A stakeholder analysis of sustainable mangrove management in Kwandang, Sub-district of North, Gorontalo District

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Abstract. Stakeholder analysis is a necessary step to design sustainable mangrove management. Such analysis was conducted to identify related stakeholders that involve in the initiative. The purpose of this study was to identify and map the stakeholders in sustainable mangrove management and describe their role and main duty. The research was conducted in Kwandang sub-district of North Gorontalo District. In this study, we found 13 stakeholders consist of 6 key players, 2 subject and 4 context setter. Stakeholder's analysis is an effective approach to identify and map interest and power of each actor prior to designing a mangrove management program. The status of each actor can be used as an input for developing and designing the management system that can fulfill interests and needs of each actor. It will also ensure that the design can be actually implemented in the ground.

Keywords: stakeholders analysis, sustainable mangrove management

1. Introduction
Mangrove management in sub-district Kwandang of North Gorontalo district was governed by related stakeholders from the central government up to village level. Mangrove serves different types of environmental services and usually involves numerous stakeholders in its management directly or indirectly. However, current management has yet to be optimal due to lack of coordination among stakeholders and disconnected linkage between work plans and mangrove management. Stakeholders play an important role as the institution responsible for the successful implementation mangrove management. Therefore, it is necessary to identify and map roles of each stakeholder to be able to implement best practices according to sustainable development concept.

Kartodihardjo et al. [1] proposed that the institution is a human innovation to manage or control an interdependence sources between human and state of affairs. The power and quality of an institution play a significant role in sustainable mangrove management as the component of management objectives [2]. It is also in line with sustainable coastal management which aimed at achieving economic benefit and at same time preserving the environment with an integrated plan and implementation by related stakeholders [3,4,5].

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Brown [6] narrated that stakeholder analysis is a collection of information from individuals or groups that have influence to decide, classify information and assess conflict between related groups. Race and Millar [7] reported that stakeholder analysis is useful to identify the most impacted groups or communities from a development program. DFID [8] proposed five situation analysis elements as mentioned in the DFID Sustainable Livelihood Guidance Sheets including:

- define and identify key stakeholder influence
- define and identify the characteristic of key stakeholder
- assess things that might influence or be influenced by reform
- understand the connection between stakeholders including real and potential conflict and stakeholder expectations
- assess capacity of each stakeholder to influence reform process

Adger and Luttrell [9] reported that mangrove management is a collaborative activity that involves many actors to control in the planning, management and use processes. Stakeholders are those who have the right and interest in the system including individual, community, group of community or organization [10]. Golder et al. [11] defined stakeholder as several individuals, groups or institutions that connected due to natural resources from a development area and potentially influenced by the activities where each actor may or may not obtain benefit when changes or no changes take place. The stakeholder can be also defined as individual, organization, formal group and user directly and indirectly impacted in the natural resources management system [12]. A stakeholder is public and private groups in the community that is interrelated with shared needs and values, show themselves as organized groups to formulate their interests by various methods [13]. Stakeholders can also be defined as groups or institutions that have attention and or influence the outcome of an activity [14,15,16] stated stakeholders as people, groups or institutions that are influenced by or can influence the achievement of a project. The purpose of this study was to identify and map the stakeholders in sustainable mangrove management and describe their role and main duty. In this study, we explore individual or groups which are influenced by or can influence decision making or program implementation.

2. Method
The research was conducted in Kwandang sub-district of North Gorontalo district from January 2018 to August 2018. Data were collected by conducting in-depth interviews with the thirteen key informants as respondents. Bungin [17] proposed that the peculiarity of in-depth interviews is involvement and understanding of the informant’s real condition. We also conducted Focus Group Discussion (FGD), observation, document and literature review. Respondents were selected using the snowball sampling method including from regional and district governments, academia, non-governmental organizations and local community. Secondary data was collected by examining assignments, responsibilities and authorities of each actor in addition to further information obtained from literature review relevant to our research.

Grimber [18] stated that stakeholder agendas can be observed from, among other things, stakeholder interests, potential impacts, relative importance, and group influence. Eden and Ackermann [19] classified stakeholders also by estimating degrees of importance and influence. We analyzed data by using quantitative stakeholder analysis [20,21,22]. A quantitative stakeholder analysis was used to explain the stakeholder’s involvement in the program, power and interest in supporting the objectives of sustainable mangrove forest management. Reed et al. [22] suggested four categories of stakeholder including:

1) subject stakeholders are defined as stakeholders with high interest but low influence
2) key players are stakeholder who has high interest and high influence
3) Context setter stakeholders are stakeholders with low interests but have high influence
4) Crowd stakeholders are stakeholders with low interest and influence

We used qualitative analysis based on interviews, FGDs, and secondary data according to procedures proposed by Reed et al. [22] including:

a. List of stakeholders, obtained from results of observations, government, the community and survey
b. Interest can be identified by examining expectation and what can be obtained by stakeholders
c. The influence of stakeholders on the success or failure of activities is measured using parameters if they have the ability to veto a decision (high influence) and/or have no ability to influence goals (low influence).

