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The Impact of Normalization of Batang Agam Watershed in Payakumbuh City

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ABSTRACT

Watershed normalization of Batang Agam was initiated in 2015 and continued until 2022 with a substantial budget allocation. But what has been the extent of its impact? Furthermore, it is essential to explore the alignment between the Detailed Spatial Plan (RDTR) of Payakumbuh City and the actual land acquisition process for normalization in three neighborhoods: Pakan Sinayan, Tanjung Pauh, and Tanjunggadang Sungai Pinago located in West Payakumbuh Subdistrict. This qualitative research, conducted through observation and surveys, delves into the implementation of normalization and the subsequent impacts it has caused. Normalization can be successful due to the support from various potential factors, including legal regulations, stakeholder collaboration, adequate funding, and community participation. Normalization brings about positive impacts across environmental, social, and economic aspects. However, it turns out that normalization also has negative impacts, such as natural responses to changes and physical developments, as well as various community activities that lack responsiveness to environmental sustainability.

A. Introduction

The city of Payakumbuh covers an area of approximately 85.22 km^2, which is about 0.20% of the total area of West Sumatra Province (according to the Regulation of the Ministry of Home Affairs No. 72 of 2019). Its strategic location serves as a connecting city between West Sumatra Province and Riau Province through a land route (Masful, 2017). The city of Payakumbuh is traversed by three major rivers: Batang Agam River, Batang Lampasi River, and Batang Sinamar River, along with five other smaller rivers: Batang Pulau River, Talang River, Baih River, Batang Sikali River, and Tembok Jua River. The Batang Agam River is situated 125 km^2 away from Padang City (Putra *et al.*, 2020) and is the largest river in the area, stretching approximately 15.6 km^2 in length and 25 m^2 in width (Regulation of Payakumbuh City Mayor No. 3 of 2022). The Batang Agam River flows through four districts (South Payakumbuh, West Payakumbuh, East Payakumbuh, and North Payakumbuh) and eleven neighborhoods within the city of Payakumbuh.

