

# Design of Institution for Participatory Lake Singkarak Management

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## Abstract

This research aims to formulate policy and institution for Participatory Lake Singkarak management. This research was conducted in District Solok and District Tanah Datar, West Sumatera Province. This study object is focused in Lake Singkarak area. The results of research are: (1) interest and influence of stakeholders are varied based on institution, need, region, utility orientation, (2) policy alternatives for lake Singkarak management are firstly co-management and secondly lake management by multi stakeholder and (3) all stakeholders in the institution for lake management have to participate beginning from institutional building, policy decision making process, policy implementation, control and evaluation.

**Keywords:** Singkarak lake, Sustainable management, Stakeholder, Institutional, Participatory

## 1. Preface

As an open access resource, lake tends to be exploited without sharing concern about its sustainability. The overuse of lake often raises conflicts of interest and authority harming its sustainability (Ginting, 1998). Furthermore, lake is a significant component in balancing system of land use, water use, air use, and other resources (Haeruman, 1999) as well as life support, water reservoir and keeps balance of ecosystem (Hamarung, 1999).

Lake Singkarak, located between Solok district and Tanah Datar district, West Sumatera province, has an area 112.20 km<sup>2</sup>. It is surrounded by 12 nagaris (customary institutions). In a customary law, those nagaris have property rights of the lake; (1) higher forest ulayat refers to open uncultivated land called land of nagari or forest of nagari. This land is mainly located in watershed of Paninggahan river, and (2) lower forest ulayat refers to land cultivated by people of nagari.

Recently Lake Singkarak has been utilized for needs of domestic, agriculture, aquaculture, industry, recreation, aesthetic, and energy resource. The absence of integrated law in utilization of Lake Singkarak harms its sustainability (Bapedal & UNP 2000). Even worse, Lake Singkarak doesn't have integrated management by various agencies like Water Resource Agency, Forestry Agency, Fishing Agency, Agriculture Agency, Tourism Agency, hydro-powered plant and people.

Lake Singkarak area has been utilized by Solok district for tourism and agriculture (Fauzi, 2002). Environmental and cultural oriented tourism policy has been established to improve welfare of people around the lake. Local government of Tanah Datar district says that the problem in Lake Singkarak area is complex as it regards development impact and nature condition. Environment Impact Management Agency (Bapedalda) West Sumatera province has an interest to monitor quality of natural resources in Lake Singkarak. Water Resources Management Agency (PSDA) manages data of water resources, water quantity and allocation, water quality, flood administration, operation stabilization, infrastructure maintenance and other water resources, institutional improvement and funding arrangements.

Water of Lake Singkarak has been utilized directly or indirectly by many enterprises. Hydro-powered plant uses the water to move turbines. Agriculture and fishing agencies use water along Batang Ombilin watershed. Other enterprises are tap water company (PDAM) Talawi Sawahlunto and PT Bukit Asam.

High utilization of space around the lake has negative impacts, such as liquid and solid waste coming into the lake. It causes changes of water quality and lake ecosystem, particularly completeness of food chain and lake natural energy. Huge contribution of solid waste coming into the lake is caused by the absence of waste management facility and infrastructure around the lake. Low quality of human resources results in poor understanding of the importance of lake ecosystem sustainability in the future (PSLH, 2002).

All sort of those activities bring about problems to the lake such as (1) declining water level down to 360,0 from 361,0 m above sea level in dry season causes water plants death in littoral area, resulting disappearance of fish spawning habitat (Syandri dkk, 2002); (2) changes of water quality such as raising of pH level, temperature, changes of color and scent (Arbain, 2002); (3) increasing critical land averagely 1,029.2 acre per year has impacts on water supply, agriculture pattern, land erosion, (Arbain, 2002); (4) decreasing fish population down to 77, 84% (416, 90 tons) from 542, 56 tons (Syandri, dkk, 1998) gone beyond maximum limit of exploitation 60% (Aziz, 1989); and (5) farm expansion and forest decrease (PSLH, 1992).

Process of policymaking without taking sectors interrelatedness and public participation into account in the past caused those problems. Environment management has two key words; integrated and sense of belonging (stakeholder participation) (Hamarung, 1999). Participatory approach requires participation, cooperation and collaboration of stakeholders (Wells, Brandon dan Hannah 1992; Haeruman 1996).

