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Post-excavation Land Conservation of Sei Ular River for Sustainable Agritourism

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ABSTRACT: *This research aims to examine the legal arrangements for the conservation of the Wampu Sei Ular River and analyze the implementation of its empowerment for the tourism sector and sustainable agriculture. The research method used is exploratory qualitative aimed at discussing symptoms that are not yet known completely. Explorative qualitative records phenomena and compiles or describes a social symptom of river conservation for tourism and sustainable agriculture. Qualitative data is collected in the form of primary and secondary data. The results of this research show that the conservation of the Wampu Sei Ular River is carried out through various programs and activities such as reforestation to save critical land and normalization in the form of garbage removal and sediment removal. The legal basis is regulated in several regulations, ranging from Laws, Government Regulations, to Governor Regulations. The implementation of Wampu Sei Ular River empowerment for tourism and sustainable agriculture includes: a routine tourism agenda and opening new tourist destinations in the river area. Sustainable agriculture is implemented through the construction of dams and irrigation, providing plant seed assistance, socialization, and assistance to the community regarding the use of renewable energy sources and agricultural technology.*
Keywords: *River, Sustainable Development, Tourism, Agriculture*

1. INTRODUCTION

The existence of rivers has had a huge influence on the development of human civilization from the past until now (Nurlidiawati, 2014). Rivers are not only a provider of clean water to fulfill basic needs but also provide greater benefits to the ecosystem of a region (Barreto & Paula, 2014). In simple terms, modern society currently empowers rivers as flood barriers, agricultural irrigation, means of transport, and tourist destinations (Muchlashin, 2019). Therefore, rivers must be preserved and protected from various forms of destruction and pollution (Nabhi, 2023).

From year to year, the condition of rivers in Indonesia is getting worse and alarming. Many rivers have decreased in quality with indications of increasing amounts of critical land, flood intensity, drought, landslides, and water pollution that cause environmental losses (Deyanti, 2018). This condition is further exacerbated by the low public awareness of preserving the river environment, as well as weak law enforcement against the perpetrators of pollution, especially those committed by corporations (Fitri Indrawati, 2014).

Massive development activities, population growth, land clearing, and industry are the main causes of pollution in watershed areas in Indonesia Good and sustainable river flow management is very important to maintain the sustainability of human life and environmental sustainability (Roos et al., 2023), River conservation analysis can be done with land use change and its effect on local water and air quality. This is important in fulfilling water needs and handling pollution, especially the concept of greening for life. (Brontowiyono et al., 2010).

Based on data from the Ministry of Environment and Forestry of the Republic of Indonesia (KLHK), from monitoring 564 river points in Indonesia, there are 59% experienced heavy pollution, 26.6% experienced moderate pollution and 8.9% others were lightly polluted. Meanwhile, data from the Central Statistics Agency (BPS) of the Republic of Indonesia in 2021, 10,683 villages experienced water pollution. Central Java is the region with the most water pollution with 1,310 affected villages, followed by West Java with 1,217 villages, and East Java with 1,152 villages. Meanwhile, in West Kalimantan Province, there are 715 villages/sub-districts, North Sumatra 673 villages/sub-districts, Central Kalimantan 610, South Sumatra 440, and South Kalimantan 396 villages/sub-districts affected by water pollution. The biggest causes of water pollution come from household waste, factory waste, and other sources of pollution. (databoks.katadata.co.id).

As one of the efforts to overcome this problem, the national strategy for sustainable development was formulated in Agenda 21 which is grouped into four three namely: community services, waste management, and natural resource management (Waluyo Jati et al., 2023). Water resources management (natural resources management), is divided into four sub-areas: water resources management, land resources stewardship, agriculture, and rural development, and forest management (Nwankwo et al., 2023). The implementation of natural resource management must be carried out in an integrated manner, including spatial planning, forests, land, watersheds, and so on (Yildirim et al., 2021).

