

## Limboto Lake Management Model Based on Adaptive Governance

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### Abstract

*This research aims to analyze motivation and issues, structure and networks between stakeholders in the management of Lake Limboto; and explains how the adaptive model intervenes in the management of Lake Limboto in Gorontalo Regency. This research uses a qualitative approach. Data collection techniques include in-depth interviews, documentation, observation and carrying out Focus Group Discussions (FGD). Data were analyzed using the spiral technique. The results of the research show that the Gorontalo Regency Government from an Adaptive Governance perspective is not yet able/not ready to survive in the face of environmental changes that may occur at any time. The motivation and issues of each stakeholder show a desire to manage and even save Lake Limboto from damage, however, activities are still found in the Lake carried out by the community which actually accelerate the degradation of the Lake environment. The structural pattern in the management of Lake Limboto requires an adaptive model that utilizes the potential resources of each stakeholder, both from the civil sector; Private and Government.*

## Introduction

For almost more than a decade, Adaptive Governance (AG) has been the focus of facilitating the position of public administration in environmental studies. This can be seen from the Journal article by (Chaffin et al., 2014) entitled "A Decade of adaptive governance scholarship: synthesis and future directions". They say that adaptive governance is a form of environmental governance that is increasingly emerging and is of interest to scholars and practitioners to coordinate resource management regimes, in the face of complexity and uncertainty associated with rapid environmental change. Although the term "adaptive governance" is not exclusively applied to the governance of social-ecological systems, research on adaptive governance is a significant outgrowth of the literature on resilience, social-ecological systems, and environmental governance. They then define adaptive governance as a series of interactions between actors, networks, organizations and institutions that emerge in pursuit of the desired state for a social-ecological system.

Adaptive governance first emerged as a reaction to the need for holistic environmental governance solutions, particularly in natural resource management. The emphasis in this approach is on leadership in the context of complex socio-ecological systems (Chaffin et al., 2014). Social and ecological systems are interconnected and impact natural resource management. Successful management of natural resources requires a thorough awareness of the intricacies of the relationship between humans and nature. Recognition that social and ecological systems are complex systems with multiple interacting stakeholders, values and circumstances. Therefore, adaptive governance emphasizes the importance of involving various stakeholders in decision-making. Collaboration and involvement of stakeholders

allows for better knowledge of the needs and expectations of each party, so that the resulting solutions can meet various interests (Wyborn, 2015).

Adaptive governance has its analytical basis in the ecological resilience theory of adaptive management. This approach emphasizes the need to face uncertainty in managing complex natural resources (Cosens et al., 2018). It was further argued that due to the uncertainty associated with global environmental change, including climate change and major changes in land use, future environmental governance systems must be highly adaptive. Governance systems, especially top-down, state-based ones, rarely match the relevant scale of ecological complexity, especially in the face of rapid environmental change (Cumming et al., 2006; Young, 2002). Centralized governance through top-down directives or command-and-control policies often fails to provide effective solutions to highly contextual situations, and also often fails in efforts to coordinate governance across large-scale ecosystems that cross multiple jurisdictional boundaries (Lemos & Agrawal, 2006). In response to this, more and more bottom-up approaches to governance have emerged through local actor groups, social networks, and various collaborations. Community leaders feel the need for alternatives to top-down government and new approaches to environmental decision-making and that found in the Adaptive Governance approach (Brosius et al., 2005; Weber, 2003).

Following the development of these ideas, adaptive governance emerged as a response to the demand for more holistic environmental governance solutions within the framework of complex socio-ecological systems. Apart from that, the concept of joint management (co-management) has influenced the concept of adaptive governance. The need for stakeholder involvement, cooperation, and involvement in decision making and resource management is emphasized in this model. Stakeholder participation is essential in the context of adaptive governance to make better decisions that include local knowledge, divergent interests and shared understanding. Adaptive governance seeks to integrate diverse views and ensure that choices taken take into account the needs and ambitions of all stakeholders through reciprocal interaction and engagement (Chaffin et al., 2014; Folke et al., 2005).

Of the many issues regarding environmental damage currently occurring, the environmental damage occurring at Lake Limboto, specifically in Gorontalo Regency, is the object of an urgent problem to be studied. How could it not be that Lake Limboto is currently in the "rescue" phase to restore the lake's function as a holding area for water flow from several large rivers that flow in Gorontalo Province. Limboto Lake is located in the central part of Gorontalo Province, namely in the Gorontalo City area and in the Gorontalo Regency area. Geographically, Lake Limboto is located in the central part of Gorontalo Province and astronomically, Lake Limboto is located at 122° 57' 40" - 123° 02' 14" E and 00° 31' 58" – 00° 34' 50" N. Limboto Lake is located in two areas, namely + 30% of the Gorontalo City area and + 70% of the Gorontalo Regency area which covers 7 sub-districts (Sulawesi River Region Hall/BWS II, 2019). Limboto Lake is a regional asset of Gorontalo Province which functions as a provider of clean water, plant and animal habitat, regulator of hydrological functions, prevention of natural disasters, stabilization of natural systems and processes, producer of biological natural resources, energy producer, means of transportation, recreation and sports, fishery sources (both aquaculture and capture fisheries), and flood control, as well as a means of research and education. Unlike other lakes, Lake Limboto does not resemble a natural pond, its surface is a large brackish area covered with aquatic flora such as lotus, water hyacinth, water hyacinth and others (Akbar et al., 2021).