Lake damage has infringed upon lake ecosystem balance. Improper management will hamper ecological, social and economical functions of the lake. Regarding the damage, holistic participatory institutional structuring, law and cooperation among lake managements are needed to accommodate stakeholder's interests and provide clarity of each other's tasks and duties (Hamarung, 1999).

Disintegrated management of Lake Singkarak and management policy limiting public participation caused ecosystem damage. Lake institution to regulate lake management hasn't been established (Bapedal and UNP, 2000). Therefore, a research on lake institution accommodating stakeholders' interests is needed to prevent ecosystem damage and guarantee lake resources sustainability.

Demand to develop lake management institution is in line with Law No. 7/2004 on water resource. It states government can establish an institution in form of 'water assembly' or other similar form as coordinating institution inter stakeholders. However, the law doesn't state rule of game of the 'assembly', therefore this research can be a concrete form of the law message.

As a public owned resource, lake is managed by various parties. As a result, lake damage has impacts on various parties, as well. Hence, cooperation in managing the lake is needed in the form of lake management institution. Based on these, a formulation on the form of participatory institution to manage Lake Singkarak is needed by taking lake condition, stakeholders, stakeholder's interests into account. Besides, it also needs agreement on mechanism of institution to perform its duties and functions for sustainable lake management.

The purpose of this research is to formulate policy and management institution of participatory Lake Singkarak management. The objectives of the research are (1) identifying and mapping stakeholders' interests in utilizing Lake Singkarak, (2) determining policy to manage Lake Singkarak sustainably, and (3) formulating participatory rule of game of Lake Singkarak managing institution.

## 2. Research Methodology

Research was conducted in Solok and Tanah Datar districts, West Sumatera province. Object of the research is focused on area of Lake Singkarak. Time of field research is from 2008 until 2010.

This research aims to formulate policy and institution for participatory Lake Singkarak management. To formulate the policy and institution, participatory approach was used by involving all local stakeholders; sub district, district, province. Detail of research phases in Figure 1.

Data used in the research are primary and secondary data. Primary data was obtained from direct observation in research sites, while secondary data was obtained from related agencies. Data collected ranges from statistic data, potential of the region, related research, master plan, policy, and other processed data. Primary data was taken from interview, questionnaire, and discussion with main stakeholders and public.

Stakeholder analysis, AWOT analysis (integrated analytical hierarchy process-AHP) and SWOT analysis (strengths, weaknesses, opportunities, threats) were used to analyze data. FGD with Gross root level (JISAMAR) and focus group discussion were used to formulate policy.

Stakeholder analysis is a system to collect information about a group or an individual, to categorize information, to explain possibilities of conflict among groups and condition which allows tradeoff. Process determining stakeholder was done by using participatory approach with snowball technique in which each stakeholder identifies other. Interview was done to find out each stakeholder's interest. The result of interview would be used to formulate policy and rule of game of institutional management of Lake Singkarak.

AWOT is aimed to identify problems and help make decision to choose the best strategy. It started with SWOT factors analysis, continued with AHP. AHP would help SWOT analysis elaborating situational decision in order

to prioritize alternative. Data was processed using computer based data processing Expert Choice 2000; a system software supporting methodology decision making AHP.

Collective grassroots appraisal (Jisamar) is a method to study condition and people's way of life. It is developed from participatory rural appraisal (PRA) technique. Jisamar was used to get information on social, economy, ecology in Lake Singkarak area. It involved people at some selected locations in 6 nagaris in Lake Singkarak area. Jisamar was conducted through in-depth interview and aspiration netting. Information collected was related to involvement, interest, perception, knowledge, lake management policy.

FGD is a tool to collect qualitative data through forum discussion. It aims to collect in depth understanding of stakeholders on experience, feeling, perception, and attitude towards Lake Singkarak as well as knowledge on policy and institution of Lake Singkarak management. FGD was conducted at regency and provincial level.

### 3. Result and Discussion

Identified stakeholders were categorized into groups of government institution, people, social organization, NGOs, and business. Stakeholders were also categorized based on continuum level, from local level, regional level to central level. Result of identification in Table 1.