To empower and reduce the level of river pollution, the Wampu Sei Ular Watershed and Protected Forest Management Centre (BPDAS) of North Sumatra, manages the potential of river resources, for sustainable tourism and agricultural activities. Conserva-

tion and empowerment of river areas are expected to maintain environmental sustainability while opening up the potential for the tourism and agriculture sectors with various productive programs that can improve community welfare (Januar et al., 2023).

This policy is in line with the objectives of sustainable development, namely: Firstly, the essential needs of the poor must be prioritized (Sumaryanto et al., 2022). Second, as a foresight that emphasizes the precautionary principle against potential serious threats or something that cannot be prevented, to overcome environmental degradation (Scheel et al., 2020). Third, it integrates the complex relationship between environmental, economic, and social aspects of society, which are the main pillars of sustainable development *(Ngoya, 2015).*

2 METHODS

The type of research used is qualitative exploratory research, which aims to discuss symptoms that are not yet known completely. Howitt, explains that qualitative exploratory research tries to produce information and knowledge in areas that have previously been under-researched (Ninan et al., 2023). This approach seeks basic knowledge and ideas in the new field. This researcher records various phenomena and compiles categories or describes a social symptom of river conservation and empowerment for tourism and sustainable agriculture (Das & Singh, 2023). Qualitative data is collected in the form of primary data and secondary data. Primary data was obtained directly from the source, namely community groups who care about rivers, people who live in the Bantara River, the Ministry of Environment, the North Sumatra Environmental Conservation Institute BPDAS Wampu Sei Ular, stakeholders, and other relevant sources. Secondary data comes from previous research, books, journals, and scientific papers. Primary data collection was carried out using observation techniques, in-depth interviews, and Focus Group Discussions (FGDs), while secondary data collection was carried out using document or literature study techniques. (Zunariyah, 2018).

3 DISCUSSION

Conservation Regulation of Wampu Sei Ular River

Article 1 Paragraph (7) of Law Number: 7 Year 2004 on Water Resources states that water resources management is an effort to plan, implement, monitor, and evaluate the implementation of water resources conservation, water resources 77tilization, and control of water destructive power. Law No. 5 of 1990 on the Conservation of Living Natural Resources and Ecosystems explains that conservation is organized based on three main principles, namely: protection of life support systems, preservation of the diversity of plant and animal species and their ecosystems, and sustainable utilization of biological natural resources and their ecosystems (Santana et al., 2023).

Sustainable utilization of resources and ecosystems is part of conservation activities (Anisa Eka Ariyani & Kismartini, 2018). In general, the empowerment of conservation areas aims to protect biodiversity and ecosystems so that humans can still utilize them. More specifically, conservation aims to (Chan et al., 2023):

1) Provide protection, restriction, and maintenance to an area or environment of value to avoid damage or extinction to the components that form the environment that can trigger an ecosystem imbalance;
2) Reuse buildings or places that are no longer in use by renewing or restoring their original function so that they can be used again, to prevent new land expansion such as converting forest functions into non-forest functions;
3) Maintaining the quality of the aquatic and terrestrial environment by ensuring the availability of clean water and air. (Theodurrus, 2021).

Water resources are one of the pillars supporting development capital. Water resources as raw materials have contributed as much as 24.8% of gross domestic product (GDP) and 48% to national employment. Therefore, without effective handling, water resources will face various complicated problems that can affect development programs and national food security (Gaafar et al., 2021). As an effort to save and maintain the beauty of the river, the North Sumatra Environmental Conservation Institute (LKLH) and BPDAS Sei Ular carry out conservation and rescue efforts for the Deli watershed whose conditions are increasingly alarming, by planting trees on the riverbanks. Tree planting efforts are carried out appropriately in planning, species selection, nursery, planting time, maintenance, and harvesting. Tree planting in the Deli watershed can prevent floods and landslides and maintain the beauty of the ecosystem (Ottinger, 2010). In addition to the riverbank reforestation program, in early 2023, the Deli River will also be cleared of debris from Jalan KL Yos Sudarso Km. 17 to Simpang Kantor Bridge in Medan. The sweeping succeeded in clearing 11,250 m³ of rubbish and removing 2,025 m³ of sediment from the river.