In this study, we used quantitative stakeholder analysis to analyze stakeholders involved in the program, power and interest of each stakeholder in supporting the objectives of sustainable mangrove forest management.

| Table 1. Research objectives, analysis method, variable and data source |
|----------------------|------------------------|-------------------|-----------------|
| Objective | Analysis Method | Variable | Data source |
| Identifying and mapping stakeholders in sustainable mangrove management in North Gorontalo District | Stakeholder analysis (Reed et al. 2009) | - Actors involved in sustainable mangrove management in North Gorontalo District | Forest Management Unit IV of North Gorontalo, Local office of environmental services, Local office of marine and fisheries department, Regional Planning Agency of Gorontalo district, District house of representative of North Gorontalo, Water police department, University, nongovernment organization, Village administration, Watershed and protected forest management Agency, Private sector, local community, Local unit of Indonesian Army (Koramil) |
| - Roles of actors | - Interest of actors | - power of actors |

3. Results and Discussion

**Stakeholders identification.** Data analysis from the respondent interviews and literature review shows that there were 13 stakeholders involved in sustainable mangrove management in north Gorontalo district including 1) Forest Management Unit IV 2) local environmental services 3) local maritime and fisheries service 4) Regional Planning Agency (BAPPEDA) 5) local house of representative 6) water police unit 7) university 8) NGO 9)village administration 10) local watershed management unit (BPDASHL) 11) Koramil 12) private sector 13) local community

**Stakeholder mapping.** We observed that each stakeholder has a different interest and power in sustainable mangrove management. We obtained this result based on key informant interviews and analysis on each stakeholder's responsibility (table 2).
**Table 2. Responsibility of each stakeholder**

| Nr | Stakeholder                                                                 | Responsibility                                                                                           |
|----|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 1  | Forest Management Unit IV of North Gorontalo (KPH IV GORUT)                  | To implement government responsibility related to forestry affairs                                      |
| 2  | The local office of environmental services (DLH GORUT)                       | To develop and implement the local policy of the environment                                              |
| 3  | The local office of marine and fisheries department (DKP)                    | To Formulate technical policy under its authority, oversee pond land allocation, permit administration and fisherman training. |
| 4  | Regional Planning Agency of Gorontalo district (BAPPEDA GORUT)              | Develop and implement regional development planning                                                      |
| 5  | District house of representative of North Gorontalo (DPRD TKT II GORUT)      | a. To develop local policies in collaboration with regent b. To monitor local policy implementation       |
| 6  | Water police department (SATPOL AIR)                                        | To execute government responsibility related to marine and coastal security                              |
| 7  | University (PERGURUAN TINGGI)                                               | To implement the three-pillar of higher education                                                        |
| 8  | Non-government organization (LSM)                                           | Contribute to management, preservation and utilization of mangrove ecosystem                           |
| 9  | Village administration (PEMERINTAH DESA)                                    | To create an institution development plan and watershed management monitoring (Minister of Forestry Regulation P.15/Menhut-II/2007). |
| 10 | Watershed and protected forest management Agency (BPDASHL)                  | To collaborate with government and private sector to utilize and sustain the mangrove ecosystem           |
| 11 | Private sector (SWASTA/PEMILIK MODAL)                                       | The subject of mangrove ecosystem management Provide inputs to the government on mangrove ecosystem management |
| 12 | Local community (MASYARAKAT)                                                | To implement territorial and community security including on geographic, demographics and social to establish territorial, tools and conditions which enable strong national defense |
| 13 | The local unit of Indonesian Army (KORAMIL)                                 |                                                                                                          |

