

Management Strategy of Sub-Watersheds Affected By Flooding In Banjar District, South of Kalimantan

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ABSTRACT

Watershed Management is the process of formulating and implementing a series of activities involving natural and human resources in a watershed, taking into account social, political, economic, and institutional factors in the watershed and surrounding areas to achieve specific social goals. This study analyzes the local government's strategy in managing the affected sub-watersheds (DAS) flood- in Banjar Regency, South Kalimantan. The background of the research is the occurrence of floods in the sub-watershed in Banjar Regency. In a follow-up review, the provincial government has the authority to manage watersheds within the province. On the power of the government, and the existing conditions, an in-depth analysis of the local government's strategy in managing the sub-watershed in Banjar Regency is needed. To answer the research problem, a descriptive qualitative research method was used. The location of this research is in Banjar Regency. The key informants of the research are elements of the South Kalimantan provincial government, especially those authorized in the management of the Martapura Sub-watershed, namely the Kayu Tangi Forest Management Unit (KPH) Organization and the Head of the South Kalimantan Province Environmental Service. This study indicates that local governments in carrying out local government strategies in managing flood-affected watersheds apply reforestation strategies, and the construction of a dam, namely Riam Kanan Dam, and still in planning is the construction of Riam Kiwa Dam. The watershed management strategy has not been maximized in flood prevention because the Riam Kiwa Dam program and waterway maintenance have not been realized.

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1. INTRODUCTION

One of the principles of governance is the active principle. The active principle is that the government must be active wherever it is because it has the primary development sources, including expertise, funds, authority, organization, and others. (Syafie, 2013:55) This situation has resulted in the government taking care of all development, governance, and social issues, especially in developing countries (Sompaa, Muzdalifah, & Hakim: 2021), because the government's position is very central. (Muzdalifah: 2021)

The government has a central role in national development. (Muzdalifah: 2020) namely in determining public policy. (Syafiie, 2013: 21) The process of setting policy is called governance. (Apter in Talizuduhu: 1985) Within the government, there is a process called governance. Governance is interpreted as the embodiment of power in the economic, political, and administrative fields to manage a country at all levels. (Sompaa et al.: 2021)

The realization of local government, the administration is based on the principle of decentralization. The principle of decentralization according to Law Number 32 of 2004 concerning Regional Government. In article 1, point 7, it is stated that "Decentralization is the transfer of government authority by the government to autonomous regions to regulate and manage government affairs in the system of the Unitary State of the Republic of Indonesia." Each region has the authority to manage its territory according to the characteristics of each region. (Rauf: 2018)

One of the areas of government authority is the management of water resources. Based on Article 18 of Law Number 7 of 2004 concerning Water Resources, it is explained that local governments can carry out part of the government's authority in managing water resources to support the implementation of watershed management. Furthermore, in PP No. 37 of 2012 concerning Watershed Management in article 22, it is stated that the preparation of watershed management plans is carried out by

- a. Minister for cross-country watersheds and cross-provincial watersheds;
- b. The governor following his authority for watersheds within the province and across districts/cities;
- c. Regents/mayors following their authority for watersheds in districts/cities.

According to the Regulation of the Minister of Forestry of the Republic of Indonesia Number: P. 39/Menhut-II/2009. River Stream Area (DAS) is a land area that is an integral part of the river and its tributaries which functions to accommodate, store and drain water originating from rainfall to lakes or seas naturally, where the land boundary is a topographical separator and the sea boundary to the water area that is still affected by activities on land." Within the watershed, there are sub-watersheds, namely the part of the watershed that receives rainwater and flows it through tributaries to the main river.

Watersheds need to be appropriately managed. According to Dixon (1986), watershed management is the process of formulating and implementing a series of activities involving natural and human resources in a watershed by considering social, political, economic, and institutional factors in the watershed and its surroundings to achieve social goals. In addition, according to Government Regulation no. 37 In 2012, watershed management is man's attempt to regulate the interrelationships between natural resources by humans in the watershed and all its activities, to realize the preservation and harmony of ecosystems and increasing benefit of natural resources for the humans in a sustainable manner.

