

Potential Analysis and Development of Reservoir Water for Ecotourism at Gajah Mungkur Wonogiri

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Abstract. Gajah Mungkur Dams in Wonogiri Regency has been developed into a tourism area but the tourism industry is less developed. This research aimed to 1) analyze the potential and the barriers ecotourism development of reservoir water, 2) analyze the direction of developing reservoir water ecotourism. Data collections were through field observation, laboratory analysis of water and interviews. Data analysis for the potential and barriers of the water reservoir ecotourism was done using qualitative descriptive, while for the direction of reservoir water ecotourism development was done using SWOT analysis. The result showed 1) The reservoir water at Gajah Mungkur Dams was very potential as ecotourism for touring around the dams, organic keramba, water park and traditional attraction; the barriers of the water reservoir ecotourism development are reservoir retreading, the water quality and environment sanitation; 2) The result of SWOT analysis for the development of water reservoir for ecotourism were to maximize the strength; increase opportunities and eliminate weaknesses.

1. Introduction

Ecotourism is a debatable term, sometimes used only for tourism site where visitor motivation is centred on natural observation. Such a thing is called 'nature tourism', while 'ecotourism' in principle requires a proactive approach that seeks to reduce negative impacts and enhance the positive impact of nature tourism. The International Ecotourism Society defines ecotourism as a responsible journey to natural areas that conserve the environment and sustain the welfare of local communities (WWF International, 2001) [1]. Reference [2] defines ecotourism as a tour to a natural area to enjoy and appreciate nature and local culture, promote conservation, have a low visitor impact, and provide excellent local socio-economic involvement of local people.

In the era of sustainable development that has been proclaimed by the Indonesian government since 1982 with the issuance of Law No. 4 of 1982 on the Basic Principles of the Environment, ecotourism development has an important role in improving the welfare of the community without damaging the environment. Reference [3] added that ecotourism provides environmental, cultural and economic benefits to the developed region.

Sustainable development through ecotourism has not used a holistic approach that combines social needs and environmental needs [4]. In other words, when planning tourism activities, they have not recognized the linkages between environmental components and social components. Sustainability is key to any eco-tourism development [5].

In developing countries, ecotourism as a conventional tourism has a challenge to contribute in sustainable development and environmental conservation. While social responsibility on the



implementation of ecotourism is not very clear [6], [7] argues that participation, accountability, and inclusiveness as a material for local empowerment. In addition, [8] proposed four dimensions of local empowerment comprising social, economic, psychological and political empowerment, while [9] stated that the empowerment of local communities in the context of environmental protection is one of the principles of ecotourism. At least ecotourism projects aim to 'engage' local communities and the worst ecotourism projects can ignore the issue of full local participation [10].

The latest innovation on ecotourism development is focused on the relationship between tourism development and community engagement. Reference [11] used the covariant structure model to find the awareness of place and class of population as the most important factor in tourism development. Reference [12] stated that the development of tourism can affect the positive welfare of society in the field of education and sanitation.

The purpose of this research was to 1) analyse the potential of water reservoir of Gajah Mungkur Wonogiri to be developed into ecotourism area, 2) to analyse the obstacles of ecotourism development of Gajah Mungkur Wonogiri reservoir, 3) to provide guidance for the development of water reservoir of Gajah Mungkur Wonogiri to be ecotourism area.

2. Methods

This research is part of the "Community Based Ecotourism Development of Gajah Mungkur Wonogiri Reservoir Tourism Area" research, and this article focuses on the analysis of reservoir water tourism development in Gajah Mungkur Dams, Wonogiri Regency. Wonogiri Regency is one of the regencies in Central Java Province, and the location of Gajah Mungkur Dams is about 6 km to the south of Wonogiri city, about 40 km from Surakarta city to the southeast. The area of Gajah Mungkur Dams is about 8800 km² includes 7 districts.

