

Collaborative Management Design For The Mahakam Lakes Based On Problem Identification And Its Socio-Economic And Ecological Functions

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Abstract: Lake area in Mahakam river basin, which covers 89 719 ha had not only the function as a direct life support, but also has a variety of ecological functions such as flood control, prevention of erosion, pollution, and biodiversity of fish control. Lake area will also be difficult to rectify the condition if contaminated, and it took years for recovery. When present, the lake area in Mahakam river basin has experienced degradation bad neighborhood. There are various efforts made by the Central Government, East Kalimantan province, regency. Kukar and West Kutai regency in the management of the lake, but its still a partial / sector that is less well targeted and unsustainable, due to lack of understanding of weak challenge of integrated lake management strategies. For the purposes of synergistic co-management and sustainable these weaknesses should be eliminated, and replaced by management based on mutual understanding, respect, and cooperate with the roadmap agreed upon, namely collaborative management plan. Collaborative management of the lake region requires a long process and the involvement of all stakeholders. Therefore, mapping the area of the lake, the preparation of the management direction of the lake, the lake area of spatial development, increased understanding and participation of all stakeholders should continue to be pursued.

Index Terms: lake area, collaborative management, problem identification, Socio-economic, Ecological Functions, and stakeholders

1 INTRODUCTION

Based on Permen PU no. 11A / PRT / M / 2006 on Criteria and Determination of River Region in Indonesia, WS Mahakam is a National Strategic River Region where the authority and responsibility of management are located at the Central Government and implemented through Kalimantan River Basin III. The designation of WAS Mahakam as the National Strategic WAS refers to the explanation of Paragraph (3) of Article 13 of RI Law. 7) of the four parameters used as the basis for determining the national strategic river area, namely: (1) the size and magnitude of the potential of water resources in the respective river area; (2) the number of sectors and the population in the relevant river basin; Social, environmental, and economic impacts on national development, and (4) the magnitude of the negative impacts of water damages on economic growth. At WS Mahakam, the Mahakam Watershed is the main and most important watershed, approximately 931 km long (measurable) and 77,095 km² covering 5 regencies / municipalities. The average rainfall in the Mahakam Watershed is about 2580.61 mm / year, the Mahakam basin also has 328 tributaries, with an area of 199.407 Ha of public waters. In addition Mahakam Watershed has the Mahakam Delta, which covers 150,000 ha with bigfoot shape (bird legs) with diverse river channels and each has an estuary. In the Mahakam Delta there are 100,000 Ha of mangrove forest land, but 85% of them are in damaged condition. The Mahakam Watershed also has high biodiversity, among which are 86 species of freshwater fish, one of which is Irrawady (*Orcaella brevirostris*) which is a freshwater dolphin that is said to exist only in East Kalimantan, Myanmar and Cambodia / Laos. The equally important ecosystem part of the Mahakam basin is the wetlands ecosystem, which covers about 30% and includes lakes, rivers, swamps, floodplains, etc. Ramsar Convention Year 1991.

There are about 76 lakes in the Mahakam Watershed A total of about 89,719 hectares, including Jempang Lake (15,000 Ha), Semayang (13,000 Ha), Melintang (11,000 Ha), Lake Perian (2,098 Ha), and so on. In general, land use in the lake area is for fisheries (fishing), keramba (haba), rainfed rice farming, community gardens, buffalo breeding, and settlements (Mislán, 2004; CSF, 2000). Several studies conducted on wetland areas (especially lake areas) in the Mahakam basin indicate that wetlands are a very important asset in water resources management. Wibowo, et.al (2000) suggests that the economic benefits of direct use of Perian peat swamp forest produce a value of Rp. 8.128 M. LIPI Research (2005) shows that the economic value of fishery productivity in Lake Semayang and Melintang reaches Rp. 78 M / year, while Budiono et al. (2005) show the functions of lakes and rivers as important places for migratory birds as well as populations of freshwater dolphins that are endangered. The results of Mislán's (2004) study indicate the existence of local wisdom of the community in interacting with the environmental conditions of the lake, such as the selection of pole houses, lanting houses and farming in the lake land during the dry season. Lake areas in the Mahakam Watershed have not only direct life support functions, such as drinking water sources, shelter and settlements and diverse habitats of creatures, but also ecological functions such as flood control, erosion prevention, pollution and global climate control Anonymous, 2004). The lake area will also be difficult to recover if it is polluted, and it will take years to recover. Currently, the area of the lake in the Mahakam watershed has degenerated in a declining environment. Increasing silting, poorer water quality, rarer lake vegetation, less fish types and quantities, increasing plastic waste and increased conflicts of interest and land transfers. The diversity of owners of the interest of lakes and land around the lake cause problems in the lake area more complex and require close cooperation in its management. Therefore, collaborative management should be put into the main pilihan and be a mutual agreement and roadmap in managing the lake area. This paper is intended to exchange ideas in order to improve understanding, awareness and strengthen the synergy of lake management efforts conducted by stakeholders of water resources in the Mahakam