Watershed Management (DAS) is a form of natural resource development planning by using a catchment area or watershed management unit with parts of its territory. (Paimin et al.: 2012) Watersheds (DAS) can be viewed as natural systems where biophysical-hydrological processes take place and complex social, economic, and cultural activities of the community. (Paimin et al.:2012) The basic framework for watershed management can be schematically described as follows.

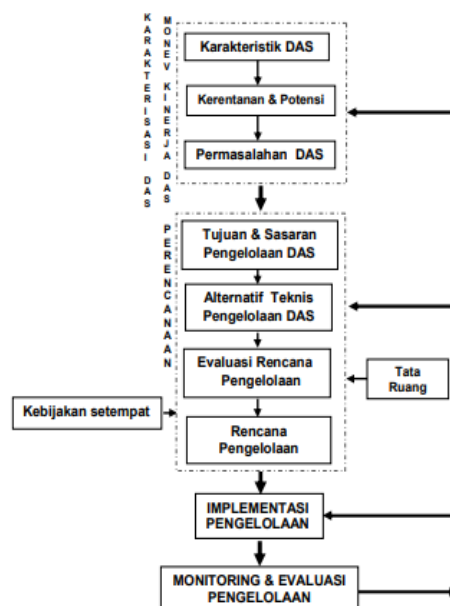


Figure 1 Basic Watershed Management Framework
Source: Paimin & Pramono, et al.: 2012

According to Sim (1990), approaches to watershed ecosystem management that can overcome flooding can be through the construction of reservoirs and water transportation, channel maintenance, flood area management, reforestation, or reforestation.

According to the Regulation of the Minister of Forestry of the Republic of Indonesia No. P.39/Menhut-II/2009 concerning Guidelines for the Preparation of Integrated Watershed Management Plans, Basic Principles of Watershed Management The basic principles in watershed management are: a. Watershed management is

carried out in an integrated manner based on the watershed as a single ecosystem, one plan, and one management system;

b. Integrated watershed management involves stakeholders, is coordinated, comprehensive, and sustainable;

c. Integrated watershed management is adaptive to dynamic changes in conditions following the characteristics of the watershed;

d. Integrated watershed management is carried out with a fair division of tasks and functions, costs and benefits between stakeholders;

e. Integrated watershed management based on the principle of accountability.

Watershed management requires the right strategy. Jauch & Glueck (in Akdon, 2011: 3) explain strategy as a unified, comprehensive, and integrated plan that links the advantages of organizational strategy with environmental challenges and is designed to ensure that the organization's main goals can be achieved through proper implementation by the organization. Strategies in this context include Policies, Programs, and Activities to realize the Goals and Targets.

Policies are defined as provisions agreed upon by the relevant parties and determined by the authorities to be used as guidelines, guidelines, or instructions for every business/activity of the government apparatus and the community to achieve smooth and integrated efforts to achieve goals and objectives, including an incentive system that needed. Policies are enabling incentives (enabling incentives), which can encourage the implementation of programs and activities and avoid being disincentives for implementing programs and activities. A program is a series of systematic activities to achieve goals and objectives. In contrast, activities are actions taken by an agency, both formal and informal government and non-government, by utilizing existing resources to produce something that supports achieving goals and objectives.

Banjar Regency is one of the regencies in South Kalimantan Province, with most of its area being lowland and included in the Martapura Sub-Watershed (DAS). (Afdhalia & Oktariza: 2019) The low location of Banjar Regency and its area passed by a large river causes the flow of water on the ground surface to be hampered. So that 29.93% of the area is always inundated, and 0.58% is periodically inundated. (Afdhalia & Oktariza: 2019)

Banjar Regency has abundant water resources. The water resources come from rivers and *anjir* (canals). The existing rivers have catchments at the foot of the Meratus Mountains, and all flow westward to form the Alalak River, Riam Kanan River, and Riam Kiwa River. The three rivers are watery throughout the year and form a watershed (DAS). (Afdhalia & Oktariza: 2019) The following is a map of the Martapura Sub-watershed.

