakeholders as its methodology. Not just the symptoms, but the source of the issue must be addressed. Collaboration is a multidisciplinary and multisectoral approach to work that emphasises cooperation. Here, the need of collaboration at the national and provincial levels becomes paramount. Political will is vital to the success of integrated water resources management. Institutions must be enhanced, particularly in terms of river management. As part of the destructive power of water, policies for controlling the risks of flooding, drought, and pollution must be a priority.**

Keywords— **Flood, Management Policy, Ternate, River Basin.**

I. INTRODUCTION

Watersheds have great resource potential, including land and water resources. The land capability owned by an area can vary. This affects the land use allocation. The use of the land is ideally adapted to the capabilities of the existing land so that there is a match between demand and availability in land management. This adjustment between land capability and land use is also important to reduce land management costs, as well as optimize land and water resources.

This can reduce the impact of drought disasters that often occur in the Gunungkidul area. However, land use is sometimes not in accordance with the ability of the land, so that it can affect the cost of management and sustainability of the land and water. According to FAO, land is defined as the physical environment that includes climate, relief, soil, water, vegetation, and objects on it that still affect land use. This understanding of land also includes the results of human activities at this time and in the past [1].

Land properties indicate the possible appearance of the land for a particular land use. The nature of this land can affect the availability of water, air circulation, the development of erosion sensitivity, and the availability of nutrients. Therefore, it is important to evaluate the land to assess its capability and suitability [2].

Land evaluation is the process of assessing land resources for a particular purpose by using an approach or method that has been tested. The essence of land evaluation is to compare the requirements demanded by the type of land use to be applied with the nature or quality of the land owned by the land to be used. This land evaluation produces information which is then used as a direction for land use according to its needs. This land evaluation also includes an evaluation of water resources. The concept of water resources is multidimensional, which means it is not only limited to physical characteristics (hydrology and hydrogeology) and supply, but also includes other things such as environmental, social, and economic dimensions [3].

Availability of water, according to the Directorate of Irrigation, is the amount of water or discharge that is in a location at a certain amount and at a certain time. The use of water is closely related to the need for water, which is the amount of water used by humans for household, agricultural, industrial, fishing, hydrological power formation, and navigation and recreation [4].

Actual PDAM Ternate production capacity is 425 liters per second, or about 1 million cubic meters per year. Customers of PDAM utilize an average of 28,250 connections per month, wasting 29 cubic meters per connection each month. Using a family of five as an example, the average daily consumption per person is 190 liters.

This illustrates the need for more consistent management of water resources in order to reduce long-term repercussions such as protracted droughts, river ecological deterioration, etc. Based on a survey of the relevant literature, this study investigates current difficulties in the area and proposes solutions for water resource management problems in the City of Ternate.

II. LITERATURE REVIEW

Watershed management requires proper governance since, in essence, the destruction of natural resources in watersheds is the result of poor governance. A watershed is an ecosystem characterized by the interaction of water and land. Rainwater

that falls within the watershed region flows downstream into the same river [5]. Good governance is required to sustain human life and life in general, including macro- and microorganisms, in the watershed region and its environs. Land usage has an impact on the interaction between land and water, among other things. Land vegetation will retain and absorb water that falls to the ground or flows from the surface. One of the features of degraded land resources is soil erosion, which is caused by surface runoff [1].

As a filter, vegetation may slow the pace of erosion. The link between land and water is interacting, although the two resources have distinct features. Water has the qualities of movement or flow, variability, and variety [6]. The nature of the flowing water makes claiming ownership difficult. Water may flow across administrative borders, both inside and between nations, hence it is often referred to as a common pool resource; its usage is not exclusive, but users might compete for it. The second property of water is its temporal variability, both within and between seasons. In certain years, water availability may be more or lower than in others [7]. Due to geographical and climatic differences, water availability in different places varies [8]. The third attribute is that water may be utilized for a variety of economic, social, and cultural reasons in tangible and symbolic dimensions to sustain life [9].

In addition to being an engineering challenge that must be managed by technocrats or engineers, the management of water is also a political process due to its extensive geographical reach, particularly its transboundary nature [10]. These three features are substantially influenced by human land usage. In contrast to water, the status of land may be regarded constant despite its variable usage [11]. Both the supply and demand for water are affected by land use. Land is also used for economic, social, and cultural reasons, and it has both tangible and symbolic qualities [12].