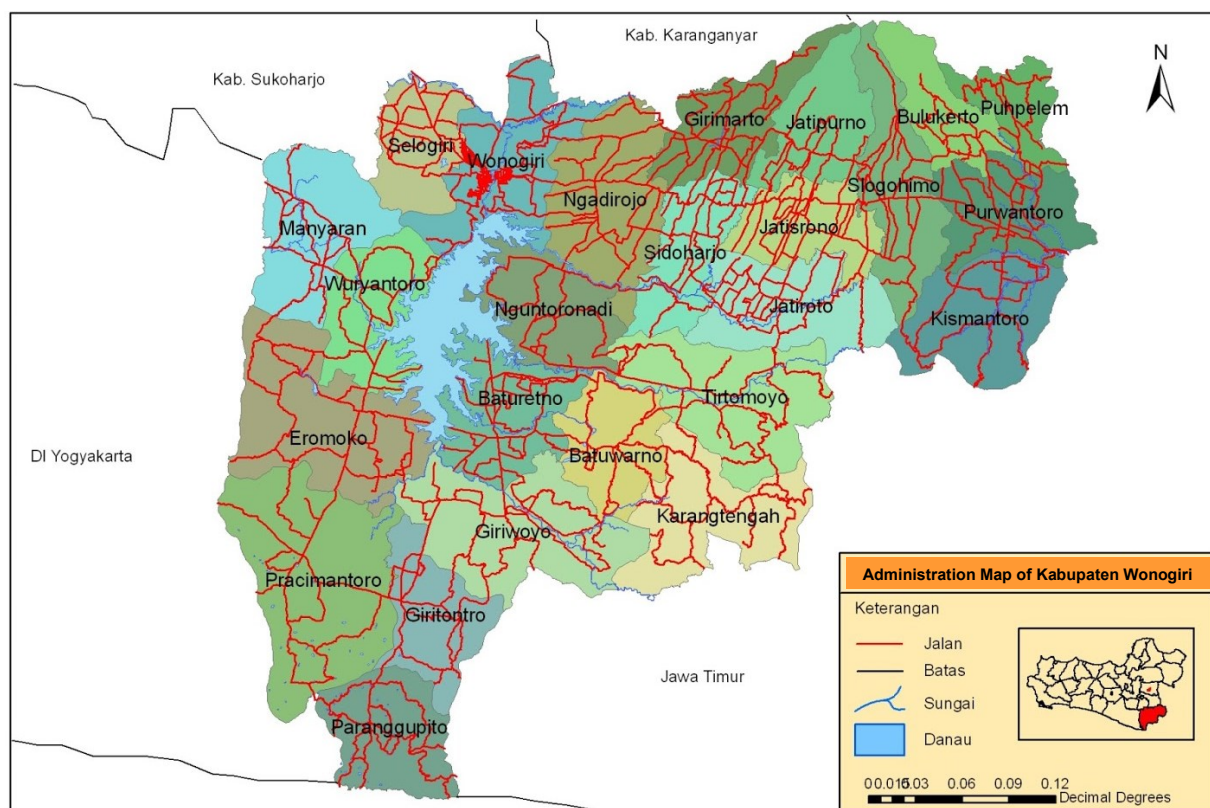


Figure 1. Wonogiri Regency Administration Map

Primary data collection gathered through (1) field observation includes observation of tourist attraction, accessibility, land use, slope, (2) in-depth interviews with key figures from the Tourism Office of Wonogiri Regency, officers from BBWS Bengawan Solo, representatives of visitors and community representatives; and (3) water quality analysis of reservoirs. Secondary data collection included Wonogiri Regency in Figures from BPS and maps from BAPPEDA. Data analysis for potential and obstacles of water pond development was done through descriptive qualitative research while SWOT analysis was used for the development of ecotourism water reservoir analysis.

3. Results and discussion

3.1. *Conditions of tourism activities that had been developed*

The Gajah Mungkur Dams was built in 1976 and operated in 1978. The main purpose of this reservoir construction was to control flooding in the Bengawan Solo drainage basin, but in its development it is used for various purposes i.e. for irrigation, electric power, drinking water source, fishery, and also tourism.

The centre of tourist activity in Gajah Mungkur Dams was located in Sendang Village, Wonogiri District. In this tourist area there were many tourist facilities, such as children games, water boom, speedboat, water bike. Not far from this place there was a *gantole* gym and a viewing field. Visitors went to the Gajah Mungkur Reservoir area was varied between 10,000–40,000 people per month depending on the holidays [13]. Peak season is usually on Idul Fitri holidays and at the end of in which the year the number of visitors can reach 100,000 in a month.

Based on field observation there were many areas in Gajah mungkur dams that can be developed into tourism area. This study focused on the development of ecotourism reservoir water of Gajah mungkur dams, so that tourism activities that will be developed can contribute to environmental sustainability and improve the welfare of the community.