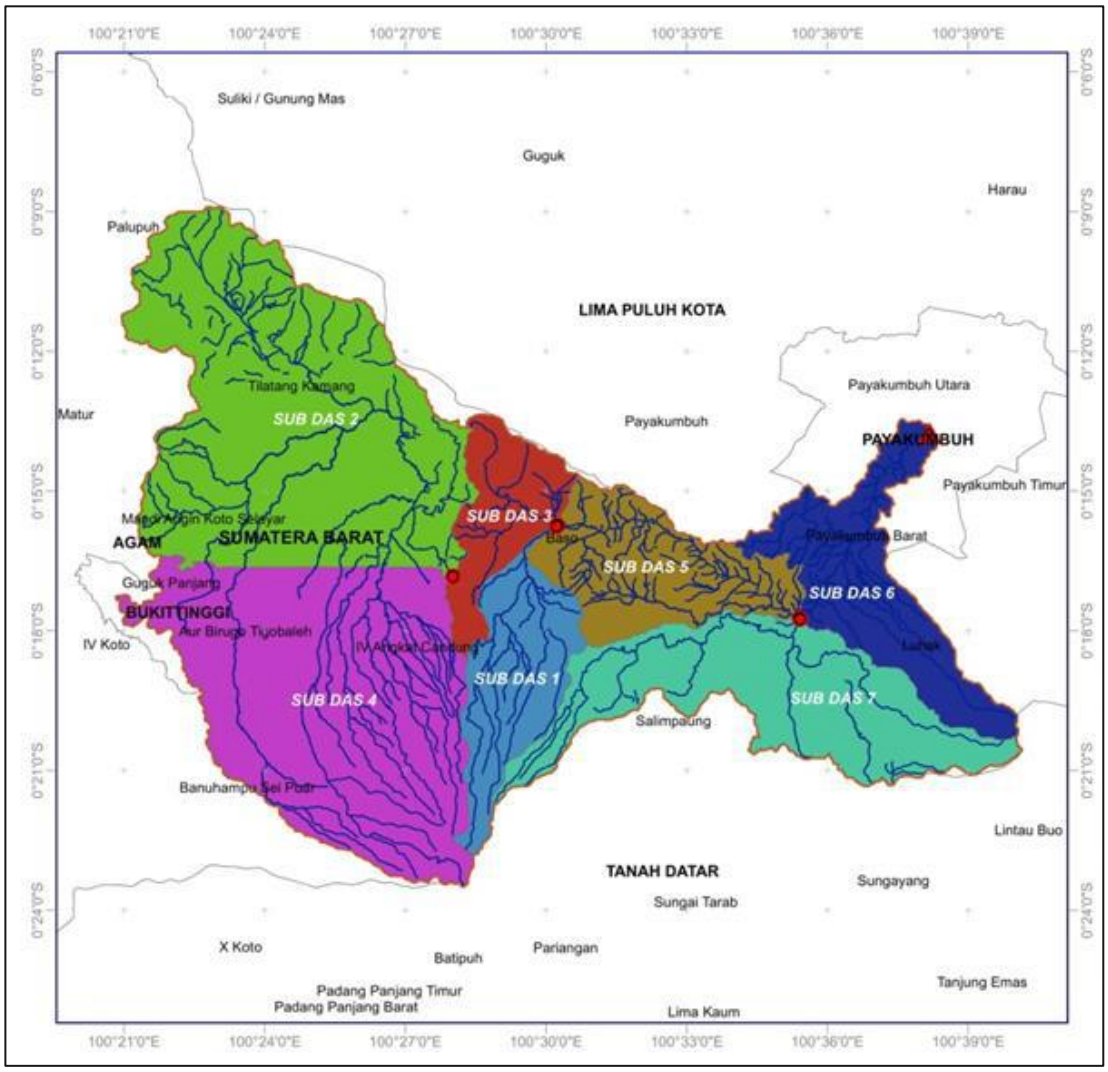

Figure 1. Batang Agam Watershed
Source: (Gustio *et al.*, 2020)

The banks of the Batang Agam River are utilized by the community for agricultural areas, fisheries, and various other activities. Unfortunately, community activities are often accompanied by negative behaviors, such as indiscriminate disposal of household waste and even dumping industrial waste from tofu production (Agnesia *et al.*, 2014; Cikasimi & Jumiati, 2023; Kospa & Rahmadi, 2019; Rismawati *et al.*, 2020) into the Batang Agam River, posing a threat to its sustainability. This has led to the narrowing, siltation, pollution, and even damage to the ecosystem of the Batang Agam River (Gustio *et al.*, 2020). Subsequently, in 2015, the Payakumbuh City Government (Department of Public Works and Housing of Payakumbuh City) conducted an analysis, planning, and field survey that would be followed by the implementation of the Batang Agam watershed normalization (Putra *et al.*, 2020). Normalization is a sustainable development effort aimed at strengthening watersheds, including measures to prevent floods and landslides while enhancing Green Open Spaces (GOS) (Fatah *et al.*, 2015; Khalik, 2022; Putra *et al.*, 2020; Wardiningsih & Salam, 2019).

The physical construction of the Batang Agam watershed normalization was carried out from 2017 to 2019, covering a distance of 3.85 kilometers, with a budget of approximately 169 billion

rupiahs.((Putra *et al.*, 2020). Over the course of 2 years, the project commenced with the river's surroundings being organized through infrastructure restoration. Subsequently, direct repairs were made to the river's damages, culminating in the construction of embankments to safeguard against river erosion (Putra *et al.*, 2020).

Figure 2. Figure Map of Normalization area of Batang Agam Watershed
Source: *Google Earth,*
https://earth.google.com/web/search/payakumbuh/@ -0.23486771,100.63163139,517.1326018a,5236.76719563d,35y,0h,0t ,0r/data=CigiJgokCZC5G35HzR3AES5FzqYMOCDAGfzuwXZIvltAIdoa0HScZltA

Based on the above description, this article aims to align the Detailed Spatial Plan (RDTR) of Payakumbuh City with the Batang Agam watershed normalization, particularly concerning land areas affected by land acquisition. Furthermore, this article will document the positive and negative impacts of the Batang Agam watershed normalization from various perspectives.