Land and water are regarded to be a component of the cultural legacy of the indigenous population of Indonesia. The utilization of land and water is very dynamic, and their availability is decreasing in tandem with population increase and economic expansion [13]. Conflicts over the use of these two resources are increasing in frequency and scope. Conflicts may arise between users within the same region or between users in separate locations [14]. Also possible are vertical conflicts between government and users. There are often confrontations between the government and the people in Indonesian land disputes owing to competing interests. The government bureaucracy's management of these two resources is split according to the authority of each agency concerned [15].

When government decentralization is undertaken, watershed management power is divided not just between regional and central bureaucracies [16], but also between regional and central bureaucracies. The compilation of rules and regulations at the central level increases the influence of the central bureaucracy in deciding the allocation of power [17].

A. Watershed Management Perspective

Typically, the use of resources is determined by the geographical linkages between watershed regions; for instance, the interaction between upstream and downstream areas in terms of land and water usage [18]. Disparities in the natural, economical, and political capacity of consumers and stakeholders to obtain water result in disparities in the allocation of these resources [19]. The sociopolitical framework influences the generation of benefits, costs, and dangers, as well as their usage and distribution. Affected by externalities such as floods, water pollution, and water shortages, regions become marginal zones, which are often impoverished neighbourhoods [20]. Continuous growth that consumes land and water without being adequately planned and managed will increase the impact of externalities, which may affect wealthy populations [21].

One party's excessive usage of groundwater might impact the other party's access to groundwater [22]. The depletion of groundwater may impact the availability of surface water. Because water is utilised to replenish the sinking groundwater table, the supply of water in rivers might decrease, particularly during the dry season [23]. As a consequence, the community as a whole is becoming ecologically conscious of the fact that water is a shared resource and that land and water use choices may impact the availability and distribution of water [24]. This perspective spawned the need for an integrated strategy that not only considered the economic development goals of an area, but also inter-regional interests [25], as well as the demands of all community groups and the future generations' interests [26].

This integrated strategy has been proposed in several forums. The Global Water Partnership is one of the venues that promotes an integrated strategy for water resource management. In 2002, during the World Summit on Sustainable Development in Johannesburg, it was decided that beginning in 2005, an integrated strategy known as Integrated Water Resource Management would be adopted [27]. Despite the fact that Indonesia has pledged to implement an integrated approach to water resources management, which is supported by Law No. 7 of 2004 concerning water resources, and that various supporting institutions, such as the Center for River Basin Management, have been established, the institutional approach tends to be centralised and emphasises the interests of sector bureaucracies.

B. Functions and Perceptions of the River

The river is a source of potable water with enormous potential. The river has been the primary instrument for economic growth and development for ages [28]. Rivers are vehicles for water storage that may be used for a variety of purposes. Every alteration that humans make to the river will have an effect on the ecology and social lives of the watershed's inhabitants. Early in human history, rivers and water were considered life-giving. In the traditional approach for communal survival, the river is a location where people may catch fish for food. As a source of life, rivers are able to

provide human demands for drinking water and water for agricultural, industrial, economic, and other productive activities [29].

Proper management and exploitation of rivers and water may enhance the well-being of riverside and watershed residents. From an alternative viewpoint, however, control over water and water supplies may be used to dominate power and other social institutions [30]. The management of rivers is a tool for managing the social, economic, commercial, transportation, and industrial systems that rely on these water resources. Regarding the variety of views, river and water knowledge grows in accordance with a psychological and psychological hierarchy. The river as a water supply is related to the Almighty [31]. The social and biological fabric of India honours the country's mighty rivers. The Ganges and Jamuna rivers are the two most revered rivers since they represent the source of life and the way to Nirvana for humanity. Although river user stakeholders have a more optimistic view of rivers and water, they often disregard efforts to preserve the amount, quality, and continuity of water supply from the biological system [32].

Frequently, rivers, lakes, and even the ocean are used as garbage dumps; in certain situations, rivers are converted into landfills (final disposal sites) [33]. This state worsens because the river user community does not comprehend the river's role as one of the parts of the ecosystem that may sustain the equilibrium of social and ecological systems in the region through which it runs [34]. The downstream watershed environment will be negatively affected by deforestation and river pollution in the upstream. The building of dams that boost regional production may be detrimental to downstream river users and potentially alter the order and balance of ecosystems downstream. These alterations to the ecosystem have the potential to influence agricultural patterns, farming, and other economic activities, as well as the social behaviour of those who rely on the watershed ecology [35]. Every action done by the social system situated at one point along the river's flow will have an effect on the social system positioned downstream. In connection to such human views, human culture is capable of evolving and adapting to the availability or scarcity of natural ecosystems' resources [36].