The number of visitors to this location was relatively small and gave little support to regional income. Based on interviews with 10 participants of randomly selected visitors, they consider that tourism area was less interesting because:

- 1) Tourism attraction was less attractive, generally it was only developed for children amusement but not the adults ,
- 2) The main attraction of the reservoir water had not been managed optimally,
- 3) Sanitation was not maintained so that the area seems very dirty,
- 4) Less interesting land use planning

3.2. *Ecotourism water potention of gajah mungkur dam*

Analysis of tourism development potential refers to the Integrated Rural Tourist Development Model [14], namely 4A (Attraction, Accessibility, Amenities, and Ancillary). Objects that can be sold as tourism attractions must have beauty, uniqueness, scarcity, diversity, landscape and wholeness. Based on the above consideration, tourism attractions that can be developed in the water reservoir of Gajah Mungkur dam are:

3.2.1. *Touring arround dams.* The Gajah Mungkur reservoir water itself is an interesting tourism attraction. The view of the clear water with the various biotas that is above and inside it is a beautiful tourism attraction. Gajah Mungkur water reservoir with its sharp-curved beaches is also interesting as a unique tourism attraction. The scenery around the reservoir is very beautiful if managed. Touring 3around the dams, the visitors can enjoy the scenery by boat. The sensation of boat rides and natural beauty is a good combination.

3.2.2. *Water park.* Water plants as the compiler water park was double functioning. There were for the beauty function and ecological functions. Some types of aquatic plants could absorb mud, absorb pollutants and increase the oxygen content in water. Several types of aquatic plants suggested were lotus

(*Nymphaea*), Tifa (*Typha latifolia*), water hyacinth (*Eichornia crassipes*), Lotus (*Nymphaea lotus*), Seroja (*Nelumbo nucifera*), Apu-apu (*Pistia stratiotes*, *Pistia crispata*) dan Kala lili (*Zantedeschia aethiopica*). Sample of water plants can see in figure 2.



Figure 2. Lotus ((*Nymphaea*), Kala lili (*Zantedeschia Aethiopica*)

3.2.3. Organic keramba. At this time in the research location had been developed with the fish breeding keramba or floating net either individually or from the Department of fisheries Wonogiri district. Types of fish that were maintained were tilapia, patin and gurameh. The feed used is a factory production that had the potential to pollute the environment.

The propose of organic keramba was a feeding system by making itself from natural ingredients such as animal waste, tofu, leaves and so on. With this type of feeding, besides the price was cheaper, it was also more environmentally friendly. The development of fishiery system of *keramba*, could be used as a tourism attraction as well as improving the community welfare.

3.2.4. Fishing. At this time, there were no special facilities for the tourists who had fishing hobby. Some people took advantage of vilages near the tourism centre for fishing. Besides it was uncomfortable due to many visitors, the location of the water was also dirty since there were a lot of wastes in the water.

According to the researchers, it needs to build a special arena for fishing in a quieter but easy access site. The location of the fishing site should be near the keramba, since the free fish will use the feed from the remaining fish feed cages. The distribution of various types of freshwater fish in this lake also adds biodiversity.

3.2.5. Traditional attraction. At this time, the cultural attractions are limited to music performances “*campursari*” and “*dangdut*”. Cultural attractions related to local customs had not yet been explored and developed to become a tourism attraction. In this study, it was also not found the customs associated with the reservoir. If there were one, it would significantly increase public participation in the tourism industry in Gajah Mungkur Wonogiri Reservoir.

The other function of ecotourism was its utilization as a tool to conserve biodiversity. The development of water park, organic *keramba*, and fishing site could elevate the biodiversity in Gajah Mungkur Water Reservoir. As a research in Zanzibar [15], ecotourism contributed on the increasing number of colobus monkeys (*Piliocolobus kirkii*) and other rare species in Teluk Jozani-Chwaka National Park. In Africa, some tour operators make a clear contribution to wildlife conservation. Wilderness Safaris, for example, started the Wilderness Wildlife Trust (WWT), which provides funding for three major activities including research and conservation, community empowerment and education, and anti-hunting and management. Map of ecotourism development plan see in figure 2.