Table 1 shows that interested and influencing stakeholder in Lake Singkarak management activities is varied by motives, area coverage development and development goals orientation. Regarding the interest of development goals, basically each stakeholder has particular motives as emphasis such as management development (related agencies and educational institution), ecology motive (NGOs, environment institute, tourists), economy motive (entrepreneur, professional organization, sub district chief, people) and social motive (social organization and NGOs)

Government, civil society and entrepreneur are important stakeholders in formulating lake management policy. Government plays regional development authority role, and entrepreneur and people play important role regarding area of economy development and people's welfare. In the context of participatory planning, government and entrepreneur can be pioneers to invite and embrace other stakeholders to participate actively, integrated, share the same vision in planning Lake Singkarak development for mutual interest. Thus, lake resource sustainability and sustainability benefits given to all stakeholders, especially local people at the front line can be implemented well in the context of justice and equality. Natural resource management involves many parties. When there is damage, those parties will get the impact. Therefore cooperation in lake management is needed. The management will have macro impact (borderless) and have to be integrated inter sectors and regions through cooperation (Hamarung, 1999).

Participatory process was used in formulating lake management policy. Formulating process involved all stakeholders by giving opportunities to determine management policy alternatives and integrity of each alternative.

5 alternatives as result of discussion with stakeholder on lake resource management policy are as follow:

(1) Community-based resource management (PSBM) is authority given to community to manage its own resources. (Nikijuluw, 2002). Government plays its role to support and facilitate community, and process community's idea into an institution. PSBM is easy to run and monitor as it is in line with local aspiration and culture. Disadvantage of PSBM is its disability to handle intercommunity problems, localized, and easily influenced by external factors (such as migration, change of population age, trade development, and change of government). It also has difficulties to reach economy scale as it only involves members. High institutionalization cost impedes the course of PSBM.

(2) Management by Government (POP) is implemented by reason of efficiency, justice, and administrative by the principle the state manages resources for the sake of people's welfare. POP has shortcomings such as government failure to prevent excessive exploitation due to regulation inertia, poor law enforcement, inappropriate policy, authority spread in some institution/ministry, inaccurate data and information, and failure to formulate management decision.

(3) Co-management is distributing responsibilities and authority to government and local community in managing resources (NRTEE 1998; Nikijuluw 2002). Government and community are responsible for whole steps of management. Form of collaboration determined by responsibility and authority of each party, simple form of stakeholder institutional relations which relates local level management with government in form of partnership.

(4) Multi stakeholder institution connects users, and local regional interest with government, also develops a forum for conflict resolution and inter user negotiation. Multi stakeholder has several roundTable meetings serving as advisory to authority planning resources utilization. RoundTable reflects public values.

(5) Cooperation between entrepreneurs and NGOs. This form of cooperation supports community development and empowerment with co-management as side outcome. The cooperation consists of NGOs and entrepreneurs for capacity building. It has vertical and horizontal characteristics. It covers scientific citizen group characterized by community activities to manage environment. Some stakeholder institutions relate local issue with regional and international institutions.

Method used to determine policy weight is paired comparison. Judgment from all stakeholders calculated and combined using *software Expert Choice 2000*. Result of analysis in Figure 2.

Result shows co-management policy (cooperation between government and community) is main policy in Lake Singkarak sustainable management. This means government and community are key stakeholders in determining sustainability of Lake Singkarak management. This is in accordance with socio-culture condition of the community generally adopting formal and informal (customary) leadership system. The implication is that government and community have to be hand-in-hand to formulate programs and activities to develop Lake Singkarak including the whole steps of planning, implementation, monitoring and evaluation. Regarding the determination of institutional form, government and community have equal role and responsibility.

The second priority of the policy is stakeholder management by involving all stakeholders related to development of Lake Singkarak. The result basically supports the main priority. Thereby, stakeholder' involvement becomes proponent of co-management policy. Result of analysis is followed up by formulating form of institutional management of Lake Singkarak. Mechanism of form formulation is discussion with all stakeholders. Focus of the discussion is participation of government and community.

Discussion at regency level focused on community aspiration, traditional leaders, and sub district authority. Other stakeholders involved in in-depth-interview. Conclusion of discussion and interview was that important aspects need a follow up. The aspects are mechanism of determining task, function, and institution authority, funding, and monitoring system covering reward and punishment.

Focus Group Discussion (FGD) at regency and provincial level discussed ideas of all stakeholder concerning Lake Singkarak management institutional policy. Result of FGD, interview, and questionnaire is described as follows.

Attention to factors of ecology, economy, and socio-cultural and institutional is important in order to maintain lake resource sustainability. Ecology factors taken into account are holistic factual ecosystem condition covering environment supporting capacity, spawning area, critical land, areas prone to exploitation, and environment ecosystem balance.