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Watershed. The purpose of writing is mainly to: Design a collaborative management model of the lake area in the Mahakam Watershed based on the characteristics, functions of the area and the problems.

METHOD

Data in this study were collected based on field survey and desk study activities from various sources. The idea of collaborative management and plans to make it happen is based on the results of focus groups discussion (FGD) and the resume of community empowerment training in the management of lake areas in the Mahakam watershed.

RESEARCH RESULT AND DISCUSSION

Characteristics and Functions of Lake Areas in the Mahakam Watershed

In the Mahakam Watershed there are about 76 lakes with a total area of about 89,719 ha, among them Jempang Lake (15,000 Ha), Semayang (13,000 Ha), Melintang (11,000 Ha), Lake Perian (2,098 Ha), and so on. The area of the lake is an inseparable part of the wetlands area in the central Mahakam Watershed which is characterized by inundation areas, including the retarding basin system in swamp areas and alluvial deposits as well as the river meanders. Characteristics of the lake area are as follows: (1) is a retention area of the Mahakam River flow. It has a temporary holding function if the flow of the Mahakam River flow exceeds its capacity, (2) the lakes of the Mahakam Watershed are floodwaters, whose water changes are strongly influenced by changes in the Mahakam River water level, (3) (5) habitat for some or all life cycles of flora and fauna, (6) unique traditions and cultural heritage, and (7) populated by densely populated people. With the above mentioned characteristics, the ecosystem of lakes and wetlands in the Mahakam Watershed has enormous functions and values both environmentally and economically, including: (1) flood and drought controllers; (2) represents a transport path, connecting more 25 Villages in Kecamatan Kota Bangun, Kenohan, Muara Wis, Muara Kaman, Muara Muntai in Kab. Kutai Kartanegara, and District Jempang, Muara Pahu, Stopover in Kab. Kutai Barat, (3) recreation or ecotourism: orchids, dolphins, birds, local cultures (lamin dayak houses), etc. (4) research and education, (5) sedimentary sediment from land and water purifier, (6) And nutrient suppliers, where water bodies and vegetation found in the lake area can retain and recycle nutrients, (7) containers and pollution bidders, (8) micro-climate stabilization, (9) global climate control, (10) water providers For the community, where most people around and inside the lake use lake water for daily purposes, (11) groundwater fillers, (12) water providers for other wetlands, where excess water in lakes can irrigate other wetlands (13) forest product providers, where swamp forest can produce a variety of forest commodities including wood, fruit and sap, (14) wildlife sources and food sources , (15) fishery source, where the lake area is the habitat of various fishery commodities, such as goldfish, mujair fish, repang fish, biawan fish, toman fish, baung fish, shrimp and so on, and (16) agricultural supporters, The source of organic compost in the form of weeds (water hyacinth and others), and (17) energy sources, where the movement of water can be converted into other energies, while peat on wetlands can be used as fuel (eg briquettes).