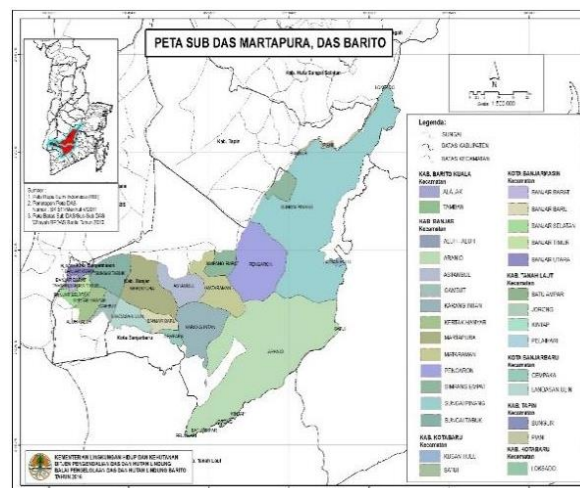


Figure 2 Map of the watershed in Banjar Regency
Source: Ministry of Environment and Forestry, 2021

Banjar Regency is classified as a flood-prone area. The main factor is the characteristics of the area where the land surface is lower than sea level. The low location of Banjar Regency from sea level causes the flow of water on the ground surface to be less smooth. As a result, some areas are constantly inundated, and some are periodically inundated. Meanwhile, in terms of slope, Banjar Regency is quite varied. This can be seen from the morphological conditions of the Banjar Regency area, which consists of sloping, wavy, hilly plains so that the morphology of the mountains forms. (RP12-JM Banjar Regency)

In January 2021, Banjar Regency is the largest flood-affected area in South Kalimantan. This disaster is the most significant flood in the last 50 (fifty) years. The Head of BPBD of South Kalimantan Province explained the comparison of the number affected by the flood disaster from several districts in South Kalimantan, namely Banjar Regency 17,996 families and 72,994 people, Hulu Sungai Tengah Regency as many as 16,100 families, 64,400 people, Barito Kuala Regency 13,568 families, 28,400 people, and Tanah District. Laut 8,870 families, 27,815 people, Balangan Regency with 5,699 families, 17,501 people, City of Banjarmasin 5,608 families, 17,009 people, Hulu Sungai Selatan Regency 3,138 families, 6,690 people, Banjarbaru City 2,594 families, 8,671 people, Tapin Regency 515 families, 1,492 people, North Hulu Sungai Regency 299 families, 774 people; and Tabalong Regency 253 families, 770 people. (Kompas TV, January 2021). Banjar Regency is the most flood-affected area in South Kalimantan and hit 7 (seven) sub-districts. The flood-affected sub-districts include Pengaron District, Martapura Kota District, Astambul District, East Martapura District, West Martapura District, Karang Intan District, and Sungai Tabuk District. (BPBD South Kalimantan Province, Kompas TV, 2021)

In Banjar District, the most affected sub-district is Pengaron District. "In this district, the flood emergency response status has been set since Monday 11 January 2021 and will be valid until 31 January 2021". (Head of the South Kalimantan Regional Disaster Management Agency (BPBD), Kompas TV, 2021) In Pengaron District, there are 6 (six) flood-affected villages, including Benteng Village, Pengaron Village, Mangkauk Village, Lobang Baru Village, Lok Tunggul Village, and Antaraku Village. (Kapolsek Pengaron, Kompas TV, 2021) The government has a central role in watershed management. Lestari and Ridwan (2016) explained that the role of local governments in downstream watershed management is based on the Main Duties and Functions (TUPOKSI) of each agency and requires cooperation from each of these departments in watershed management. In addition, by Krisna, Panjaitan, and Salampessy (2015), it is explained that the position and role of stakeholders, namely government agencies, the private sector, and the community, are categorized as groups of appropriators, providers, and producers, where the role of these stakeholders is still overlapping which causes weak policies and disruption of watershed functions. Faisal Ridho (2018) explained that the government's policy on watershed management had not run 100%, namely based on an analysis of land use returns, planting, and conservation. Based on this explanation, it is known that the role of local governments in watershed management tends not to run optimally. The same thing can happen in the management of flood-affected watersheds in Banjar Regency.