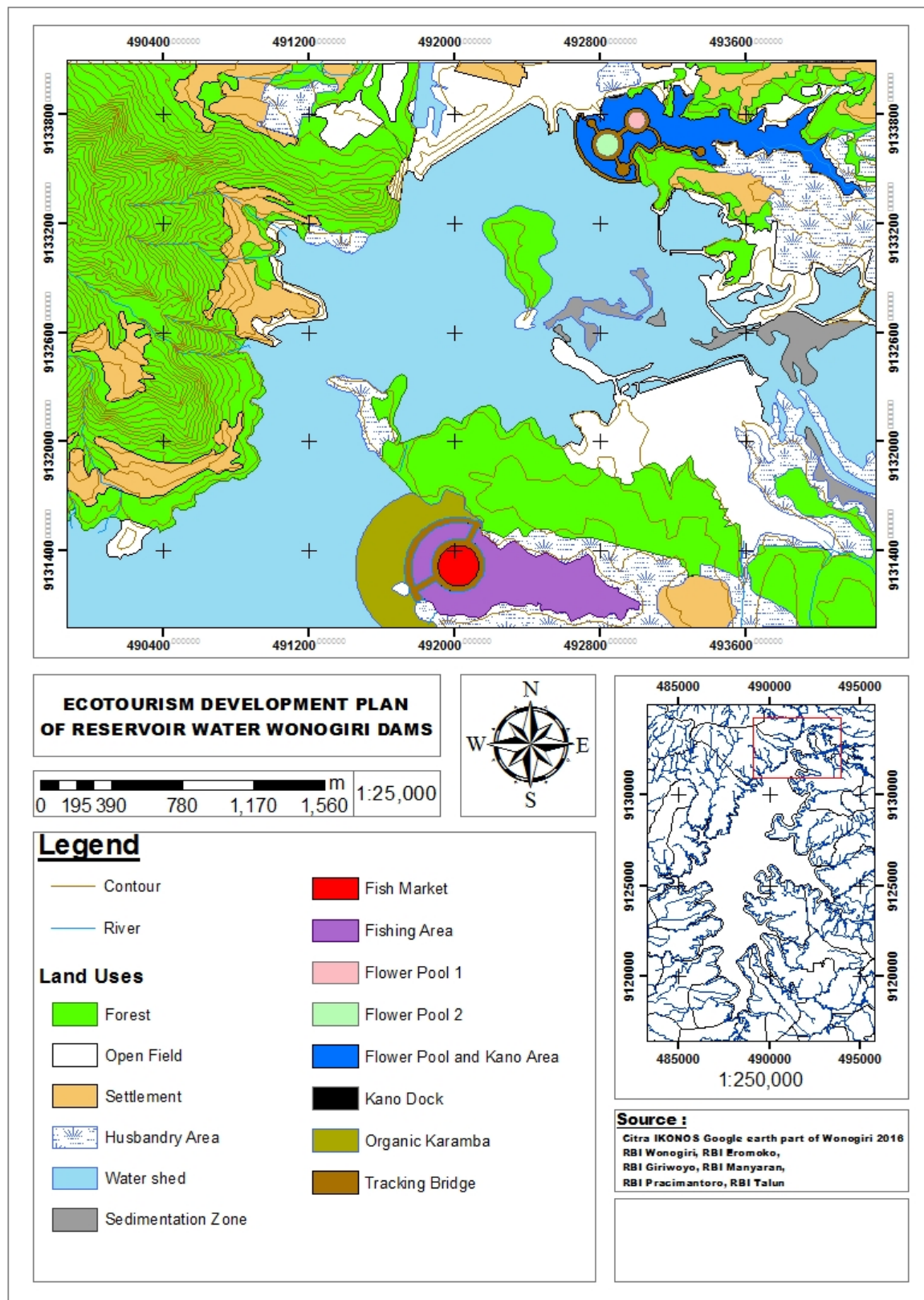


Figure 2. Maps of ecotourism development plan

3.3. *Obstacles of ecotourism development in Gajah Mungkur reservoir*

Based on the results of field observations, the results of interviews with stake holders, water quality analysis of reservoirs concluded that there were some obstacles to the development of ecotourism water reservoir Gajah Mungkur, namely:

3.3.1. Accessibility. Good road access was only to the area of tourism centre in Sendang Village, Wonogiri District. Some locations were feasible to develop but road access has not reached the area.

It is the duty of the local government to increase access to reservoirs besides the existing road access, to encourage the growth of tourism points and also to encourage the improvement of the economic activities of the community.