The current conditions regarding the problems in Lake Limboto are actually almost the same as several lakes in Indonesia, but what is happening at Lake Limboto currently is considered by several experts who concentrate on conducting studies and research on Lake Limboto to be

worrying (Hasim, 2011; Nusantari, 2010). The rate of shallowing of the lake due to erosion from the rivers that flow into the lake is very large. In a period of 74 years (1932-2006) Lake Limboto was reduced to 3000 Ha with an average depth of 2.5 m, from the previous area of around 7000 Ha and a depth of 30 m. The shallowing of the lake causes the appearance of plains, both in the middle of the lake and on the edges of the lake (Balai Wilayah Sungai Sulawesi I I Gorontalo, 2019). Limboto Lake shows visible degradation from shallowing, pollution and occupation of the lake area by the community. Limboto Lake is a lake that has experienced heavy sedimentation and reduced area.

Institutional development is one of the main programs in lake management according to the Lake Limboto master plan. The institutional conception should also be embodied in the mission description, so that the concept becomes the ontological basis of the program. Thus, the ontological, epistemological and axiological threads of institutional concepts can be seen in the context of saving Lake Limboto. However, on the other hand, important institutional issues in the Lake Limboto master plan failed to be stated concretely in Regional Regulation (Perda) Number 1 of 2008 concerning Management of Lake Limboto, and Regional Regulation Number 9 of 2017, as existing policy legal products. Regional Regulation Number 1 of 2008 concerning Management of Lake Limboto, for example, does not clearly explain institutions, division of authority, roles of sectors and actors in the management of Lake Limboto. The coordination function of agencies and agencies that manage the environment at the provincial and district/city levels has not been explicitly explained. This mandate was then considered relatively weak for resolving complex problems in Lake Limboto, so it was relatively ineffective. On the other hand, institutions are important because they bring together various stakeholders and actors to coordinate. If we return to the concept of Governance, especially in the adaptive governance (AG) concept, it appears that there are things that have not been implemented, especially by the Regional Government of Gorontalo Regency in preparing governance related to the context of Lake Limboto management and this urgently requires an in-depth study to answer the phenomenon, which exists. The problems that occur are related to weak coordination, overlapping authority, structures that have not been integrated and the inability to maximize existing networks as a wicked problem that must be solved immediately. This can then be analyzed through the AG approach as expressed by (Berkes, 2008), that to see the implementation of adaptive governance itself, it must be seen from 3 features/attributes, namely the motivation and issues of each party participating in government governance; Next, there is a structure that focuses on discussing the coordination system that is built at both horizontal and vertical levels and a network that looks at how resource exchange occurs between stakeholders in government governance.

Several previous studies regarding adaptive governance have been carried out by several researchers, for example research conducted by (Mukhlis, 2017), with the title Government Governance in Increasing the Adaptive Capacity/Resilience of Bandar Lampung City. Furthermore, research was conducted by (Purifyningtyas & Wijaya, 2016) with the title Study of the Adaptation Capacity of Pekalongan Coastal Communities to Vulnerability of Rob Floods. Another research was also conducted by (Sagala & Simbolon, 2017) with the title Adaptive Capacity of the Regional Government of Indramayu Regency in Responding to the Impact of Climate Change. Some of the existing research has the same focus as the research in this paper, namely the use of the concept of adaptive governance, but there are several significant differences between several previous studies, such as the locus taken in this research discussing lakes and the concepts/approaches used in This research takes features developed by (Berkes, 2008). This is also what differentiates and shows the uniqueness of this article because it takes the Lake locus.

## Methods

The implementation of this research will use a qualitative deductive approach. The main reason for this approach was chosen because this study will seek to find out, describe, and analyze the reality of the events being studied, making it easier for the authors to obtain objective data to know and understand the adaptive governance capacity in the management of Lake Limboto in Gorontalo Regency. The technique of collecting data in this study uses observation techniques, interviews, Focus Group Discussions (FGD), and related data searches regarding Limboto Lake documents, research results, and other reports. Informants who will be interviewed in this study are determined by purposive sampling by looking at the suitability of the prospective informants with the required information. Related to this, informants and key informants who have direct contact with Limboto lake management policies include Regional Research and Development Planning Agency (BAPPEDA) Province and Gorontalo Regency, Public Works and Spatial Planning Office (PUPR) Gorontalo Province; Gorontalo Regency and Provincial Environment Office, Gorontalo Regency Village Community Empowerment Office, Gorontalo Regency Fisheries and Marine Service, Gorontalo Regency Agriculture and Plantation Office, Gorontalo Regency Tourism Office, Bone Bolango Watershed and Protected Forest Management Center (BPDAS), Regional River Basin Center Sulawesi (BWSS) II Gorontalo, Biota Community, JAPESDA Gorontalo, PT. Selaras Mandiri Sejahtera (SMS), PT. Bumi Karsa, NGOs observe Lake Limboto, academics/researchers attending Lake Limboto, and several community leaders in zoning the lake area. The data processing technique used is data reduction through data categorization and classification. Then, the pattern matching analysis technique (Yin & Robert, 2000), where the pattern that becomes the reference is the theoretical pattern of the effectiveness of network governance, namely trust, size, goal consensus, and the nature of the task.