Flood disaster is a natural phenomenon that causes losses to the community. History records the large number of natural disasters globally that have caused enormous losses to humans and their livelihood assets. (Londok, 2012) In essence, the damage to natural resources that occurs in the watershed is caused by

poor management. In this condition, the presence of the government becomes a deep concern. Therefore, this research will analyze the local government's strategy in managing flood-affected sub-watersheds in Banjar Regency.

2. METHOD

In this study, the author uses a qualitative research method. Qualitative research uses in-depth analysis. Namely, the process and meaning (subject perspective) are more detailed in qualitative research. The theoretical basis is used as a guide research focus is on the facts on the ground. This approach is appropriate to explain the strategy of the South Kalimantan Provincial Government in watershed management in Banjar Regency so that in-depth research results are obtained and can answer the overall problem formulation. The type of research is descriptive qualitative.

In contrast, the types of data in this study are primary and secondary data. This method is used with consideration of relevance to the research material. The research carried out is descriptive, describing the reality of the events under study, making it easier for the author to obtain objective data to know and understand the strategies used to manage watersheds in Banjar Regency.

This research is located in South Kalimantan Province, a government area authorized to manage the most flood-affected sub-watersheds in Banjar Regency in 2021. The critical informants of this research are elements of the South Kalimantan Provincial Government. They are authorized to manage watersheds in Banjar Regency, including the Head of the Unit Timber Tangi Forest Management (KPH), Head of the Environment and Forestry Service (LHK), and supporting informants the Regional Secretary of South Kalimantan Province. Researchers in collecting data using observation techniques, interviews, and documentation.

Technical data analysis uses techniques according to Bogdan and Bilken (Meleong, 2013: 248), namely qualitative data analysis techniques can be done by working using data, organizing data, sorting it into manageable units, attracting and determining patterns, finding patterns, finding what is essential and what is learned and decides what can be shared with others. According to Miles and Huberman (Sugiyono, 2009: 246), there are several activities in data analysis, namely data reduction, which is a sorting process, focusing attention on simplification, abstracting, transformation, rough data that emerges from notes. The steps taken are sharpening the analysis, classifying or categorizing each problem through a brief description, directing, removing unnecessary, and organizing so that it can be drawn and verified. The reduced data are all data regarding research problems. Second, data presentation is a structured collection of information that allows concluding and taking action. The presentation of the data is directed so that the reduced data is organized, arranged in a relationship pattern so that it is easier to understand. Data presentation can be done in narrative descriptions, charts, relationships between categories, and flow charts.

The third step is drawing conclusions or verification. This stage is concluding all the data that has been obtained as a result of the research. Drawing conclusions or verification attempts to find or understand the meaning of regularities, patterns, explanations, causal paths, or propositions. Before drawing conclusions, data reduction, presentation, and conclusion drawing or verification are carried out from previous activities. Drawing conclusions is the final stage of data analysis and data processing activities.

3. FINDINGS AND DISCUSSION

Sub-watershed Management Strategy in Banjar Regency

The flood-affected sub-watershed management strategy is an effort, step, or process of realizing programs or policies concerning natural and human resources in a flood-affected watershed, to achieve specific social goals, namely the realization of sustainability and balanced ecosystems increasing benefit of natural resources for humans sustainably. More specifically, efforts to overcome flooding in the watershed environment are constructing reservoirs, maintaining canals, managing flood areas, and reforestation. Based on the description of flood-affected watershed management in Banjar Regency by the Regional Government, the

watershed management strategy can be analyzed. The management of the Martapura watershed in the Banjar Regency area can be identified using the basic watershed management framework from Paimin et al. (2012), data obtained from key informants, namely the elements of the Kayu Tangi Forest Management Unit. The following is an explanation.