Analysis of responsibilities and main duty is necessary to observe the authority of local government organizations and communities in the management. It allows also the identification of interests and power of organizations in mangrove management of North Gorontalo District. Main duty determines the pattern of coordination between official agencies and it shows rights and responsibilities of the organizations including its involvement in the program. Uphoff [23] reported that the performance of an institution can be measured through variables for example how the institution can complete its main tasks. Identification of stakeholders related to the management found that there was overlapping authority between actor in the program due to lack of coordination between institutions and lack of strategic work plans. In general it is important to develop and implement a systematic policy or program in management [25]. Golder and Gawler [11] reported the importance of program design stage of targeted activities. Further, he also stressed the critical of program definition prior to its further design. The matrix of stakeholders map based on the level of interest and power in the sustainable mangrove management in Kwandang district is presented in figure 1.
The stakeholder’s position obtained from the analysis can be used as inputs for planning processes to determine the participation strategy. In general participation strategies can be done through sharing information or one-way communication, discussion, involvement, collaboration or empowerment [26]. Wilcox [27] outlined five forms of participation strategy including information sharing, consultation, collaborative decision-making, and supporting the interests of independent communities where participation strategies are used in accordance with the needs and positions of each stakeholder.

**Table 3. Interest and power of the stakeholders**

| Nr | Stakeholder                                           | Interest       | Power                                                                 |
|----|-------------------------------------------------------|----------------|-----------------------------------------------------------------------|
| 1  | Forest Management Unit IV of North Gorontalo          | High           | High due to its authority on forest land use planning                  |
| 2  | The local office of environmental services            | High           | High due to the authority to coordinate environmental monitoring     |
| 3  | The local office of marine and fisheries department   | High as the coordinator for local development management    | High as the policy maker                                              |
| 4  | Regional Planning Agency of Gorontalo district        | High as the implementer of local policy                      | High due to the authority as the local development planning          |

**Figure 1.** Matrix of stakeholders map based on the level of interest and power in the sustainable mangrove management in Kwandang district (Source: Primary data, 2018)
| Nr | Stakeholder                                           | Interest                                                                 | Power                                                                 |
|----|------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
| 5  | District house of representative of North Gorontalo  | High as the authority to monitor local program and activities             | High due to influence on spatial planning                              |
| 6  | Water police department                              | Low, the main interest is to secure forest and coastal area               | High due to its authority to protect the forest and coastal area and law enforcement |
| 7  | University                                            | Low, the focus is on research and extension to the community              | High as they can involve in training and consultation                  |
| 8  | Non-government organization                          | High, they can involve in public services development                    | High                                                                  |
| 9  | Village administration                               | High, they are responsible to improve community welfare and protect the village area | Low due to limited facility                                           |
| 10 | Watershed and protected forest management Agency     | Low, their main responsibility is to maintain the watershed area         | High due to related policy, mangrove programs and activities          |
| 11 | Private sector                                       | Low, their main interest is to obtain an economic benefit                 | High since they have the capital that can be used as power tools     |
| 12 | Local community                                      | High, as they can benefit from natural resources                         | Low as they have no access to policies                                |
| 13 | The local unit of Indonesian Army (Koramil)          | Low                                                                      | High as they have the responsibility to defense nation in general    |

Supporting mangrove management can be done if the main responsibility of stakeholders is accompanied by a clear strategic work plan. In addition, coordination among stakeholders needs to be improved to establish inter-stakeholder relations which in turn will lead to an agreement and understanding of the concept of sustainable mangrove management.

4. Conclusions.
Our analysis identified 13 stakeholders are involved in sustainable mangrove management in the North Gorontalo District. We also observed that based on power and interest matrix, key players and subject stakeholders play a major role in the initiative. The stakeholders have been recognized as useful actors to support program implementation, thus good relationship should be maintained to obtain their contribution.

The initiative has to protect the interest of the local community and village administration as the most impacted actors. Increasing awareness of these actors on the importance of mangrove ecosystem as live support system can be done to involve them in the sustainable initiative. These actors can collaborate to empower subject stakeholders to achieve the goal of the program. Actors categorized in this quadrant were considered as critical player due to high power and interest on the success of management implementation.

5. Recommendation.
Key actors play a vital role in sustainable mangrove management, thus coordination and synergy of stakeholders including the Ministry of Environment and Forestry, Ministry of maritime and Fishery,
Regional Planning Agency (BAPPEDA) and related actors need to be enhanced. This is to ensure the proper development of sustainable mangrove management plan. BAPPEDA as the responsible agency for planning at regional level has to develop regulations on sustainable mangrove management. The key actor role is not limited to program development only but also they have to involve further in monitoring and evaluation. Monitoring can be done through routine agenda or based on incentive mechanisms for stakeholders who are implementing sustainable mangrove management. Stakeholders under subject category should act as counselors and data providers for key players in the initiative.

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