Problems

As an important ecosystem and directly related to changes in the Mahakam watershed, changes in the wetland ecosystem especially the lake area greatly affect changes in the Mahakam watershed and vice versa. The occurrence of silting in lakes and swamps can lead to the loss of water reservoir storage capacity and increase flood impact in Kutai Kartanegara and Samarinda districts. Unsustainable fishing activities such as toxic and stroom use can lead to fish productivity in rivers and threaten food availability for dolphins and so on. Currently, as part of the wetland ecosystem, the lakes in the Mahakam Watershed face the following problems: (1) deposition and sedimentation, which is estimated to have a 4-6 cm spreading rate of source from the Mahakam and also lake catchments, (2)) Decrease in water quality, due to various community activities such as domestic wastewater, transportation, garbage, timber activities, mining, oil palm plantations, etc. (3) weed growth, which at the time of booming nearly 40-70% of lake area covered by weeds. The dominant types of weeds are: Kiambang (*Salvinia* sp.) And Eceng Gondok (*Eichornia* sp.) Kumpai (*Hymenachne* sp.), Iron (*Ischaemum* sp.) And Gembor (*Salvinia molesta*, *Polygonum* sp.), (4) overfishing , Due to the increasing number of fishermen and the loss of fish reserves due to environmental damage and encroachment by the community, (5) the waning of local wisdom. There is a shift of local wisdom towards the less environmentally friendly due to the socioeconomic and environmental changes of society. These changes include reserved reserves (formerly avoided), use of electrical stays and trawlers in fishing, selection of permanent housing (no longer lanting houses and high-paved wooden houses), and fish caramba, (6) wildlife hunting and inclusion of invasion fish . The increase in population and consumption, as well as the influence of capital in the life of society, led to the community began to explore the sources of income that have not been utilized before. Like the Grouse, and the breeding of Toman Fish that is not endemic to the Mahakam Watershed, (7) the reduced water catchment area. Reduced forest, clearing of plantation land, and mining activities resulted in shrinkage of water catchment areas and caused a change in the balance of the hydrological cycle, And (8) the growth of settlements. Increasing population increases the demand for settlements, and the increasing number of settlements in the lakes, especially in the lakes. There is still a lot of pressure on the lake area in the Mahakam watershed. The degradation of the value and function of the lake area in the Mahakam watershed will have negative environmental, social, and economic impacts, especially for the surrounding community. It is an obligation for all of us To maintain the existence of the lake area in the Mahakam Watershed along with all the potential that is in it as one effort to ensure the survival of present and future generations.

Ideas for Collaborative Management of Lake Areas in the Mahakam Watershed

Amanah lake area management has a strong legal basis, including: Law No. 23 of 1997 on Environmental Management, Law No. 41 of 1999 on Forestry, Law no. 5 of 1990 on the Conservation of Biological Natural Resources and its Ecosystem, Law no. 7 of 2004 on Water Resources, PP 82 of 2001 on Water Quality Management and Water Pollution Control, Government Regulation No. 42 Year 2008 on Water Resources Management, Presidential Decree No. 32 of 1990

on the Management of Protected Areas, and so on. There are various efforts that have been done by the Central Government, East Kalimantan Province, Pemkab. Kutai Kartanegara and Pemkab Kutai Barat in the management of lake area, but the nature is still partial / sectoral so that less appropriate target and not sustainable. These efforts were initiated from the Seminar on Lakes Management (Bappeda Kaltim, 1994), followed by Mahakam Master Plan (I) and (II) (PPBPP, 2002 and 2003), followed by the drafting of PSDA WS Mahakam Pattern (PPBPP, tahun 2006), Inventory of SDA data in WS Mahakam (BWS Kalimantan III, 2007), investigative study and utilization of Lake Semayang and Melintang (PPBPP, 2006), Jempang Lake Management (PPBPP 2006) Survey and investigation Lake Jempang (BWS Kalimantan III, 2007), Operation and Lake Maintenance (Pemkab Kukar, 2007), the Creation of Wave Drips embankment in Melintang (Dishub Kukar, 2008), and WWD Embankment in Semayang (Dinas PU Kaltim, 2009). The management of the lake area in the Mahakam watershed has been less intensive, partial, overlapping, and the appearance of conflict between interests. These weaknesses are attributed to: (1) an understanding of the management of water resources that is still weak, (2) unclear roles and responsibilities, (3) lack of understanding among stakeholders on the importance of integrated wetland resource management strategies and plans On a sustainable basis, (4) limited human resources and funding, and (5) lack of coordination among various stakeholders. For the sake of synergistic and sustainable shared management these weaknesses must be eliminated, and replaced by mutual understanding, respect and cooperation with agreed roadmaps. Collaborative management is defined as the agreement of two or more stakeholders to share information, roles, functions and responsibilities in a mutually agreed partnership and partnership (Borrini-Feyerabend et al 2000 in Azhari, 2006). Characteristics of collaboration is the process of mutual learning (sharing), especially information sharing. In the process of achieving goals are often made continuous adjustment or adaptive (Carlsson and Berkes 2005). The formation of collaborative management can be initiated from cooperative processes, partnerships, and ultimately collaboration. To achieve equality in collaboration takes a very long time, and if it has been achieved collaboration, it is expected to achieve self governance (self-governance). Collaborative lake area management is very important to do, given the limitations of government and society in managing the lake area. Collaborative lake area management is in line with what has been agreed in the Bali Agreement on Sustainable Lake Management, 7 points of agreement: (1) management of lake ecosystem, (2) lake lake resources utilization, (3) development of monitoring, evaluation and information system Lakes, (4) preparation of adaptation and mitigation measures of climate change, (5) capacity building, institutional and coordination, (6) enhancing community participation, and (7) sustainable financing (Bali, 13 August 2009). Collaborative management of the lake area in the Mahakam Watershed is still an idea, but the process has begun. Activities that have been undertaken to start a collaborative management pioneer and follow-up are:

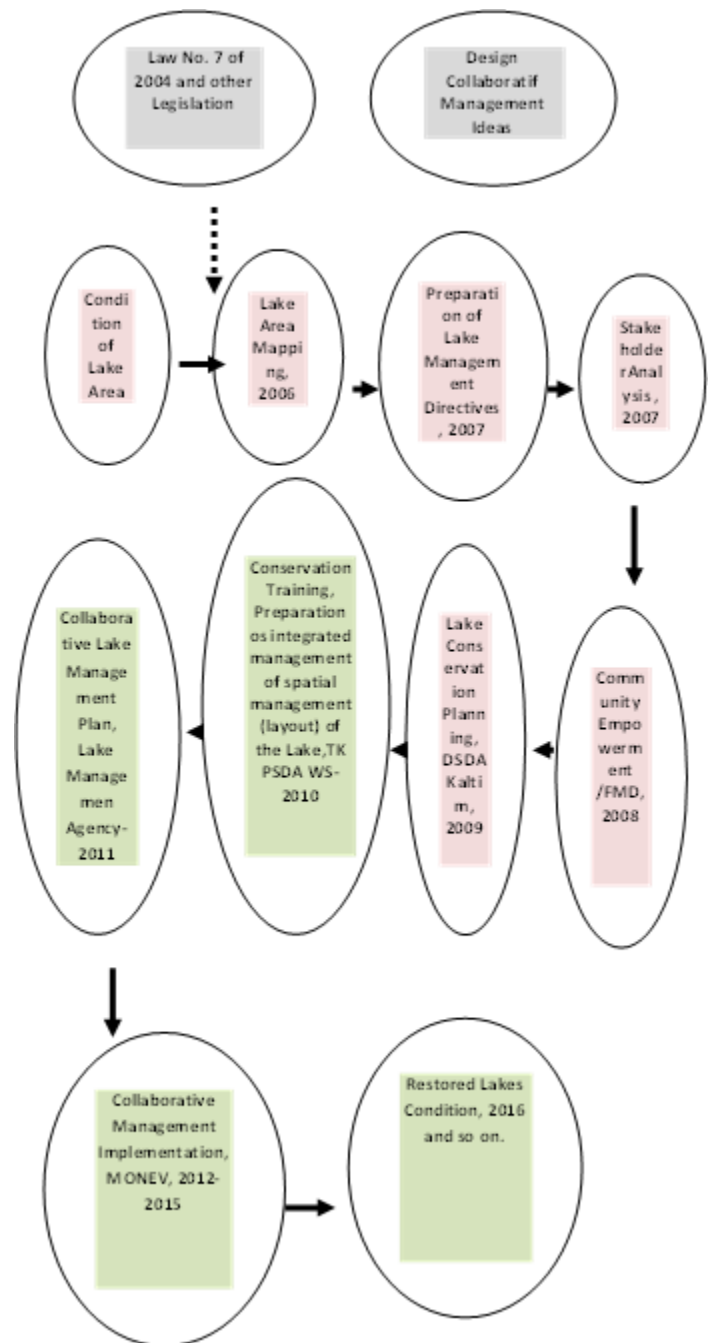


Figure 1. The Process Towards Collaborative Management of Lake Areas.

Collaborative Management Implementation Restored Lake Lakes Condition, 2016 and so on.

1. Implementing the mapping of the lake area: D. Jempang, D. Semayang, and D. Transversal through Preparation of Management Direction D. Jempang (2006) and Inventory and Utilization Study D. Semayang and D. Melintang (2006) by Flood and Security Project Kaltim Beach-DG of Natural Resources that includes: boundaries and lake area, biogeophysical and socio-cultural conditions, and lake problems.
2. Implement stakeholder analysis of lake areas (PPSA Lemlit Unmul, 2007). For the lake area there are several stakeholders, which are broadly grouped into

3, namely: (1) Central Government represented by BWS Kalimantan III (Directorate General of Natural Resources) and BP DAS Mahakam Berau; (2) Provincial Government and Regency / City Government: Forestry Service, Mining Agency, Agriculture Agency, Environment Agency, Fisheries and Maritime Office, Bappeda, Public Works Office, and (3) Communities (Bidabiwase NGO, RASI Foundation, PPSA Lemlit Unmul, general). Each element has advantages and disadvantages in its participation in the management of the lake. In general, the concept of stakeholder relationships in the lake management plan is illustrated in Figure 2.