C. Good Governance Principles

Governance or governance system is defined as the structure and process in which community members delegate authority in the decision-making process [37]. Management governance is reflected in the authority or control over everything that happens in the territory of a system (governance zone, governance vicinity), both social and ecological, or both systems. In a structured watershed management institution, watershed management efforts and actions are carried out by the management group [38]. In traditional social groups, the delegation of decision-making authority is generally more entrusted to individual figures as leadership institutions, as has been found in major water user community groups in West Java, which are led and managed by an ulu-ulu or mantri cai.

In a more structured social system, the community elects representatives or figures who can convey their aspirations in their governance system. Communities, as stakeholders, have control over the structures and processes that occur in their governance system [34]. Communities have the opportunity to participate in determining the direction and goals of efforts to manage social resilience in their system. Good governance is implemented by a group of managers who are legally elected by the members of the institution concerned [39].

In a structured socio-ecological system, institutional members choose representatives or figures who can convey their aspirations in the required resource management system. Institutional members as stakeholders have control over the structures and processes that occur in the management system [40]. Communities have the opportunity to participate in determining the direction and goals related to resource management efforts in their socio-ecological system. Traditional socio-ecological systems generally do not choose leadership figures or establish leadership institutions [41]. Traditional leadership is not a position based on a formal election (legal election), but rather a psycho-social acclamation in which society recognizes and accepts a person as a social leader because of his attitudes, actions, dedication, and responsibility towards social groups and the surrounding ecosystem. In the traditional socio-ecological system, the community generally has no control over the decisions and decision-making processes carried out by leadership figures or institutions. Good governance must have management capabilities to maintain, improve, and maintain the sustainability of natural resources to meet the needs of the community [42].

The characteristics of good governance are as follows [43]:

1. having a participatory nature in the sense of opening up opportunities for good contact and interaction,
2. being a polycentric organization, that is, an organization consisting of several authority holders;
3. being accountable to the community and those with the above authority;
4. being deliberative in the sense of providing opportunities for its members to debate, mediate and negotiate;
5. having a multi-layered management structure in the sense of containing broad representation; and
6. fair in the distribution of unexpected benefits and risks.

III. METHODOLOGY

This study examines prior research on the issues surrounding the implementation of the management on River Basin through a literature review. Inferences may also be made on the methods that can be used to resolve problems with River Basin Management. The methods used in this study are Observation, Literature Study, Focused Group Discussion and In-Depth Interview with the community and stakeholders.

IV. RESULT AND DISCUSSIONS

A. Reform of Water Resources Management Institutions

Water and watershed management institutions are essentially social constructions that are constantly changing and developing according to the process of social and ecological evolution. The form of interaction and the direction of socio-ecological change are highly dependent on the dynamics of interplay between social and ecosystem elements. In the process of change, there is a multi-directional interaction between:

a. the watershed management system as the designer and decision maker,
b. the members of the watershed management organization as the main stakeholder for the sustainable use of the watershed, and
c. the other ecological and social elements involved.

The concept of water and watershed management institutions includes formal and informal regulations, norms and cognitive bases, as well as structured symbolic systems to regulate the use and distribution and determine the status of water resources within a community group. The concepts mentioned above can be broadly divided into aspects of policy, law and administration, all of which include formal and informal elements. Water law issues refer to the legal status of water, rights to water, conflict resolution mechanisms and, possible conflicts between laws, legal diversity and the presence or absence of administrative regulations to implement these laws [44].

Policy aspects include priority of use, cost, ability to decentralize or centralize, ability to participate and coordinate with other policies. The administrative aspect is the organizational structure of water management, including financing, staffing, capacity and fundraising. In terms of institutional development, a knowledge diffusion process is needed in accordance with the role and position of the management agency as a polycentric organization that prioritizes participatory and deliberative aspects. In accordance with its function, the management institution must provide opportunities for stakeholders in the use and management of watersheds to express their aspirations regarding the need for their collective resources. It is time for the formal and absolute top-down management pattern to be abandoned and gradually integrated with grass-roots management which is more informal in nature but still sticks to the agreed collective directions and goals [45].