The data analysis technique in this study uses the Spiral model popularized by (Creswell & W., 2017). In the early stages of data collection (data collection), both primary and secondary data and data are in the form of text and images. In the second stage, the process of reading (reading) and making notes (memoing) is carried out as a reflection of several answers to research questions. In the third stage, the recorded data is described, classifying, and interpreting all data based on context and categories. The last step is to represent and visualize by making conclusions that can be made in the form of a matrix/table.

## Results and Discussion

Lake Limboto in Gorontalo is currently included in the 15 priority lakes to be saved, because the condition of Lake Limboto has entered a critical phase. In fact, Lake Limboto is one of the natural resource assets currently owned by Gorontalo. The Limboto Lake system covers an area of 920 km<sup>2</sup> and around 23 rivers and tributaries enter the lake. Limboto Lake functions as a provider of clean water, habitat for plants and animals, regulator of hydrological functions, prevention of natural disasters, stabilization of natural systems and processes, producer of biological natural resources, means of transportation, recreation and sports, fisheries source (both aquaculture and capture fisheries), source of income, flood control, and as a means of research and education. Limboto Lake is an important part of the aquatic ecosystem which functions as a place for organisms to live, with several types of organisms. Referring to the current conditions, the depth of Lake Limboto has decreased drastically. In 1932 the depth of the lake was 30 meters, while in 2007 it was 2.5 meters. Over a period of 75 years, the depth of the lake decreased by around 27.5 meters (91.7%) or an average of 0.37 meters/year. Meanwhile, the area of the lake in 1932 was 8,000 ha to 2,5371 ha in 2007. This means that in the span of 75 years there has been a confinement of the area of Lake Limboto of 5,462.9 ha

(68.3%) or every year 72.8 ha (Akuba & Biki, 2008). A more detailed description can be seen in Figure 1.

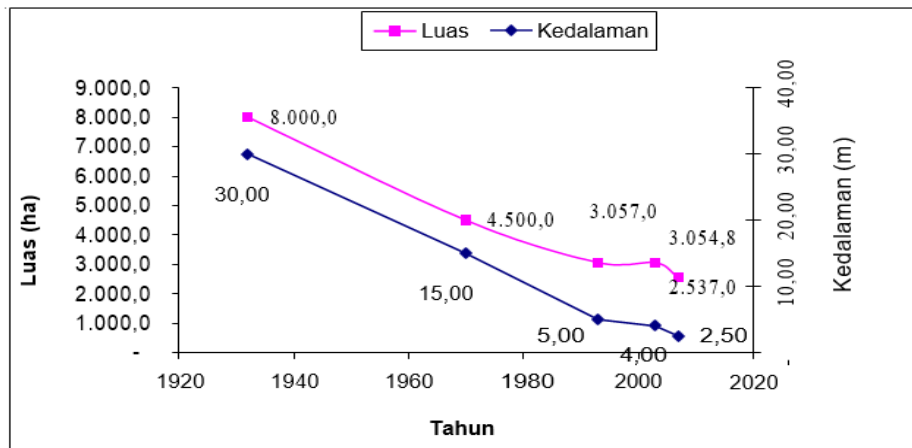


Figure 1. Dynamics of the area and depth of Lake Limboto until 2020

Source: Processed Secondary Data, (2023).

Based on the interaction relationship between the Limboto Lake problems, a problem analysis is in accordance with Ceberg Theory in the document issued by the Lake Community Movement (Germadan) (Kementerian Lingkungan Hidup Republik Indonesia, 2014), Limboto as presented in Figure 2, which shows the specific structure of the problem and main problems that must be addressed both short and long term.

The management of Lake Limboto carried out by the Gorontalo Government, especially in dealing with climate change which cannot be predicted, uses an adaptive governance dimension approach. This approach is then used to look at stakeholder motivation in the context of interests and power in influencing or at least contributing resources that are useful for lake management purposes, structures that are able to influence the stakeholder engagement process and coordination models and networks that determine the exchange of resources from each stakeholder.