Identification of Watershed Characteristics and Problem Analysis

In the management of the Martapura Sub-watershed, the initial stage is to identify the characteristics of the watershed. *"Identification is carried out by using GIS (Geographic Information System) technology tools.* (Head of KPH Kayu Tangi, 2021) GIS is a system consisting of hardware, software, data, people, and institutions used to collect, store, analyze, and disseminate data on Earth's surface.

This step found that the Martapura watershed is a sub-watershed of the Barito watershed, which is part of the Barito River Basin. *"The Martapura watershed, whose main river is known as the Riam Kanan river, passes through the city of Martapura and has an upstream area, namely the Riam Kanan Dam."* (Head of KPH Kayu Tangi, 2021) The Head of KPH Kayu Tangi also added that:

"Based on the South Kalimantan DEM (Digital Elevation Model) analysis, the elevation value of the Upstream area reaches 14 meters, and the Downstream reaches 6 meters, the river density level is 0.828 km /km², which is a medium density class, or the river channel passes through rocks with softer resistance, so that the transport of sediment stuck in the flow will be greater".

The next step after identifying the characteristics is problem analysis. The Chairperson of BPDASHL explained that a problem analysis had been carried out that produces data on watershed problems, including a forest in the Martapura watershed only remains 25%. In the upstream area of the watershed, which is still beautiful, causing an increase in design discharge by 12.5%. Threats that increase the criticality of land in the upstream Martapura watershed are rampant illegal logging and illegal mining in the upstream. Part of the watershed is the lack of application of spatial planning by its designation. Community planting patterns are not under conservation principles of land, as well as weak supervision of the destruction of forest areas in the upstream area of the Martapura watershed.

Alternative Technical Management and Watershed Management Plan The

Head of KPH Kayu Tangi explained that the local government has technical alternatives for watershed management in Banjar Regency. The technical alternative is the upstream management of the Martapura watershed based on a technical study of the design discharge and SWOT analysis, awareness-raising, and cooperation from government agencies and the community in good land management, in addition to tightened supervision by both the community and related agencies.

The head of KPH, Kayu Tangi, explained that the watershed management plan in Banjar Regency is through the Water Resources Infrastructure Network System Development Plan. The water resource network development plan covers water resource conservation, utilization of water resources, and integrated control of water damage that is in synergy with the water resources management pattern in the Barito River Basin.

In addition, there is a plan for the Development of an Environmental Management Infrastructure System. The head of KPH Kayu Tangi explained that:

"The plan for the development of an environmental management infrastructure system includes increasing the role of the community and the business/private sector in the management of drinking water, solid waste, wastewater and drainage; and coverage of drinking water, solid waste, wastewater, and drainage services."

The third watershed management plan is to build an Environmental Management Infrastructure System. The head of KPH Kayu Tangi explained that the system includes:

1. The solid waste management system consists of
 - a. Temporary shelter centralized in each environmental unit and service center integrated with TPS.
 - b. TPS are scattered in every village integrated with the provision of waste transportation facilities and infrastructure.
 - c. Waste processing using appropriate environmentally friendly technology by the community around the TPS location based on the 3R system and Sanitary Landfill. The landfill is located in Padang Panjang Village, Karang Intan District.

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2. The drainage network system consists of:
 - a. The primary drainage system is the entire river network,
 - b. The secondary drainage system along the primary and local primary collectors is found in central urban villages and housing complexes,
 - c. The areas that constitute Inundation areas need to be provided with a water pump by the inundated area.

Watershed Management Implementation and Monitoring and Evaluation (Monev)

Watershed Management Implementation in Banjar Regency is carried out with various programs. The head of KPH Kayu Tangi explained that "In 2019 the Government of South Kalimantan has a target to plant 32,000 ha of trees as part of the National Movement for Watershed Recovery". It was further explained that to encourage planting activities for all levels of society. The South Kalimantan Provincial Government held a simultaneous planting Kick-Off throughout South Kalimantan and the Commemoration of the 2019 National Watershed Recovery Movement, which was carried out in conjunction with the Green Gamis program in Kupang Rejo Village, Sungai Subdistrict. The purpose of this activity is the South Kalimantan provincial government and 13 (thirteen) regencies/cities to preserve nature.