Furthermore, considering that water resources and watersheds are the collective rights of their users, efforts to reform and evolve water resources and watershed management institutions should be directed towards communal problem-solving oriented efforts. In terms of accountability, good governance must also encourage the development and strengthening of horizontal relationships among members of the management system in order to increase the diffusion of information and knowledge needed to address these collective problems. The resources available to the community, both economic resources and social resources, must be utilized locally and adapted to the needs of water resources and watershed management (locally and finely tuned). This attitude allows the opportunity to prioritize achievements that are in line with real demands. In addition, local knowledge and skills (indigenous know-how) must also be adapted into the resource management system to help accelerate the transformation process of the management institution [46].

B. Initiating Recommendations for Water Resources Management Solutions

In essence, the proposed alternative solutions include three (3) treatments, namely (i) understanding a shared vision; (ii) partnerships between sectors, regions, and stakeholders; and (iii) political will. These three important points are elements of good governance for handling flood risk, drought risk, and controlling river pollution.

1. Stakeholder Identification and Engagement
   Identify the stakeholders as legitimate owners who have the right to and must resolve any problems that arise in their area of interest. The parties who have high influence and influence are chosen to be stakeholder representatives who will then be asked to play their role continuously in overseeing the resolution of the problem. The National/Provincial Water Resources Council and/or TKPSDA, as an existing multi-sectoral forum, are stakeholders whose roles and responsibilities must be reinforced so that they may effectively carry out their responsibilities. The ideal composition of the National SDA Council is a balance between those representing government stakeholders and those representing NGOs (non-governmental organisations), so it is hoped that both parties can complement each other in proposing policy recommendations to the President and evaluating their implementation.
   Because the role and function of this Council are highly strategic, it is appropriate that the representatives of the Council's members who represent the government at its meetings are officials with knowledge and experience in the field of water resources and decision-making authority in their respective agencies. This individual should be a permanent assignee of the ministry or institution, so that the debate and development of water resources policy in the Council would result in holistic and thorough suggestions. Similarly, members who represent non-government entities are obliged to continue communicating developments and outcomes of cooperation to the constituencies they serve.

2. Building a Shared Vision and Sharing Knowledge and Experience
   In order to increase stakeholder engagement, it is vital to first establish a common vision (visioning). Visioning activities are crucial for fostering growth and gaining the support of all stakeholders for a common goal to be pursued. This visioning process is anticipated to generate a feeling of belonging to all planned initiatives, programmes, and activities (sense of belonging). In the absence of a unified vision, there will be little commitment amongst sectors. The execution of operations will be quickly halted by the

smallest hindrance and will not generate the desired results. In every area associated with the management of water resources, there exists fundamental information that may be shared with other stakeholders. The fundamental knowledge of each sector utilised as common knowledge (lessons learned) helps the construction of a powerful shared vision. As part of the empowerment process, such fundamental information must be conveyed consistently during stakeholder meetings.

3. Integration from the bottom
The integration of river management always begins at the lowest suitable level, based on several instances of success (bottom-up). Integration at a level of management that is not too high guarantees that programmes and activities are integrated at the level closest to the incidence of the issue. A design of integration at a level that is too high will result in the slack management of issues in the field and may lead to massive-scale discourses that are not genuine activities. This notion has been included into the yearly programme planning system (Development Plan Deliberations from the sub-district level to the national level), but its application must be strengthened (its quality).

4. Monitoring and Evaluation as Key to Success
In order to improve future implementation, the monitoring and evaluation system must be made more effective and intensive. The spirit of each accomplishment and success must be shared in order to promote the spirit of future accomplishments and better future strategies.
If the Presidential Regulation concerning the National Policy on Water Resources Management (Jaknas PSDA) has been enacted, then the Jaknas PSDA and its follow-up matrix must be disseminated to the respective Ministries/Institutions concerned, particularly those related to efforts to control the destructive potential of water. Monitoring and evaluating the implementation of the suggestions on the Jaknas PSDA matrix must be conducted frequently and systematically.

5. Appreciate Community Initiatives and Organizations
It is becoming more apparent that the success of any river management programme or activity depends heavily on the engagement of stakeholders. Local governments, the business sector, and communities in flood- and drought-affected regions must be empowered to handle issues in the future. The recent development of the river care community as a component of stakeholders must be hailed as the beginning of a new era of water or river resource management via the formation of working groups for stakeholder involvement.

6. Addressing the Root of the Problem, Not the Symptoms of the Problem
Real action is needed to address the cause of the problem and not just the symptoms of it. In addition, it is also necessary to clarify the roles and responsibilities together. It is wrong to assign the roles and responsibilities of complex water resources management issues to one institution, even though the causes of the problem are spread across many sectors and are far from the correct management logic. These shared roles and responsibilities are tied together in a collaborative scheme and carried out continuously.