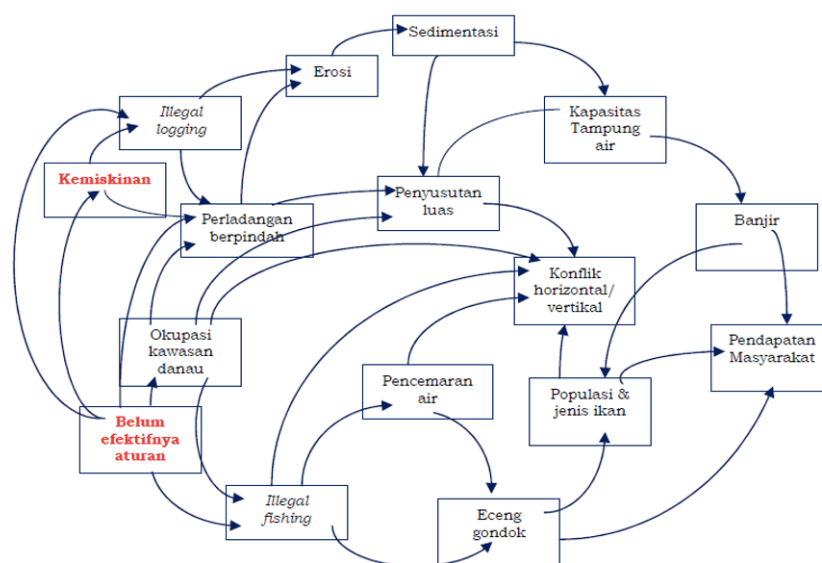


Figure 2. Causal Obscurity of Lake Limboto problems

Source: Secondary Data Processing, Germadan Limboto, 2014

## **Adaptive Governance Features in terms of Motivation/Issues in Limboto Lake Management**

The motivation referred to in the AG concept as expressed by (Folke, 2007) is the things that underlie related parties to carry out activities in a joint action in order to prepare for unpredictable environmental changes in the future. The motivation behind stakeholders influences the capacity of leading sector initiatives to incorporate new issues and transform them into activities as collective action, whether related to ecology, economics, social culture or the development of different collective actions in different situations. Different stakeholders may also have different Motivations for taking part in collective action.

Regarding motivation from the civil sector, findings obtained in the field show that the people around Lake Limboto still rely heavily on fishing for their livelihoods using traditional methods which are not environmentally friendly and can even damage the Lake Limboto ecosystem. This then becomes a challenge in itself in efforts to save Lake Limboto, whose environment, water function and other ecosystems in Lake Limboto have been greatly degraded. It is the task of the Regional Government of Gorontalo Regency to provide education and good perception for the people around the lake so that they can minimize the current damage to Lake Limboto, even though for the majority of people they do this regarding their economic lives. Several findings obtained by the author in the field also show that the activities of the Limboto Lake community are carried out at all times in this place, starting from fishing activities, buying and selling catch activities, restaurant businesses and other activities that are very closely related to the life of the existing community. on Lake Limboto

Apart from economic motivation, cultural motivation is a motivation that is deeply rooted in the community around Lake Limboto. The people around the Limboto Lake area believe that the existence of Limboto Lake is more than just a source of livelihood and water source in general. The function and role of Lake Limboto in people's lives is closely related to the form of culture which is a complex of ideas, notions, values, norms and other regulations in maintaining human relations with the environment as expressed by (Koentjaraningrat, 2000). In this research, it is known that there is strong interaction culturally and economically between the people around Lake Limboto and Lake Limboto itself who adhere to the values inherited from their ancestors. Regarding the motivation of the private sector in the context of the management of Lake Limboto, from the results of research research through interview observations and document studies, several data and facts in the field were obtained that the involvement of the private sector was more in motivation and economic issues and matters related to the revitalization of Lake Limboto itself. This can be seen from the activities that occur both upstream and downstream regarding Lake Limboto. In general, the results of the author's observations carried out in the Lake Limboto area show that the Lake Limboto area is only used by business actors in the restaurant business sector. Almost all around the lake area, which is spread across several sub-districts, there are restaurants that sell several types of fish produced from Lake Limboto, such as tilapia, tilapia, eel and several other types of fish. Other business sector activities apart from restaurant business actors around Lake Limboto are the activities of companies operating in the service sector in the Lake Limboto revitalization program. The Revitalization Project has been started since 2014 under the coordination of the Sulawesi River Region II Center in collaboration with the private sector, several companies with activity intensity from medium to high, such as the PT Selaras Mandiri Sejahtera (SMS) Company which operates in the construction sector and provides heavy equipment services. PT. SMS is also a contractor company in the fields of Water Resources (Dams and Irrigation) and road construction. From the data obtained by the author, the project work carried out by PT SMS is specifically to maximize the function of Lake Limboto through the dredging and

sediment control process, as well as an effort that functions to control floods covering an area of 2,914 hectares and increase the water storage capacity according to BWSS II Gorontalo. This project was carried out by PT Selaras Mandiri Sejahtera in collaboration with PT Bumi Karsa with a contract value of IDR 229.9 billion.

Several other companies from the data obtained are also involved in several Government Programs in the Revitalization of Lake Limboto, such as PT Tamael, PT Nindya Karya and PT Bumi Karsa. PT Bumi Karsa, for example, this company is involved in partnering with BWSS II Gorontalo in the revitalization of Lake Limboto. As one of the national construction companies in eastern Indonesia. Several types of work that have been carried out by PT Bumi Karsa regarding Lake Limboto include dredging work; Lake outlet canal work; Lake levee work; sediment control building work; bridge construction work and maintenance of access roads.