Several studies related to watershed normalization have been conducted by various researchers, including Gustio *et al.* (2020), who recorded the erosivity in the Batang Agam watershed from 2010 to 2019 due to negative activities carried out by the community and other natural factors. Firdaus *et al.* (2021) further emphasized the importance of monitoring and controlling activities along the watersheds to prevent potential hazards. According to Febrian *et al.* (2023), the normalization of the Batang Agam watershed is essential to prevent flooding and preserve the river's cross-sectional shape. However, the normalized area can be developed into a tourism and culinary center. Furthermore, Kautsary *et al.* (2021) added that utilizing the watersheds can increase the percentage of green open spaces and urban parks. This statement is supported by Aprillia *et al.* (2020), who argue that the Green

Open Spaces (RTH) resulting from normalization can be used by the community for recreational purposes and interacting with the surrounding environment. In line with that, Putra *et al.* (2020) assert that the normalization of the Batang Agam watershed can be achieved by harnessing its potential, including community participation and careful consideration of on-site conditions. This research also illustrates that the normalization efforts were not solely aimed at preventing floods and landslides, but the government has envisioned the normalized area as a public open space and even as a center for new economic development, including being promoted as a tourist destination. However, (Cikasimi & Jumiati, 2023) revealed the fact that after the Batang Agam watershed normalization, household waste and even tofu factory waste were found, leading to a decrease in water quality. As a result, the Payakumbuh City Environmental Agency then took various measures to control the water pollution of the Batang Agam River in Payakumbuh City. Previous studies have focused on the significance of the Batang Agam watershed normalization, including the process of its implementation. This article presents data from the Detailed Spatial Plan (RDTR) of Payakumbuh City that aligns with the Batang Agam watershed normalization, along with information on land acquisition, including the names of landowners and the number of land parcels affected by the normalization. This article also seeks to analyze the impacts resulting from the Batang Agam watershed normalization activities.

B. Research Methods

This research was conducted in three neighborhoods affected by the Batang Agam watershed normalization, namely Pakan Sinayan, Tanjung Pauh, and Tanjunggadang Sungai Pinago, in the West Payakumbuh Subdistrict. The method employed in this research is qualitative, where data collection involved direct observation, on-site surveys, and interactions with the community residing near the Batang Agam River using a *Google Form* instrument, along with information support gathered from literature studies. According to Fadli (2021), qualitative methods do not rely on numbers or evaluations but rather focus on social and human-related aspects. Qualitative researchers collect data themselves through documentation, behavioral and environmental observation, or interviews with participants (Creswell, 2012). Darmalaksana (2020) further explains that processing data from direct observations presents information and enables drawing conclusions. Armed with secondary data and field surveys, the number of land parcels affected by the Batang Agam watershed normalization was obtained. To strengthen the analysis, survey data from 10 individuals were also utilized, with 8 of them filling out the form and providing their responses regarding the impact of the Batang Agam watershed normalization on the community's livelihood.

C. Implementation of Normalization of Batang Agam Watershed

The normalization of the Batang Agam watershed is part of the Detailed Spatial Plan (RDTR) of the Payakumbuh City Government (Department of Public Works and Housing of Payakumbuh City). Pohan *et al.* (2018) explains that the Detailed Spatial Plan (RDTR) is a regional spatial plan for districts/cities that contains detailed zoning regulations, governing the spatial arrangement of an area in a comprehensive manner. The Detailed Spatial Plan (RDTR) of Payakumbuh City is a comprehensive

and general regional spatial plan that also outlines the spatial planning for the provincial area. The Detailed Spatial Plan (RDTR) of Payakumbuh City aims to transform Payakumbuh into a safe, clean, well-organized city, providing recreational spaces that can serve as green open spaces (RTH).