Table I
Land Area Condition of Deli Watershed

Category	**Broad**
The land is a bit critical	16,977.74 hectares
Critical Land	1,186.36 hectares
Potentially Critical Land	3,782.79 hectares
Highly Critical Land	2,329.08 hectares
Non-Critical Land (Normal)	14,776, 25 hectares
Total Land Area (Deli Serdang-Karo-Medan)	**39.054,22 hectares**

Source: North Sumatra Environmental Conservation Institute (LKLH) North Sumatra 2020.

The North Sumatra Watershed Forum together with the Indonesian Green Aren Foundation (YAHI) launched the One Million Superior Aren Trees Assistance Programme, marked by the first planting at the Kota Cina Site Complex and Lake Siombak Bank, Lingkungan VII Paya Pasir Village, Medan Marelan District, Medan City. In addition to reforestation, BPDAS Wampu Sei Ular also reclaimed former excavation C mining land in the Sei Kukam Hulu-Sub Watershed Sei Bingei Area, water conservation and watershed management of North Sumatra Province (Fordas Sumut) and the Sei Ular Watershed Forum Action Program for 2023-2024 (socialization of fords, the establishment of ford posts, training in making eco-enzyme fertilizer).

Within the national and regional scope there are several regulations governing the empowerment and protection of rivers, especially the Wampu Sei Ular River, including the surrounding ecosystem, namely:

1) Law Number 32 Year 2009 on Environmental Protection and Management.
   Regulates legal protection and criminal sanctions for perpetrators of water pollution and destruction of river ecosystems with a maximum imprisonment of 15 years and a maximum fine of Rp. 15,000,000,000 (fifteen billion rupiah);
2) Law No. 7 Year 2004 on Water Resources.
   This law regulates the management and conservation of water resources based on the principles of sustainability, balance, public benefit, integration and harmony, justice, and legal certainty;
3) Government Regulation No. 37/2012 on Watershed Management. Regulates watershed management, including water resources management, flood control, and environmental management in watershed areas;
4) Government Regulation No. 38 of 2011 on Rivers.
   This regulation regulates river management, including river space management, licensing, information systems, community empowerment, protection, authority and responsibility for river development;
5) Regulation of the Minister of Home Affairs No. 22/2009 on Technical Guidelines or Methods of Regional Cooperation.
   This regulation provides technical guidelines or ways of cooperation between regions (provinces and districts/cities) in the context of managing water resources, including rivers;
6) Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.10/Menlhk/Setjen/OTL.0/1/2016 on the Organisation and Work Procedure of the Watershed and Protected Forest Management Centre.
   Becomes the regulatory basis for the Wampu Sei Ular Watershed Management Centre (BPDAS) to manage and empower water resources (including rivers and forests) in North Sumatra;
7) Minister of Environment and Forestry Instruction INS.1/Menlhk/Pdashl/DAS.1/8/2017
   Requires people to plant and maintain at least 25 trees during their lifetime that are planted in the surrounding environment (including rivers). The 25 trees come from 5 trees at elementary school, 5 trees at junior high school, 5 trees at high school, 5 trees at university, and 5 trees at marriage.
8) North Sumatra Provincial Government Regulation No. 11 of 2023 on the Regional Spatial Plan of North Sumatra Province 2023-2043.
   This regulation is a regional spatial plan for North Sumatra Province that includes the management of water resources and rivers.

Implementation of Wampu Sei Ular River Empowerment for Tourism and Sustainable Agriculture

Empowering rivers for tourism and sustainable agriculture has a positive impact on environmental sustainability and improving community welfare. In the tourism sector, tourism management of conservation areas has a huge economic effect on the business world and the community (Roos et al., 2023). In 2022, tourist visits to conservation areas reached 5 million people consisting of 4.9 million domestic tourists and 195 thousand foreign tourists with a value of Non-Tax State Revenue from Entrance Tickets to Natural Tourism

Objects (PNBP-PMOWA) of Rp. 96,737,120,500. This number increased compared to visits in 2021, namely: 2.9 million domestic tourists and 12 thousand foreign tourists with a contribution value of PNBP-PMOWA of IDR 34,219,489,000 (ppid.menlhk.go.id).