### **Features of Adaptive Governance in terms of Structure in Limboto Lake Management**

The concept of structure as one of the features of adaptive governance expressed by Berkes, is a model of coordination and cooperation of stakeholders to achieve goals and influence decision making (Berkes, 2008). The structure which is also identical in a policy network is intended to see the position of actors in the implementation of the policy network (Klijin & Koppenjan, 2016). Structure explains the pattern of relationships as seen from the position of each actor in working and interacting. In the context of Lake Limboto management, this structural concept is of course an effort made by the government as the leading sector, in this case the Regional Government, in maximizing strategic steps in dealing with environmental changes that are difficult to predict, especially related to the condition of Lake Limboto so that there is a collaborative approach between stakeholders. very forward.

Several policies related to the Limboto Lake problem, such as Gorontalo Several policies related to the Limboto Lake problem, such as Gorontalo Regent Decree Number 280/26/IV/2019 concerning the establishment of a forum for the Limboto Lake area, emphasize the existence of cross-sector coordination and cooperation efforts in saving and managing Limboto Lake. Apart from that, another important thing is how efforts to save Limboto Lake must be carried out by building synergy, participation and partnership between the public and the private sector. Structures and networks are things that support coordination and cooperation efforts in each horizontal and vertical dimension of the adaptive governance dimension. The concept of structure then as a social system is conceptualized and measured as a pattern of relationships between actors (Laumann & Knoke, 1987). Structure is identical to the patterns that characterize the network and also influence the way actors work and interact, so that with this relationship pattern we can see the structure and relationships between actors in the network.

In the context of Limboto Lake management, structure refers to the decision-making process and network that aims to solve problems in policy implementation. Thus, this concept focuses on the process of participation and deliberation to build a consensus with the aim of increasing cooperation and coordination efforts between various stakeholders. Because of this, a forum/platform for adaptive governance is very urgent in the process of implementing the rescue and sustainable management of Lake Limboto. The existing platform is then sought to facilitate the main strategy and coordination of planning and management of activities by delegates from several sectors of society (public, private and civil society) who then represent the needs and interests of stakeholders at different levels. Coordination can also be improved by developing social learning by transferring new knowledge and approaches in a collaborative system between leading sectors and other stakeholders at different levels. In highly complex

adaptive systems, this concept also encourages discussion between sectors and the production of new knowledge. The extent to which leading sector initiatives can build forums/platforms to coordinate management activities can also provide an indication of the level of their adaptive capacity (Berkes & Folke, 2003).

The study of the management structure of Lake Limboto has been carried out by researchers based on field observations of stakeholders related to the management of Lake Limboto and modifications to the results of research conducted by Hasim et al., (2012). Observation results show that there are 23 stakeholders who have an interest and influence in efforts to save and manage Lake Limboto in an integrated and sustainable manner (Table 1).

Table 1. Potential Role of Relevant Stakeholders in the management of Lake Limboto (Gorontalo Regency Government Context)

No	Stakeholders	Potential Role
1	Sulawesi River Regional Office II	Planning and Implementing the Development of Water Control Infrastructure
2	Watershed Management Center (BPDAS-HL)	DAS Planning and Monev
3	Regional Development Acceleration Planning Agency (BAPPEDA) Gorontalo Province	Macro planning and cross-sector coordination
4	Gorontalo Province Public Works Department	Planning and Development of Facilities and Infrastructure
5	Regional Environment and Research Agency BLHRD) Gorontalo Province	Planning, control and research related to the environment
6	Provincial Tourism Department	Cross-Regency tourism planning and development
7	Provincial Maritime Affairs and Fisheries Service (DKP).	Fisheries Sector Planning and Policy Formulation
8	Provincial Environment and Forestry Service	Planning, development and monitoring of forest areas
9	Gorontalo Regency Regional Development Planning Agency (BAPPEDA).	Macro planning and cross-sector coordination of Gorontalo Regency
10	Gorontalo Regency Public Works Department	Planning and construction of facilities and infrastructure
11	Gorontalo District Agriculture Service	Planning and development of the Agricultural sector
12	Gorontalo Regency Fisheries Service	Planning and development of the District's fisheries sector
13	Gorontalo Regency Environmental Service (DLH).	Environmental planning and control
14	Gorontalo District Community and Village Empowerment Service	Planning and Implementation of Community Empowerment in the Lake region
15	District Tourism Department. Gorontalo	Tourism planning and development

16	National Land Agency Kab. Gorontalo	Asset Planning and Recording
17	Limboto Lake Area Forum District. Gorontalo	Information Integration Forum Regarding Limboto Lake
18	Higher Education Institutions (PT), are involved in the problem of Lake Limboto	Support in providing data and information as well as scientific narratives
19	NGO: Japesda; Biota Foundation; Limboto Watershed Forum; Forum 45; Green Leaves NGO	Mentoring, Empowerment and Supervision
20	Upstream Community (agriculture)	Support through environmentally friendly agriculture
21	Lake Fishing Society	Support through environmentally friendly fisheries
22	Private Sector (PT SMS; Bumi Karsa; Tamael; Nindya Karya Gorontalo	Development of Infrastructure, Facilities and Infrastructure
23	All Relevant Ministries	Macro planning and implementation related to aspects of saving and managing Lake Limboto