Economy factors to consider in policy implementation are economy resources mapping as the basis for the economical development of the region, commodity development with competitive and comparative advantages, support for the development of natural resource-based industries, and creating sTable and sustainable region's economic growth. In welfare aspect, factors to consider are boosting per capita income, equal distribution of income, poverty eradication, and creating new easy-to-access jobs for local community.

Social factors to consider in policy implementation are socio cultural local wisdom, integrated local community empowerment, existing ulayat rights, access to socio cultural development of the community, and mechanisms for indigenous and immigrant integration. Furthermore, other factors to consider are customary institution empowerment, NGOs and higher education participation to monitor development implementation, and institutional development of Lake Singkarak management.

Based on result of Jisamar, questionnaire, and FGD, information and perception on importance of formulating institutional management of Lake Singkarak obtained as follows:

(1) Lake Singkarak is located in two administrative regions; Tanah Datar district and Solok district. Two districts often have different lake management triggering conflict of utilization and authority. Several nagaris also have different local wisdom in managing the lake causing friction among communities. Moreover, the lake location in the path of cross Sumatran needs participation of provincial and central government.

(2) Community has received sustainable management coaching unfortunately most of concepts in coaching remain unimplemented. Community monitoring system (siswasmas) in Back to Nagari (village) program has been proclaimed, however it doesn't run effectively due to lack coordination in each nagari. Besides, there is

different perception on layout concept especially at the border of nagaris. Layout improvement (such as building at the back to the lake) is difficult to implement as land and building is private property or land of ulayat. Changing the layout will cost a huge expense unless community makes changes voluntarily.

(3) There have been a lot of assistance for lake improvement and management, nonetheless unorganized, overlapping, mostly project oriented and for short term neglecting sustainability. Various studies have been conducted, undocumented, yet, as a result not optimally underutilized.

(4) An institution is needed to monitor execution of lake utilization activities. Community around the lake and hydro-powered plant are the main users of the lake. It is difficult to control negative impacts of lake utilization since there is no clear responsibility limit and monitoring mechanism.

Regarding institutional management of Lake Singkarak, agreement on institutional instrument has been made. The instrument is aspiration from all stakeholder and expected to be accommodated in the process of forming institutional management of Lake Singkarak. Aspects to consider in forming institutional management of Lake Singkarak are duties, functions, authority, and decision making mechanism.

Limit of authority is important as it reflects user's interest in decision making. Lake management problems often relate to jurisdictional boundaries of the institution to regulate lake resource allocation, decide who involves, and what to obtain. Rights legitimacy and jurisdictional boundaries regulate who has the right to involve in decision making. Decision and objectives is determined by rule of representation in decision making. Perfect competition cannot solve differences in community. Government should play its role to change rights by making regulation. Stakeholder can achieve the goal of participatory lake management by understanding property rights, jurisdictional boundaries, and regulation. In order to develop Lake Singkarak institutional management, institutional mechanism should be established as management guidelines.

Major issues in Lake Singkarak institutional management are authority and decision making mechanism. Things to consider are:

- (1) Institutional management represents two districts, nagaris around the lake and entrepreneurs.
- (2) The institution has authority in giving incentive and disincentive to community and entrepreneur utilizing Lake Singkarak.
- (3) Stakeholder have to combine bottom up and top down system in decision making mechanism.
- (4) Involving all stakeholder (government, private, community, and NGOs) in making decision.
- (5) Taking into account power and potential of community and NGOs around the lake and overseas. They also should involve in institutional management.
- (6) Community involvement in the institution is as watchdog. Moreover existence of this institution doesn't understate role of nagari in order to keep existence of nagaris.
- (7) Institution should be integral; cross-sector and cross-administrative, comprehensive; an authority covering local and regional, and coordinative; have coordinating function with other institution.

#### **4. Conclusion**

Based on result of analysis and discussion, it is summarized that: (1) interest and influence of stakeholder varied by institution, need, area coverage, and utilization orientation, (2) primary alternative for management policy is co-management (collaboration government and community) and secondary alternative is synergizing multi stakeholder management, and (3) lake institutional management should involve all stakeholders in all process; forming institution, determining decision making mechanism, policy implementation, monitoring, and evaluation.