Water quality of reservoir water

Reservoir water quality was analysed primarily for the development of organic cages and waterpark. Parameters selected were parameters related to biota life, i.e. BOD, COD, DO and pH.

The value of BOD in the water of Gajah Mungkur Reservoir ranged from 3.89 to 8.89 mg/L. The water of Gajah Mungkur had been contaminated by organic material which was easily decomposed and not suitable to be used as raw water source of drinking water, but still can be used for fish farming activities.

From the results of the water quality analysis of the waters of Gajah Mungkur Reservoir, it showed that the COD value of waters ranged from 14.27 to 38.83 mg/l, with an average value of 26.48 mg / l. This data indicates that reservoir waters are contaminated by organic matter which was difficult to unravel.

Distribution of dissolved oxygen (DO) in this study was between 4.46 – 7.70 mg/L. Although it had not been polluted for DO parameters, but from previous studies the content of DO waters of Gajah Mungkur reservoir decreased.

3.3.2. Environmental damage. The natural landscape around the reservoir should be a beautiful sight because it is a hilly area. Based on the observations, in some locations there were stone minings that causes the land to be bald and prone to landslides.

3.3.3. Relief. The reliefs referred to micro reliefs in the reservoir borders. In some areas, the reservoir had a relatively steep slope, making it difficult to develop into a tourism destination.

3.3.4. Community awareness. Community awareness to actively participate in the tourism industry is still small. Keramba management community, for example, has not yet realized that keramba can actually become a tourism activity so it can be a source of income for example by selling fresh fish.

3.3.5. Management. The Gajah Mungkur Reservoir management was under the Great River Basin (BBWS) management of Bengawan Solo, while tourism activities become part of Wonogiri regency government management. This becomes a problem since for developing tourism, Wonogiri regency government must get permission from BBWS BS.

3.4. *Development of Gajah Mungkur water reservoir ecotourism direction*

The direction of ecotourism development of Gajah Mungkur water reservoir was analysed using SWOT analysis by exploring strengths, weaknesses, opportunities and threats to find the best direction.

Tabel 1. SWOT Analisis of Gajah Mungkur water reservoir ecotourism development

INTERNAL EXTERNAL	STRENGTHS (S)	WEAKNESS (W)
	<ul style="list-style-type: none"> Many interesting tourism objects The potential local cultures are numerous and interesting Government attention Investor's attention 	<ul style="list-style-type: none"> Accessibility is less supportive Limited facilities and infrastructure Maintenance of the environment is not good
OPPORTUNITIES (O)	STRATEGY S-O	STRATEGY W-O
<ul style="list-style-type: none"> Regional autonomy Progress in the field of ICT The tourism sector is increasingly in demand by the public 	<ul style="list-style-type: none"> Adding sustainable tourism attractions (ecotourism) Utilizing ICT promotion 	<ul style="list-style-type: none"> increasing accesibility Build facilities and infrastructure
THREATS (T)	STRATEGY S-T	STRATEGY W-T
<ul style="list-style-type: none"> Double management Low community awareness Low ommunity quality 	<ul style="list-style-type: none"> Syncckronize the government program with BBWS WS 	Improving the community awareness on sustainable tourism

Based on the above SWOT analysis, the direction to improve Gajah Mungkur water reservoir ecotourism were:

1. Adding ecotourism agttraction in not yet developed sites
2. Improving ecotourism promotion by utilizing ICT for example utilizing internet, leaflet, book and so on
3. Improving the community welfare through improving tourism awareness of the community
4. increase accessibility and tourist amenity to attract visitors

Thus the goal of ecotourism which was developing tourism that still maintain the environment and improve the welfare of the community can be achieved. This was consistent with the opinion of Stronza and Pêgas (2008) [16], which finds links between ecotourism and nature conservation using two case studies from Brazil and Peru. This study showed that ecotourism creates a strong link between economic benefits and nature conservation.

4. Conclusion

Based on the explanation, it could be concluded that:

1. The reservoir water at Gajah Mungkur Dams was very potential as ecotourism for touring around the dams, organic *keramba*, water park and traditional attraction;
2. The barriers of the water reservoir ecotourism development were reservoir retreading, the water quality and environment sanitation;
3. The result of SWOT analysis for the development of water reservoir for ecotourism were Adding ecotourism attractions, increase promotion by utilizing ICT, increase tourism awareness to the community, increase accessibility and the tourist amenity.

Aknowledments

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