The Head of KPH Kayu Tangi added:

"The simultaneous tree planting activity aimed at Rehabilitation of Land Forests also supports the South Kalimantan Governor's green revolution program as outlined in the South Kalimantan Provincial Regulation Number 7 of 2018 concerning the green revolution movement, as a strategy to reduce the area of critical land restoration of watersheds and community empowerment around the forest".

The Head of KPH Kayu Tangi further explained the program:

"In 2020, together with the South Kalimantan Forestry Service, we have carried out many activities that support the programs of the provincial, central, and Banjar district governments. The government program is to support and increase the level of natural and environmental sustainability to reduce the criticality of land".

The Head of KPH Kayu Tangi explained in more detail:

"The Green Gamis program, namely the Thursday Planting Movement by Banjar Regency, the Green Revolution Movement of South Kalimantan Province, and other activities such as social forestry to support communities in forest areas to obtain a forest management permit legally."

That strengthened the Head of the Environment and Forestry Office of South Kalimantan Province:

"The South Kalimantan Provincial Government has committed to improving environmental quality through the Green Revolution program, which prioritizes planting along watersheds in all regions. South Kalimantan also organizes and controls the mining and plantation sectors. We have implemented a moratorium on the mining and plantation sectors. No more permits have been issued by either the central or regional governments. In the field itself, issuance is carried out such as the revocation of 625 mining business permits by the South Kalimantan Provincial Government".

Regarding the flood disaster that occurred in Banjar Regency, the Head of KPH Kayu Tangi explained that:

"So far, a Flood Control System has been designed. Now the system includes building Riam Kanan Dam in Aranio District, there is also construction, rehabilitation, as well as operation and maintenance of flood control buildings in all flood-prone rivers, in addition, there is a normalization of rivers in Banjar Regency, and there are plans to build Riam Kiwa Dam in Aranio District".

Regarding the plan to build the Riam Kiwa Dam, the Regional Secretary of South Kalimantan explained that this was to overcome the floods in Martapura and its surroundings. The current development of the Riam Kiwa Dam construction plan is to determine the location of Riam Kiwa which will later be handed over to the Banjar Regency Government, resolving internal problems so as not to harm other parties and hastened development realization.

The next stage in watershed management is monitoring and evaluation. The head of KPH, Kayu Tangi, explained that "the South Kalimantan Provincial Government usually conducts a comprehensive evaluation of the spatial policy and management of SDA (Natural Resources) in a comprehensive cross-sectoral manner." The Head of the Environment Agency added that "this policy received a positive response from the Ministry of Environment and Forestry and provided several recommendations."

4. CONCLUSION

Based on the research results, it can be concluded that the local government strategy in managing flood-affected watersheds in Banjar Regency, South Kalimantan Province, is formulated through basic watershed management steps. The watershed management steps taken include identification of watershed characteristics, analysis of problems, determination of technical alternatives for watershed management, preparation of watershed management plans, implementation of watershed management, and monitoring and evaluation of watershed management.

The watershed management strategy in flood-prone areas is carried out through reforestation. The programs carried out are nature and environmental conservation programs by planting trees, namely the Green Gamis Program carried out along the watershed in Banjar Regency and the Green Revolution Program along the watershed in South Kalimantan Province. In addition to the reforestation strategy, a dam construction strategy was implemented by building the Riam Kanan Dam and the construction of the Riam Kiwa Dam in the planning stage. The strategy still in the planning stage is to build an Environmental Management Infrastructure System, namely waste management and drainage. Based on the facts, the local government's strategy is not yet fully optimized to deal with flooding in the area. The absence knows this of a program specifically for flood area management. In addition, the Riam Kiwa Dam program is still under construction, even though this dam functions to prevent flooding in Martapura and its surroundings, as well as the drainage system program.

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