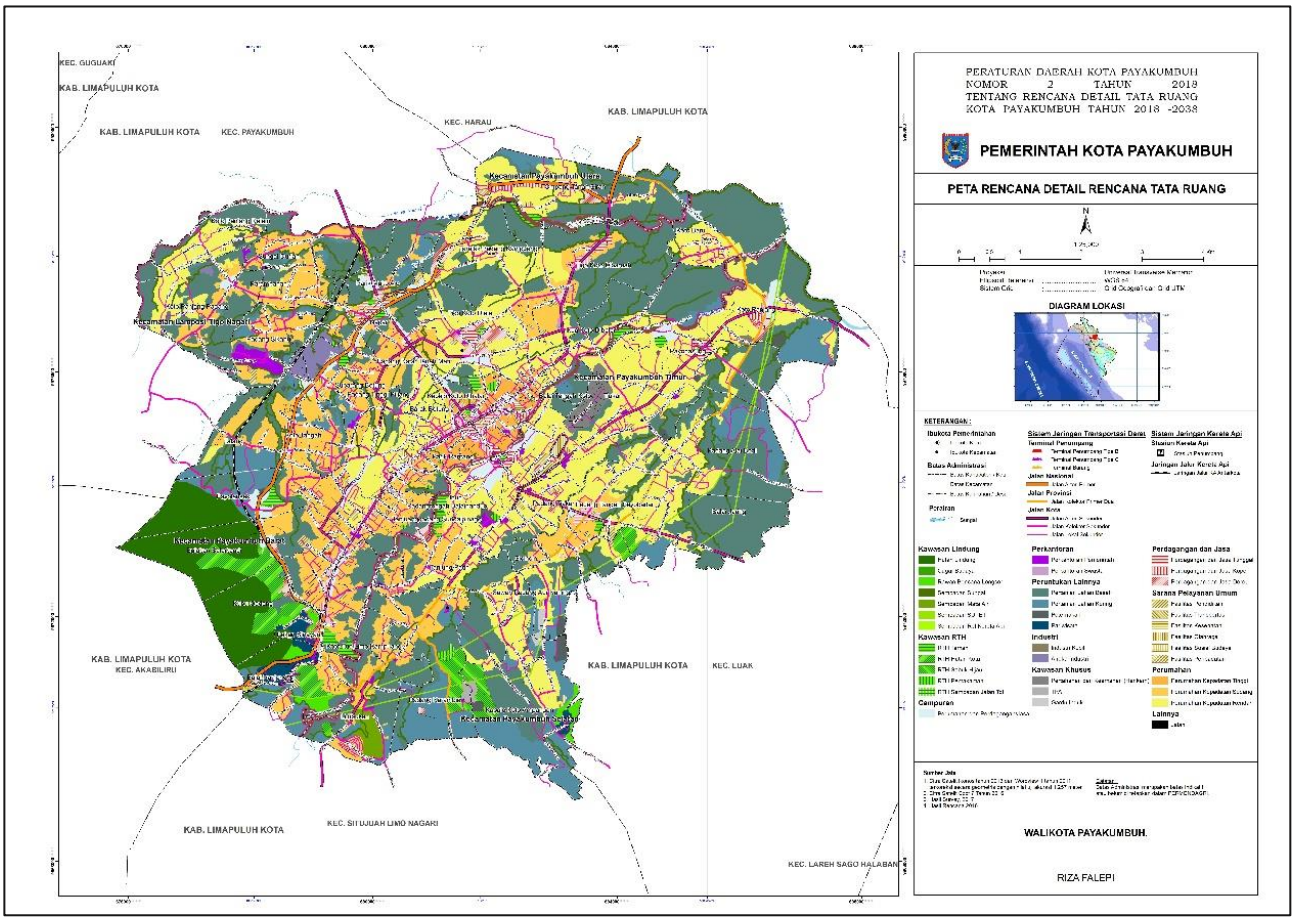

Figure 3. Map of Spatial Detailed Plan (RDTR) of Payakumbuh City
Source: PUPR Office of Payakumbuh City (2018)

Detailed Spatial Planning Map (RDTR) of Payakumbuh City highlights the inclusion of the Batang Agam watersheds in the development plan, aiming to utilize the area as a city park, green open space, and iconic attraction in Payakumbuh City. In this context, analysis, planning, and field surveys were conducted starting from 2015 as a preparatory phase before commencing the normalization of the Batang Agam watersheds.