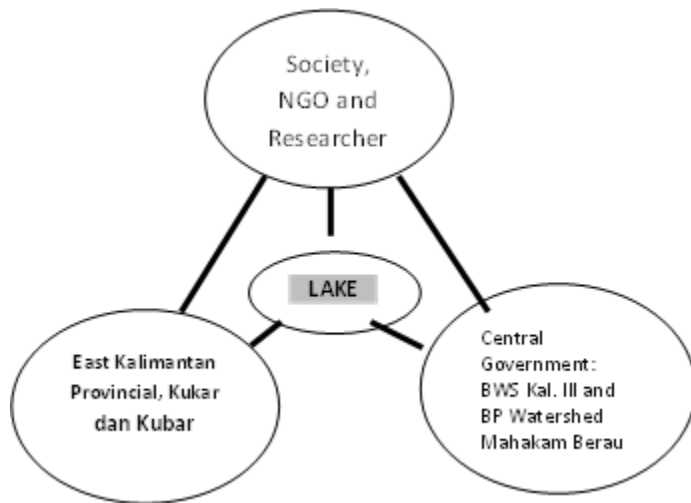


Figure 2. Concept of Inter-Stakeholder Relations

3. Increased community participation through community empowerment activities in the management of lakes (PPSA Lemlit Unmul, 2008) and DED J. Conservation (BWS Kalimantan III), with the aim of exploring aspirations, improving understanding and community participation in lake management. Issues discussed are lake condition, pollution, illegal logging, illegal fishing, lake utilization, community participation, and community lake forum planning.
4. The establishment of community institutions such as the Jempang Lake Community Forum (2008) and Lake Semayang-Melintang Community Forum (2008) by Team GNKPA Kaltim-BWS Kalimantan III. This activity involves several facilitators from related institutions both UNMUL, Provincial Government and District Government. Kutai Kartanegara and Kutai Barat Government.
5. Aspiration excavation for the creation of wave protection embankments in Semayang and Melintang lakes, lighthouses, the development of new reserves through DED Semayang-Melintang (Natural Resources Division of Public Works Office of Kaltim, 2009).
6. Completed the establishment of the Water Resources Council of East Kalimantan Province, to coordinate the management of water resources in East Kalimantan which is expected to encourage mutual understanding and realization of collaborative management of water resources in East Kalimantan,

including the management of the lake area. This stage is in progress and targeted for completion in 2009, with the facilitation of BWS Kalimantan III and Water Resources Sector of East Kalimantan Public Works Office.

These efforts are pioneering activities in realizing the idea of collaborative lake management, and will be enhanced through institutional, spatial, joint research / training and community empowerment approaches. Targets for 2010 are:

1. Lake Area Conservation Training (2010), Compilation of Integrated Management of Lake Area Management (2010) and the establishment of the Mahakam River Water Resource Management Coordination Team (TK PSDA WS Mahakam) (2010), East Kalimantan Water Resources Management Regulation (Perda Pengelolaan SDA Kaltim) 2010) which will involve BWS Kalimantan III, Natural Resources Division of East Kalimantan Public Works Department, Environment Agency, Bappeda, Fisheries and Maritime Office, Agriculture Agency, Mining Service, and Regency of Kukar and Kubar, and so on.
2. For 2011, the PSDA WS Mahakam Pattern document is targeted to have been approved and followed by a collaborative lake management plan agreement by all stakeholders, and the establishment of TK PSDA Lake Area with its working arrangement and funding sources.
3. For 2012-2015, it is expected that all stakeholders can fully implement their respective roles and all activities using mutually agreed monitoring and evaluation tools.

CONCLUSION

Collaborative management of lake areas in the Mahakam basin is especially for D. Jempang, D. Melintang, and D. Semayang is still an idea, which requires a long process and support from all stakeholders. Without collaborative management, maintaining the environmental carrying capacity of the lake area will not be synergistic and effective.

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