*Source: Research interpretation results after processing (2023)*

Furthermore, based on the results of the analysis obtained during the research, both through interviews and FGDs with informants, the researchers designed the form of structure and network that was formed based on an adaptive governance perspective. The involvement of multi-stakeholders in the context of saving and managing Lake Limboto can be seen from the analysis of the types of involvement, responsibilities, functions and resources of each stakeholder. From the results of research regarding the involvement of stakeholders in efforts to save and manage Lake Limboto, it was found that the civil sector, in this case the community and NGOs, in terms of cooperation so far, have been positioned as parties that are needed to carry out consultations and participate in the implementation of programs related to the management of Lake Limboto. Although the results of interviews show that civil society, especially NGOs, feel that the activities carried out are just repeated over and over again without any further real action. The many discussion forums facilitated by the Regional Government have so far been considered by some civil parties to end discussions only in those forums, so that their input seems to have only been recorded without being followed up with subsequent programs. Regarding the structure that emphasizes the involvement of stakeholders, especially communities that fall into the public sector category, a phenomenon was found that occurred in the community, especially in the Limboto Lake area, where some people felt they had not been actively involved in the management of Limboto Lake itself, so that several emerge. statements from the local community who think that the affairs/problems of Limboto Lake today are only the Regional Government's business and they are only following what the Regional Government will implement. On the other hand, most OPDs such as the Department of Fisheries, Maritime Affairs, the Community and Village Empowerment Service, the Agriculture Service and the Gorontalo Regency Bappeda stated that it is also difficult to explain the culture of the people in the Lake area regarding efforts to preserve the Lake, such as efforts to prohibit occupation, catching and cultivating fisheries that are not environmentally friendly, throwing rubbish around the lake, building settlements and other things that some people have done up to now which has accelerated environmental degradation in Lake Limboto.

The picture of the phenomenon that has been explained is related to synergy and coordination efforts between the civil sector and regional government, which still shows less than optimal ties in its implementation, especially from the civil sector, in this case the community around Lake Limboto, which is considered to be a party that has contributed to the occurrence of environmental degradation in the Lake, whereas the concept of adaptive governance emphasizes how the target group, in this case the community, must be actively involved in the sense of supporting environmental resilience programs in conditions whose changes cannot be predicted. Although in general in the context of governance, society as a party in the category of limited authority due to the resources they have cannot necessarily be blamed because in the context of the structural approach to the civil sector in the realm of consultation, it has an impact on the weak power of this type of stakeholder in influencing decision making due to their limited access to the flow. decision making, especially the sorting of capacity levels and the variety of issues in the civil sector, directly limit the possibility of producing new knowledge (Folke et al., 2005).

In contrast to the civil sector, the type of private sector involvement in the context of Limboto Lake management has so far been more directed towards forms of cooperation related to work contracts. For example, several companies such as PT SMS, PT Bumi Karsa have been assigned the task of carrying out revitalization projects in the form of dredging projects, building canals, embankments, sediment control buildings, bridges and road maintenance along the Lake Limboto area, which have collaborative relationships with the Directorate General of Water Resources and also BWS Sulawesi II Gorontalo. These companies have started operating since the Limboto Lake Revitalization project was implemented in 2012 with a current budget of approximately 1 trillion Rupiah. From the results of observations by researchers in the field, the activities carried out by several of these companies are mostly related to the procurement of heavy equipment and several other tools in an effort to revitalize the Lake area. Apart from that, several experts were also involved from these companies. As a result of interviews with BWSS II Sulawesi, information was obtained that the company carrying out this revitalization project was the winner of the tender held by the center and that its party, as the leading sector in Lake infrastructure issues, coordinated with the company to determine the technical matters that would be built in the area. Limboto Lake.

The next context is the Government sector which involves several Regional Government organizations at different levels of authority. In the concept towards adaptive government as explained by Plummer & Armitage, (2010) there will be many components that will be involved and of course they must be active in realizing programs that have been designed in very complex dimensions because each of them has the resources to carry out this realization. The complexity of authority that occurs in the management of Lake Limboto itself from the secondary data obtained shows that one of the things that has not been discussed until now is the issue of integrated institutions. Provincial Regional Regulation Number 1 of 2008 is a legal product for the local level whose spirit is how related parties can work together to save Lake Limboto. In terms of considerations from the Regional Regulation, it is then explained that the management of Lake Limboto needs to be implemented in a comprehensive, integrated and sustainable manner by actively involving the community. It was further explained that lake management requires legal certainty and clarity of responsibilities between stakeholders so that lake management can be carried out effectively and efficiently.

Based on several phenomena that have been explained previously, the Government sector as the leading sector is the party that plays an important role in terms of the adaptive governance structure, apart from the fact that the Government has the authority to make policies in the form of technical programs, the Government also holds budgetary power to carry out related

activities. with the management of Lake Limboto, unfortunately problems of coordination and synergy are still obstacles to maximizing the program's achievements. On the other hand, the private sector, especially those in the core area of Lake Limboto, has taken a role in participating in the infrastructure development process in the Lake Limboto revitalization project. The civil sector, in this case the community, is faced with a problem regarding the use of the lake which ignores the conservation values of Lake Limboto itself. The community is expected to actively participate in preserving the lake and not be the perpetrators of environmental degradation of the lake. So far, the role of NGOs, which are considered quite active and have often provided input to the Gorontalo Regency Government, should be maximized as supervisors and community assistants who can provide environmental education and empowerment programs related to Lake Limboto.