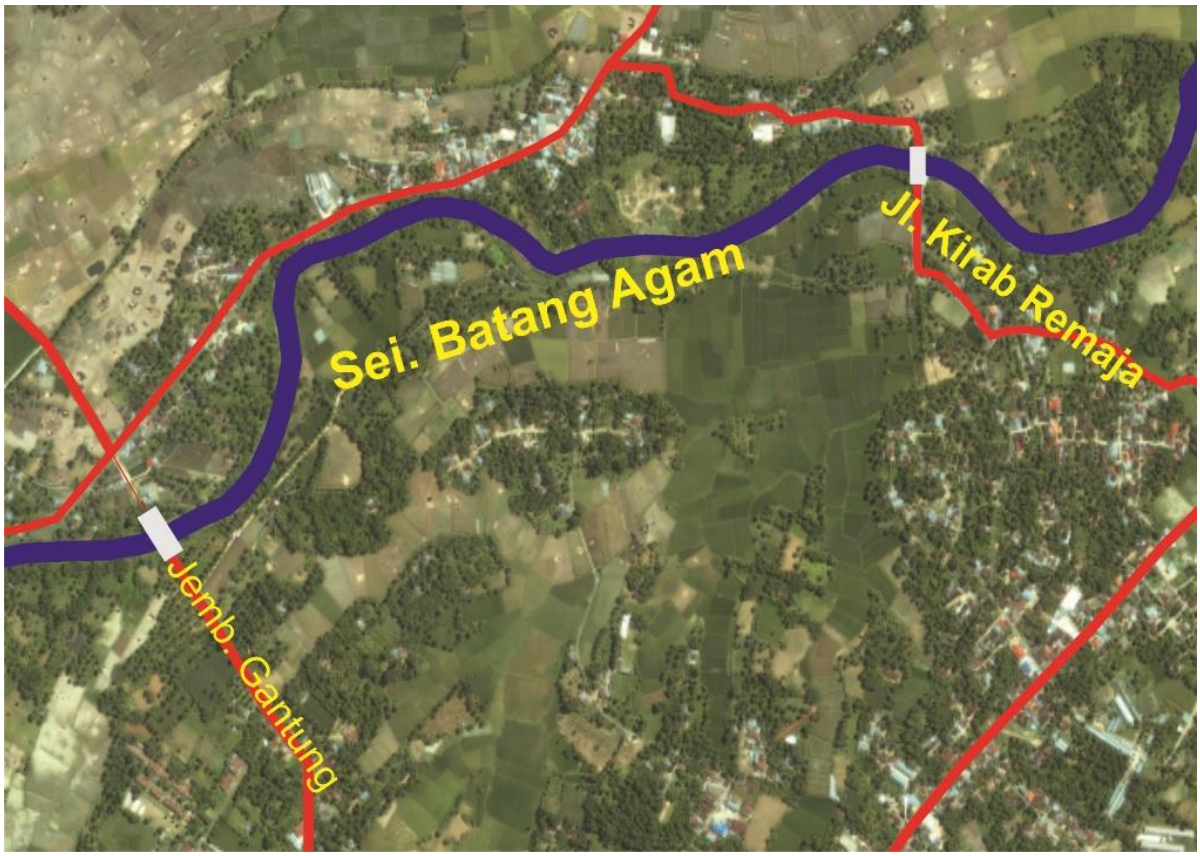

Figure 4. Batang Agam Watrshed Normalization Plan
Source: PUPR Office of Payakumbuh City (2016)

Figure 5. Batang Agam Watershed Normalization Plan
Source: PUPR Office of Payakumbuh City (2016)

The observations conducted by the Payakumbuh City Government revealed that landslides occurred along the banks of the Batang Agam River, leading to damage in agricultural and fishery areas. Furthermore, negative activities are evident, including people from the nearby market

discarding garbage into the river, extracting gravel and sand, and even constructing buildings along the watersheds.