In terms of employment, 97 Business Permits for the Provision of Nature Tourism Facilities employ as many as 1900 people, and 81 Business Permits for the Exploitation of Nature Tourism Services have involved at least 2,068 workers and casual workers. In addition, nature tourism activities in conservation areas have also provided jobs for local communities as accommodation, food and beverage service providers, tour guides, and souvenir businesses (Chen et al., 2021).

Table II
Contribution of Conservation Areas to Tourism Sector Revenue

Income sources	2021	2022
Domestic and international tourist arrivals	2.9 million visits	5.1 million visits
Nature tourism entrance ticket	Rp. 34,219,489,000	Rp. 96,737,120,500
Levy on the results of the business of provision-Natural Tourism Facilities	Rp 6,483,300,000	Rp. 9,607,400,000
Business License Fee for natural provision-Tourism Services	Rp. 500,000	Rp. 3.000.000

Source: Ministry of Environment of the Republic of Indonesia.

Wampu Sei Ular has tourism potential that can be developed optimally. The tourist destinations and agendas that have been implemented include

1) Waterfront City Sei Ular Sergai Regency, starting from the cross Sumatra road bridge to the Estuary along 15 km. This arrangement uses the concept of integrated and sustainable river areas with the aim of surface water conservation, water tourism areas, culinary tourism, and aquaculture areas;
2) Bathing in Sei Wampu Ular River, Dolok Tinggi Raja. In this tourist destination, visitors can enjoy the freshness and warmth of the Sei Wampu Ular river water in the Dolok Tinggi Raja Nature Reserve / Tourism Park area in Dolok Merawan Village, Simalungun Regency;
3) Floating Tourism Objects on the banks of the Sei Wampu Ular, Binjai Bakung Village, Pantai Labu District, Deli Serdang Regency;
4) River Flow Tourism Object, Melati Gang Delima Village, Perbaungan Subdistrict, Serdang Bedagai Regency;
5) Wampu River Rafting Tour, Marike Village – Bahorok Bridge, Langkat Regency;
6) Rafting Tourism Pagar Manik-Sungai Buaya (Serdang Bedagai-Deli Serdang);
7) Sibolangit Nature Park (TWA), Sibolangit Village, Sibolangit District, Deli Serdang Regency, North Sumatra Province.

The existence of tourist destinations has a direct effect on improving the welfare of the local community and driving the economy (Zhai et al., 2020). Besides the tourism sector, the Wampu Sei Ular River also plays an important role in agriculture as an agricultural concept using sustainable natural resources, and utilizing renewable energy to produce quality agricultural products (von Jeetze et al., 2023).

Agroecology-based sustainable agriculture is supported by the community based on four pillars, namely: Firstly, it is economically feasible to establish a long-term production system. Second, the use of technologically appropriate technology. Third, it is

environmentally sound and sustainable. Fourth, socially and culturally acceptable and applicable (Beltrán-Véliz et al., 2023).

The empowerment of the Wampu Sei Ular River for sustainable agriculture in its domain:

1) The Wampu Sei Ular River can function as a flood control by building the right infrastructure, such as dams and waterways, flooding can be controlled and agricultural land can be protected from damage or crop failure due to flooding;
2) Source of irrigation water, being a source of irrigation that is needed by farmers to meet the needs of water in rice fields, fields, and gardens;
3) Being a source of livelihood for the community around the river, especially for fishermen. In this river there are various types of fish with high economic value such as Dong-dong fish, Baung, Selais, Tapah, and Jurung fish;
4) The Wampu Sei Ular River can be utilized as a source of renewable energy, such as hydroelectric power plants. Utilising renewable energy sources can reduce dependence on fossil fuels and reduce negative impacts on the environment