If depicted in a simple chart regarding the management structure of Lake Limboto regarding the involvement of parties in the adaptive governance feature, it can be seen that the Gorontalo Regency Government plays an important role as the leading sector for lake management in accordance with the authority given in Regional Regulation Number 1 of 2008 concerning the management of Lake Limboto and Regional Regulation Number 9 of 2017 concerning the Spatial Planning for the Lake Limboto Strategic Area, this leading sector position can then be utilized by the Gorontalo Regency Government by directing all OPD related to the resources they have in terms of budget, infrastructure facilities and governance management.

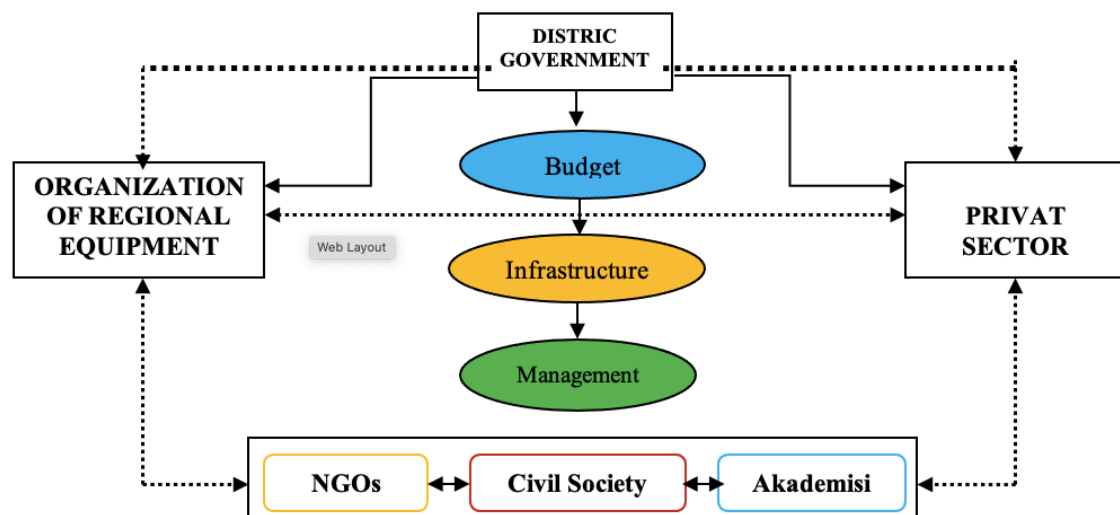


Figure 3. Structural Model Design Based on the Adaptive Governance Approach Limboto Lake Management

The private sector's position is to support the Government's system in efforts to revitalize lake management and can synergize with the civil sector in activities related to efforts to save the lake. Even though the research results show that this interaction is still weak, it is hoped that this can be realized, because after all the role of the sawsta sector is really needed because it has resources that can be used, especially those related to providing infrastructure technology. On the other hand, the civil sector, especially the community category, must receive special attention because apart from being one of the objects most damaged by Lake Limboto, the community also has an important role in maintaining and actively participating in efforts to save the lake, with support and guidance from NGOs and education from the academic community. People living around the Limboto Lake area/zoning can be directed to understand the conditions for rescue and management. The most important thing that was found regarding coordination in the existing structure was the lack of a sense of togetherness for efforts to see

the lake as a big work that must also be executed together starting from the central level down to the community at the lowest level. Everyone carries out their work and programs according to the provisions of their respective responsibilities, resulting in a lack of synergy between existing programs. Several informants interviewed by researchers then agreed that a common vision was needed to see Lake Limboto as a collective responsibility and a strong principle of integrity was needed, whether it was in a strong institution in the form of a forum to unite all existing interests.

The concept of adaptive governance in terms of structure to express the readiness and alertness of the Gorontalo Regency Government in anticipating unpredictable weather changes and their impact on the environmental conditions of Lake Limboto is believed to be well prepared if the problems of coordination, synergy and collaborative efforts across sectors, across levels, can be found. standard and sustainable patterns so that it is hoped that the Gorontalo Regency Government can show resilience in facing changing conditions that can occur at any time.

### **Features of Adaptive Governance in terms Network in Limboto Lake Management**

The next adaptive governance feature is networking. Networks are an instrument that combines several actors to work together and interact to achieve common goals (Kickert et al., 1997; Kooiman, 1993; Rhodes, 1997). The network in question is a pattern formed from multi-stakeholder involvement in the management of Lake Limboto in Gorontalo. Networks in adaptive governance, as stated by Berkes (2008), are interpreted as a forum in which there is a process of exchanging resources owned by each stakeholder.