The Payakumbuh City Government, in collaboration with the Ministry of Public Works and Public Housing (PUPR) and other relevant stakeholders, undertook the "Normalization of the Batang Agam Watersheds" to align with Payakumbuh City's Regional Regulation Number 2 of 2018 on the Detailed Spatial Plan for 2018-2038 and Regional Regulation Number 7 of 2012 on the Long-Term Development Plan for 2005-2025.

Normalization is implemented according to the specific characteristics of the Batang Agam watershed and the conditions observed in the field. The Public Works Office of Public Housing in Payakumbuh City divides the normalization area based on the river morphology, considering factors such as the slope of the main river and sediment transport conditions. The division of normalized regions can be observed in the following table:

Table 1. Division of Batang Agam Watershed Normalization Zones

Batang Agam Watershed Zones	Slope of the River	Division of Zones	Provincial Allocation Arrangement
Upstream Area or Production Area	> 6%	parts of Bukittinggi	allocation of debris flow channel protection
Central Area or Transportation Area	3% - 6%	covering the Baso area and part of the Bukittinggi area	allocation for debris flow channel protection, sediment pockets allocation, groundsel allocation, river normalization, and bank protection
Lower Reaches or Sediment Deposition Area	<3%	It includes the districts of Harau and Situjuah in Lima Puluh Kota Regency, and partly the districts of South Payakumbuh and West Payakumbuh in the city of Payakumbuh.	river normalization and bank protection, utilizing the Batang Agam River as a discharge channel, and adjusting the planned water level to the flood characteristics of the Batang Sinamar, a tributary of the Batang Agam River.

Source: Public Works Office of Public Housing Payakumbuh City

The normalization of the Batang Agam watershed is carried out in the regions of West Payakumbuh Subdistrict, South Payakumbuh Subdistrict, North Payakumbuh Subdistrict, and East Payakumbuh Subdistrict. The RDTR of Payakumbuh City explains that North Payakumbuh Subdistrict, West Payakumbuh Subdistrict, and East Payakumbuh Subdistrict are included in the strategically designated Urban Area I (BWP I) as stipulated in the city's RTRW. Meanwhile, the normalization of the Batang Agam watersheds falls under the watershed buffer subzone, which is protected according to Article 10 of Regional Regulation Number 2 of 2018 concerning the Detailed Spatial Plan for 2018-

2038. The regulation outlines the plan for conservation zones, comprising of Local Protection Zone (PS), Green Open Space Zone (RTH), and Natural Sanctuary and Cultural Heritage Zone (SC).

The Batang Agam watershed normalization, as the first step towards creating a *water front city*, commences in the West Payakumbuh Subdistrict and is currently progressing to the South Payakumbuh Subdistrict. Moving forward, the normalization will be extended to the North Payakumbuh Subdistrict and East Payakumbuh Subdistrict through land acquisition (Payakumbuh City Mayor Regulation No. 3 of 2022).

The implementation of the Batang Agam watershed normalization, covering a distance of 9.8 kilometers, has been a challenging endeavor. During the physical construction, the most significant challenge encountered was the deterioration in river water quality. Water quality degradation can occur during the pre-construction, construction, and post-construction stages, leading to alterations in hydrology and rainwater *runoff* (Rijal & Aldy, 2012). Another issue that arises is traffic congestion around the busiest market in Payakumbuh City, known as Pasar Ibuh. Pasar Ibuh is one of the markets with bustling activity nearly every day, making it challenging to avoid traffic congestion during the implementation of normalization. The congestion worsens as the volume of vehicles transporting materials increases during the physical construction process. Therefore, various activities carried out in the riverside area require community control and supervision to prevent any dysfunction (Yogafanny, 2015).