7. Working Collaboratively, Synergistically and Coordinated
Collaboration is a multidisciplinary and multi-sectoral work concept that prioritizes working together (working together) cooperatively to achieve the desired shared vision. What is important in collaboration is the willingness to solve problems together cooperatively with interpersonal communication skills. In collaboration, the principle of "two heads are better than one" applies. The parties involved will benefit when they experience increased collaboration, build trusting relationships, set common goals, and effectively solve common problems. This is where the role of coordination becomes very important, where this role is the duty and function of the Water Resources Council both at the national and provincial levels.

8. Jobdesk Distribution Based on Matrix
Policies that have been formulated and become mutual agreements between the government/institutions, regions, and stakeholders must be implemented properly and effectively. The policy is implemented with the right strategy and the right description of programs and activities.

The inter-sectoral activities that emerge from the conclusion of the stakeholder meeting are then arranged in an activity matrix that explains who will handle what, when, and what the estimated costs are. National Water Resources Management Policy and Provincial Water Resources Management Policy need to be followed up in the form of a matrix of division of labor for each related agency. Likewise, at the river basin level, it is necessary to develop a matrix as a follow-up to the implementation of the Water Resources Management Pattern and Plan. This matrix will be a reference in the implementation of Monitoring and Evaluation.

9. Political Will
A crucial factor in the success of integrated water resources management is political will, which is described in (i) institutions and (ii) government policies. Institutions need to be strengthened, especially in the management of river areas, which include river bodies and watersheds. Institutions such as those responsible for the management of river basins and watersheds are the key to the success of good basin governance. Floods as the impact of poor

management of water resources (bad governance) must be improved in the future. Policies for controlling floods, droughts, and pollution that strike a balance between technical approaches and non-technical efforts need to be continuously encouraged and implemented.

It is also proposed that conservation activities be carried out continuously in the upstream area. The district/city government needs to be held accountable for the supervision of development that is not in accordance with its designation. It is proposed that the Civil Servant Investigator (PPNS) immediately function in the context of law enforcement and to monitor conditions in the upstream, middle, and downstream rivers related to preventing floods, droughts, and river pollution.

Policies for managing flood risk, drought risk, and pollution as part of the destructive power of water must be a concern across sectors, regions, and stakeholders. Upstream areas that must be conserved must be guarded and protected from utilization for other purposes. Utilization of land in the upstream area of the river must be environmentally friendly in order to prevent erosion that causes river sedimentation and the danger of landslides.

In addition, domestic waste, which is often the cause of river water pollution, must also be prohibited from being dumped into water bodies. The role and awareness of the community and stakeholders in the successful management of water resources is very vital and decisive. Therefore, the culture of loving water needs to be continuously instilled and nurtured from an early age to adulthood.

10. Effective Supervision and Control
The implementation of sustainable river development and management will not work well if the supervision and control are not effective. Law enforcement is one of the vital aspects of the success of sustainable river management. Therefore, aspects of monitoring, evaluation, and law enforcement must be emphasized in every ministry/agency and region.

V. CONCLUSIONS

Water and watershed management institutions are essentially social constructions that are constantly changing and developing according to the process of social and ecological evolution. The form of interaction and direction of socio-ecological change are highly dependent on the dynamics of interplay between social and ecosystem elements. In terms of institutional development, a knowledge diffusion process is needed in accordance with the role and position of the management agency. It is time for the formal and absolute top-down management pattern to be abandoned and gradually integrated with grass-roots management, which is more informal in nature. The National/Provincial Water Resources Council and/or TKPSDA, as an existing multi-sectoral forum, are stakeholders whose roles and responsibilities must be reinforced. The ideal composition of the National SDA Council is a balance between those representing government stakeholders and those representing NGOs. Integration of river management always begins at the lowest suitable level, based on several instances of success (bottom-up). Monitoring and evaluating the implementation of the Jaknas PSDA matrix must be conducted frequently and systematically. Real action is needed to address the root of the problem and not just the symptoms. Collaboration is a multidisciplinary and multi-sectoral work concept that prioritizes working together. In collaboration, the principle of "two heads are better than one" applies. This is where the role of coordination becomes very important at the national and provincial levels. A crucial factor in the success of integrated water resources management is political will. Institutions need to be strengthened, especially in the management of river areas. Policies for managing flood risk, drought risk, and pollution as part of the destructive power of water must be a concern.

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