The results of research in the field show that each sector's involvement in the management of Lake Limbot is within the management and preservation of the lake itself, meaning that lake problems are the shared responsibility of each party. The exchange of resources in the network is determined by the position of each stakeholder in the platform structure that is formed and influences the stakeholder's obligations in exchanging resources. The stronger the stakeholder's position in the structure, the more bound the stakeholder is in the distribution of resources in order to produce new knowledge and the consensus that is formed. Related to the exchange of resources that has occurred in the management concept of Lake Limboto so far is the lack of education for the community around the lake itself in understanding the conditions of environmental degradation that have occurred. On the other hand, it seems that the placement of the community as program objects so far by the Regency Government has resulted in apathy towards being able to contribute to saving the lake. The results of interviews with several local communities illustrate that their real involvement is still lacking in the efforts made by the Gorontalo Regional Government, only activities that are meetings with the same content make them seem to accept what the Regional Government will do next.

Apart from local communities, NGOs also have a big role in disaster mitigation because they are considered capable of bridging community interests with government institutions or private stakeholders in policy processes. The existing NGOs resources are also people who understand environmental concepts and lake problems because those in them are none other than the majority of the academic community from several campuses in Gorontalo. This fact can also be seen from the point of view of the flow of institutionalization of social interests, with the consolidative function that NGOs have, they can actually summarize the interests of communities that are geographically spread across several separate areas, therefore, the routine of exchanging information across communities as well as the community and other parties can

be pursued by NGO mobility resources that can move in the social space dimension and in the policy dimension (Herren Gemmill & Bamidele-Izu, 2002).

Private sector activities, especially in the work on the Revitalization project which started in 2014, were carried out after a work contract was implemented jointly in this case in several related ministries, namely the Ministry of Public Works and Public Housing, through the Directorate General of Water Resources in coordination with the Sulawesi River Basin Center II Gorontalo. PT. SMS, for example, has resources in the form of heavy equipment facilities to carry out dredging to restore the depth of Lake Limboto and remove materials that cause sedimentation at the bottom of the lake. Apart from that, the experts we have are good capital for the lake revitalization work process. From field investigations and interviews with several parties related to the presence of private parties in the management of Lake Limboto, it shows that up to now, private silver has not had a negative impact regarding the exploration of Lake Limboto itself, because the condition of the lake is currently purely a buffer zone. , conservation areas and areas whose existence is strictly guarded by the Government. Opportunities for companies or corporations to exploit the existence of the lake for private interests are almost minimal. This fact shows that in terms of exploiting the potential that exists in the lake economically it has not attracted the private sector to invest in the development of Lake Limboto. Even though Lake Limboto in terms of tourism potential is very promising if there is a desire to do so. However, again, the existing condition of the lake, which is currently in a critical phase in terms of the lake's environment, makes entrepreneurs seem reluctant to do this.

The next Regional Government sector is the most comprehensive party in terms of the resources it has. Apart from its position as a policy maker and determiner for all matters related to programs for managing and saving Lake Limboto, the Government, both the Gorontalo Regency Government but also the Provincial and Central Governments, also play a role as implementers in the execution of existing programs from each work unit. The data obtained shows that the public sector is the owner of key resources for management and saving measures for Lake Limboto. With all the authority that the Government has as the leading sector, they can actually design existing patterns because the governance process whose umbrella is policy is in their position. The programs established by the relevant OPDs pave the way for implementing efforts to manage and save Lake Limboto, with the support of existing budgeting resources of course they can expedite the existing programs. Likewise, related to the Government's attitude in minimizing damage to the Lake, both that which occurs naturally due to climate change and damage that occurs due to human intervention that occurs around the Lake area, close monitoring of these phenomena and activities can be carried out and the Government can act to issue strict sanctions. if there is behavior that violates the limits that have been set in an effort to prevent damage to Lake Limboto.

## Conclusion

Motivation and issues as a feature of adaptive governance (AG) between sectors, both civil, private and government, each have the same desire in managing Lake Limboto, namely efforts to maintain the existence of Lake Limboto as a conservation area, water reservoir, source of livelihood, flood control , and other things related to efforts to save Lake Limboto so that we found the same motivations from each sector, but there was something that was found from the research results that the community's motivation regarding activities at Lake Limboto sometimes did not pay attention to the environment of the Lake itself so that many activities were found that actually accelerated environmental degradation in Lake Limboto itself. The Lake management structure as an AG feature from the results obtained shows weaknesses in terms of coordination and synergy of programs related to Lake management, especially between the civil sector and the Government. This happens because a standard structure for

Lake management has not been found so far and in addition, Lake responsibility matters are very complex at various levels of government authority, even ineffective program coordination and synergy also occurs between regional apparatus organizations (OPD), especially in the Regency Regional Government. Gorontalo. The implementation of the network as a feature of adaptive governance by looking at the flow of resource exchange from each sector is also not yet effective, especially in the civil sector, where each party plays a role in lake management. Continuous weak communication has led to a breakdown in relations between the two sectors after planning was developed in several forums that invited the community to discuss, sometimes only limited to formal activities and not involving the community. So it seems that the resources owned by each sector are not utilized in the management of Lake Limboto.

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