Apart from the PUPR Office, the Payakumbuh City Government also collaborates with the Payakumbuh City Land Office in implementing the normalization of the Batang Agam watershed. The Payakumbuh City Land Office plays a crucial role in the process of measuring land acquisition. The normalization of the Batang Agam watershed commenced in 2015 and continued until 2022. However, in 2022, there was no physical construction; instead, the focus was on the process of land acquisition and compensating individuals whose land was affected by the normalization of the Batang Agam watershed.

D. The Impact of Batang Agam Watershed Normalization in Payakumbuh City

Normalization of the Batang Agam Watersheds is a significant initiative by the Payakumbuh City Government, aimed at fostering physical development, particularly in the agricultural and rural sectors. Upon the completion of the Batang Agam Watershed normalization project, the three villages chosen for this research, namely Pakan Sinayan Village, Tanjung Pauh Village, and Tanjunggodang Sungai Pinago Village in Payakumbuh Barat District, experienced intriguing transformations. Although the primary objective of normalizing the Batang Agam Watersheds was to prevent flooding and landslides along the river, Payakumbuh City Mayor Regulation No. 3 of 2022, currently, the utilization of the area has been expanded to include a *water treatment plant* (WTP), sports stadium, green open spaces (RTH), tourist attractions, and culinary destinations for the residents of Payakumbuh City and its surrounding areas (Febrian *et al.*, 2023; Gustio *et al.*, 2020; Putra *et al.*, 2020).

Figure 6. Condition of Sungai Batang Agam before Normalization
Source: Documentation from the PUPR Office of Payakumbuh City (2017)

Figure 7. The condition of the Batang Agam River bank after normalization
Source: https://hariansinggalang.co.id/ada-basianyuik-dan-barakik-pada-festival-batang-agam/

Upon closer examination, the normalization of the Batang Agam Watersheds yields both positive and negative impacts across various aspects. For a more comprehensive understanding, the impact of the Batang Agam watershed normalization is presented in the following table:

Table 2. The Impact of Batang Agam Watershed Normalization in Payakumbuh City

Aspect	Positive Impacts	Negative Impacts
Environment	1. The Payakumbuh City Government has effectively managed the area along the banks of the Batang Agam River, ensuring its sustainability is well-maintained. 2. The area along the banks of the Batang Agam River in the three villages has been beautifully organized, providing a safe and pleasant city park that the community can use for recreational activities and sports. 3. There are green open spaces and a city park 4. The surrounding community has an ample supply of clean water flow. 5. Improving irrigation network 6. Prevent flooding and landslides	1. The community constructs unauthorized buildings, which negatively impact the watershed's function 2. Unplanned construction makes the Batang Agam watershed look untidy and unappealing to the eyes. 3. The conversion of paddy fields has led to a decrease in the availability of Sustainable Food Farming Land (LP2B) and Protected Paddy Fields (LSD) 4. The Batang Agam River is experiencing a rise in pollution caused by detrimental activities from both the local community and migrants. Indiscriminate garbage disposal is a significant contributing factor to this issue. 5. On both sides of the river, there is a pile of excavations 6. The ecosystem around the river is disturbed because a significant amount of vegetation is being cut down, converting its functions into roads, parks, and green open spaces 7. The ecosystem is disturbed by the crowds generated
Social	1. The area along the banks of the Batang Agam River has become a prominent tourist destination in Payakumbuh City 2. The banks of the Batang Agam River, which used to be an unfamiliar and rarely visited area by the community, have now transformed into a popular tourist spot, offering recreational activities, *cafes*, and green spaces that are frequently visited by the public 3. The area along the Batang Agam River has become a comfortable spot for sports activities (*tracking/jogging*) 4. The area next to the Batang Agam River has turned into a child-friendly space. 5. The area along the banks of the Batang Agam River has become a prominent tourist destination in Payakumbuh City	1. The land surrounding the Batang Agam River banks is primarily owned by individuals, resulting in a lengthy land acquisition process. 2. Due to the lack of lighting at night, the Batang Agam River area has become an unsafe and less conducive gathering place.