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Table 1. Stakeholders managing Lake Singkarak

Level	Stakeholder	Interest
<b>National and International</b>	Ministry of Forestry	Forest management development and sustainability.
	Ministry of Environment	National coordination on environment and conservation management
	Donor (GTZ)	Conservation and resource management
	Researchers	Conservation and public education
<b>Regional: West Sumatera Province</b>	Board of Regional Development Planning (Bappeda)	Coordination on regional development
	Environmental Impact Management Agency (Bapedalda)	Developing environment management and conservation
	Provincial Legislative Council (DPRD)	Stability and monitoring
<b>Regional: Tanah Datar district</b>	Board of Regional Development Planning	Coordination on regional development
	Environmental Impact Management Agency	Developing environment management and conservation
	Forestry and Plantation agency	Developing forestry management and development strategy
	Agriculture agency	Developing agriculture management
	Tourism agency	Developing tourism management
	District Legislative Council	Stability and monitoring
<b>Regional: Solok district</b>	Board of Regional Development Planning	Coordination on regional development
	Environmental Impact Management Agency	Developing environment management and conservation
	Fishing agency	Developing fishing resource management
	Agriculture agency	Developing agriculture management
	Tourism agency	Developing tourism management
	District Legislative Council	Stability and monitoring
<b>Local</b>	Sub district chief	The genuine regional income (PAD), people's welfare, tranquility
	Village Unit Cooperative (KUD)	Member's welfare and business sustainability
	Singkarak Power plant	Business sustainability
	Entrepreneur (hotels and restaurants)	Income and business sustainability
	Informal sector trader	Income
	Fisherman	Income and sustainability
	Tourists	Natural beauty and security
	Local NGOs	People empowerment
	Customary institution (nagari)	Participation and people empowerment
Social organization	Participation and Human resource development	

Source: Field Survey (2005)

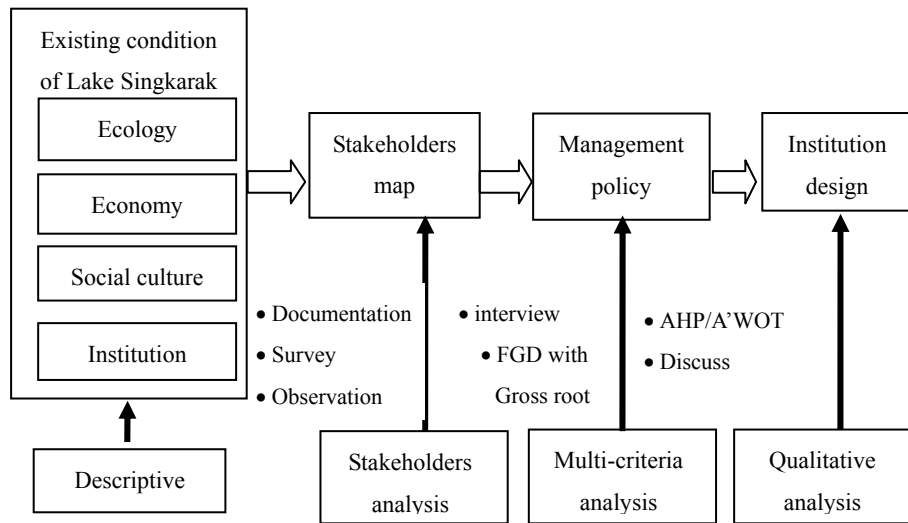


Figure 1. Phases of research

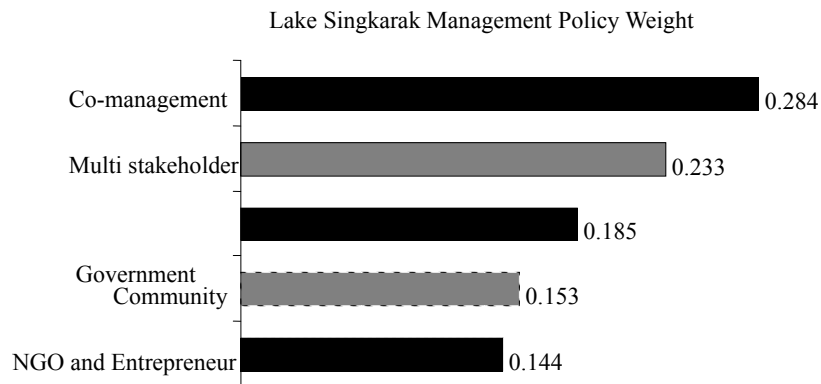


Figure 2. Lake Singkarak management policy weight result of AHP