Robert Malthus stated the theory of natural resource management as a way to balance population growth and food needs by increasing agricultural productivity (von Jeetze et al., 2023). If this is not implemented, there will be environmental degradation in the form of pollution and damage due to excessive exploitation of natural resources without considering their sustainability (Kachena & Spiegel, 2023)

The increase in population causes the ability to provide food and water to become increasingly limited. In addition, the increase in population has also resulted in increased conversion of forest and agricultural land for settlement or industry (Shiferaw et al., 2023). This condition causes agricultural productivity to decline, due to the shrinking of rice fields, as well as the destruction of forest areas and irrigation networks (Vihervaara et al., 2012). The water resources sector will face critical issues including:

1) Water allocations to various sectors are experiencing localized scarcity due to growing non-irrigation water demand (Ball et al., 2023);
2) Inadequate access to clean water supply as urban water supply facilities are unable to serve growing demand (Zhou et al., 2023);
3) Water pollution due to the discharge of urban wastewater, industrial waste, and business waste is detrimental and can reduce the availability of clean water (Booth et al., 2018);
4) Limited provision of operation and maintenance (O&P) funds for existing facilities and infrastructure, as well as investment to add new facilities in anticipation of increased water demand;

The North Sumatra Wampu Watershed Forum together with the Agriculture, Fisheries and Forestry Extension Commission (KP3K) of Deli Serdang Regency and Pondok Pesantren Al-Hidayah Sei Mencirim Village, Kutalimbaru District, Deli Serdang Regency developed Beneng taro cultivation, marked by the first planting of taro seeds on the Al-Hidayah Islamic Boarding School Campus. This agricultural product is expected to be accepted by the community as well as a learning material for Santri in the context of applying agricultural science (Hegde et al., 2023).

The North Sumatra Wampu Watershed Forum, in collaboration with the community of Stabat Lama Village, Stabat District, Langkat Regency, planted 3000 seeds of Sempur, Asam Gelugur, and Aren plants in the community. These three types of plants were deliberately chosen because they function as riverbank reinforcements, and the

fruit can be processed into sweets which are typical culinary specialties of the local community (Malay Langkat) with economic value.

In addition, Sei Wampu Dam has also been built in an area of 10,991 hectares in four sub-districts, namely, Stabat, Hinai, Secanggan, and Wampu Sub-district. Sei Wampu Dam is a development of rain-fed rice fields and rice fields with semi-technical irrigation to optimize water utilization for agriculture, especially during the dry season. Fulfillment of water needs for irrigation areas sourced from the Martebing River is carried out by diverting water from the Sibaro River with a discharge of 12.30 M3/det (Belawan Ular Padang River Basin). Fulfillment of water needs from the Batugingging River is carried out by diversion from the Ular River with a discharge of 5 M3/det (Belawan Ular Padang River Basin).

4 CONCLUSIONS

Conservation of the Wampu Sei Ular River is carried out through various programs and activities such as saving critical land by reforestation, normalization of waste removal, and removal of sediment. The legal basis is set out in regulations at the central and regional levels such as Law No. 32 of 2009 on Environmental Protection and Management, Law No. 7 of 2004 on Water Resources, Government Regulation No. 37 of 2012 on Watershed Management, Government Regulation No. 38 of 2011 on Rivers, Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. P.10/Menlhk/Setjen/OTL.0/1/2016 on the Organisation and Work Procedure of the Watershed and Protected Forest Management Centre, and Government Regulation of North Sumatra Province No. 11 of 2023 on the Regional Spatial Plan of North Sumatra Province 2023-2043.

The conservation area tourism sector contributes greatly to economic growth, the business world, and employment. The implementation of empowering the Wampu Sei Ular River for tourism includes: setting a routine tourism agenda and opening new tourist destinations in the river area. Sustainable agriculture is implemented through the construction of dams and irrigation programs for agriculture, providing plant seed assistance, socialization, and assistance to the community regarding renewable energy sources and agricultural technology.

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