	6. There are many facilities such as stalls or shops	
Economy	1. By creating business opportunities for the local community, such as stalls, *cafes*, and children's playgrounds, the economy can be significantly improved 2. Create job opportunities 3. By normalizing the banks of the Batang Agam River and enhancing infrastructure, transportation flows can be facilitated, and mileage can be reduced 4. An efficient irrigation network leads to increased agricultural and fisheries production in Payakumbuh City	

Source: Processed by the author

The majority of the land along the Batang Agam River banks is privately owned, resulting in a prolonged land acquisition process. Among the three research sites, the majority consist of agricultural and farmland areas, necessitating land acquisition for the development of roads, city parks, and green spaces (RTH). This land acquisition was carried out from 2016 to 2019. Below is the table displaying the land acquisition data as part of the Batang Agam watershed normalization project:

Table 3. Land Acquisition Data for the Batang Agam Watershed Normalization Project

No	Year	Landowners	Village	Number of Plots
1.	2016	Ridwan.	Tanjunggadang Sungai Pinago	2 Plots
2.	2016	Indra Yani Bhakti	Tanjunggadang Sungai Pinago	1 Plot
3.	2018	Mursal Sk	Pakan Sinayan	1 Plot
4.	2018	Lasmarni	Pakan Sinayan	1 Plot
5.	2018	Wahdanijar	Tanjung Pauh	1 Plot
6.	2018	Iswarni	Tanjung Pauh	1 Plot
7.	2018	Hawadis and Hawari Wahid	Tanjung Pauh	1 Plot
8.	2018	Asrimal/Muhammad Abrar	Tanjung Pauh	1 Plot
9.	2018	Ramadalis	Tanjung Pauh	1 Plot
10.	2018	Herayeti	Tanjung Pauh	2 Plots
11.	2018	Rosliana	Tanjung Pauh	2 Plots
12.	2019	Febra Ernita	Pakan Sinayan	1 Plot
13.	2019	Zulkifli	Pakan Sinayan	2 Plots
14.	2019	Firman Andrian	Pakan Sinayan	1 Plot
15.	2019	Hendri Wardi	Tanjung Pauh	2 Plots
16.	2019	Wahdanijar	Tanjung Pauh	1 Plot
17.	2019	Hamdani	Tanjung Pauh	1 Plot

Source: Processed by the author

The community whose agricultural and fisheries land is affected by the normalization process does not reject this activity; in fact, the majority of the community supports the Batang Agam watershed normalization. Furthermore, during the development process, the community actively engages in mutual cooperation to accelerate the cleaning efforts and facilitate the normalization project.

E. Conclusions

The Payakumbuh City Government has a Detailed Spatial Planning (RDTR) that serves as the foundation for urban planning, especially concerning the implementation of the Batang Agam watershed normalization project. The normalization process is carried out by the Public Works and Housing Agency (Dinas Pekerjaan Umum dan Perumahan Rakyat/PUPR), the Land Office of Payakumbuh City, and other relevant *stakeholders*. Normalization can be successfully implemented due to the support of various factors, including legislative regulations, *stakeholder* synergy, budget allocation, and community participation.

After normalization, several impacts can be felt by the community. Unfortunately, normalization not only brings positive impacts but also entails negative consequences. Positive impacts can be felt in terms of environmental, social, and economic aspects. On the other hand, negative impacts arise from the natural response to changes and various activities of the community that show insufficient responsiveness towards environmental conservation.

Recommendation

The normalization of the Batang Agam watershed has been successfully carried out despite all the challenges and obstacles it faced. The normalization has transformed the Batang Agam watershed into a more beautiful and even iconic attraction of Payakumbuh City. Hence, both the government and the community should actively participate in preserving its sustainability. This article only highlights a few discussion points, and it is hoped that future researchers can explore the impacts of normalization in greater depth and unravel the negative consequences arising from the normalization process.

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