Jurnal Dinamika
Sosial Ekonomi

Print ISSN (1411-593X) | Online ISSN (2721-3137)
Volume 26 Issues 2, December 2025
DOI: https://doi.org/10.31315/jdse.v26i2.14986

Development of the Selingkar Ijen Agropolitan Rural Area, Banyuwangi, with Ecological Resilience

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Article History:
Submitted: June 23, 2025
Approved: Dec 7, 2025

Keywords:
Rural Area,
Osing,
Ecological Resilience,
Sustainable Development.

Page:
153-161

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ABSTRACT

Rural area development is an integrative development among villages in an effort to accelerate and improve the quality of services, development, and community empowerment using a participatory development approach. The governance of Rural Area Development still pays insufficient attention to local wisdom in sustainable development. This research aims to identify a local wisdom-based rural area development strategy in supporting ecological resilience. The research focuses on the Environmental Dimension in the Rural Area Development Index (IPKP) as an indicator of Ecological Resilience, and the Environmental Resilience Aspect in the Developing Village Index (IDM) as a framework for Ecological Citizenship. The research location is the Selingkar Ijen Agropolitan Area, Banyuwangi, covering 7 out of 14 villages. This research is a descriptive qualitative study using the Soft System Methodology (SSM). Data collection was carried out through observation, focused group discussions, and in-depth interviews using Planning Charrette analysis. The results indicate that the development of the Selingkar Ijen Agropolitan Area has already incorporated local wisdom in the management and utilization of the environment and natural resources. The Osing cultural local wisdom contributes to Ecological Resilience and the strengthening of Ecological Citizenship for sustainable rural area development.

INTRODUCTION

Development inequality among regions is a common aspect of economic activities within a territory. This disparity is caused by differences in the availability of natural resources and existing demographic conditions. As a result of these differences, the capacity of a region to drive the development process also varies. Development inequality also occurs across sectors; some regions with advanced economies, supported by complete infrastructure and facilities, may possess very poor social and environmental conditions (Sjafrizal, 2008)

Rural area development is mandated by Law No. 6 of 2014 concerning Villages. Rural area development aims to accelerate and improve the quality of services, economic development, community empowerment. Area development is carried out through a participatory approach by integrating various policies, plans, programs, and activities of stakeholders within the designated area.

Based on the 2020-2024 National Medium-Term Development Plan (Bappenas, 2020), there are 62 National Priority Rural Areas (KPPN). The Agropolitan Lingkar Ijen in Banyuwangi is the best and top-ranking KPPN with a competitive status. The Rural Area Development Index (IPKP) for Lingkar Ijen in 2023 was 97.33, increasing to 97.80 in 2024, with the environmental dimension scoring 92.54 in 2024 (Ditjen PDP Kemendes PDT, 2024). Understanding ecology helps us understand environmental conditions and their resilience.

Ecology, according to Otto Sumarwoto is defined as the knowledge of interactions between individuals and their surrounding nature (Syaprillah, 2016) Meanwhile, according to Miller (1975), ecology is the understanding of social interactions of living things and the continuity of their lives. There are two types of ecology. First, autecology is the ecology of how different species of living things interact with each other. There are many ecologies, such as plants, animals, insects, and humans. Second, synecology is about the relationships between various types of living things. This can include the science of forests, cities, and coasts (Hadi, 2000)

A social-ecological system (SES) is defined as a system processed from biophysical parts and the social conditions associated with those parts. Social-ecological systems are characterized by the unity of all parts, being stable and bounded by certain ecosystem phenomena (Berkes et al., 2003; Glaser et al., 2008; Marlianingrum et al., 2021). Social-ecological systems consider how different systems are interrelated. Human relationships with their environment are mediated through various physiological, psychological, cultural processes (Lawrence, 2003).

A social-ecological system consists of 4 (four) closely interconnected dimensions. The relationship between humans and the environment is influenced by the dimensions of time, space, humans, and nature. The four dimensions of personality include social, cultural, character, and intentionality (Esbjörn-Hargens & Zimmerman, 2009; O'Brien, 2010; Lejano & Stokols, 2013).

The concept of a Social-Ecological System (SES) is a bounded and interconnected part between an individual component and a system. An SES can be understood by identifying its parts, network linkages, the nature of relationships, and the presence of boundaries (Davidson-Hunt & F. Berkes, 2003; Hafsaridewi et al., 2019)). Ostrom (2009)) presents an updated version of a nested framework for analyzing outcomes achieved in social-ecological systems (SES). There are 4 subsystems: Resource system (size) such as protected forests, wildlife, water resources, Resource units (mobility) such as types of plants/animals, quantity, and flow of water, Governance system (level) such as government/community and Users (resource knowledge) such as communities Osing them to meet food needs, recreation/commercial purposes. The novelty of this research is The Osing cultural local wisdom contributes to Ecological Resilience and the strengthening of Ecological Citizenship for sustainable rural area development.

Cultural villages, as ecological villages, are formed upon the principles of harmony, in alignment with the concept of ecological citizenship and civil responsibility. The governance of development in the Ijen Ring Agrotourism area of Banyuwangi considers local wisdom to encourage the community to love their environment. Kemiren Village, in particular, utilizes the local wisdom of the Osing culture to maintain the ecological balance of its surroundings.

RESEARCH METHODOLOGY

Prioritizing Location Selection

The priority of location selection is based on the Rural Area Development Index (IPKP), which consists of the economic, socio-cultural, infrastructure and facilities network, and institutional dimensions. The Selingkar Ijen Agropolitan Rural Area in Banyuwangi Regency is one of the 62 National Priority Rural Areas mandated in the National Medium-Term Development Plan (RPJMN) 2020-2024. This area had the highest Rural Area Development Index (IPKP) score, reaching 97.80 in 2024, with a status of 'Competitive' (Berdaya Saing). The area comprises 14 interconnected villages across three sub-districts: Glagah Sub-district (Kemiren, Tamansuruh, Kampunganyar, and Paspan villages), Licin Sub-district (Pakel, Gumuk, Jelun, Segobang, Banjar, Licin, Kluncing, and Tamansari villages), and Kalipuro Sub-district (Telemun and Bulusari villages). Based on the Developing Village Index (IDM), which includes the dimensions of social resilience, economic resilience, and environmental resilience, these 14 villages were further selected down to 7 villages namely

Kemiren, Tamansuruh, Kampunganyar, Tamansari, Licin, Telemun, and Bulusari Villages—all categorized as 'Advanced Villages' (Desa Maju).

Sustainable Rural Area Development Approach

Rural areas play a vital role in supporting economic, social, and environmental sustainability in many countries, including Indonesia. These areas often face complex challenges, ranging from environmental degradation to limited access to basic services and economic opportunities. To address these challenges, a comprehensive and sustainable approach to rural area development is needed. This approach ensures that development not only provides short-term benefits but also maintains balance and preservation for future generations.

A sustainable rural area development approach can be grouped into three main aspects: environmental, social, and economic. These three aspects are interrelated and support each other in creating a harmonious and sustainable rural ecosystem. The Triple Bottom Line concept consists of three main pillars, more commonly known as the 3Ps: planet, people, and profit. "Planet" represents a company's concern for nature and the surrounding environment. "People" relates to a form of social care for the community and its environment. “Profit” refers to the economic objective of achieving sustainable profitability (Wilson, 2015)

Soft System Methodology (SSM) in Rural Area Development

Rural area development needs to be based on observed field phenomena so that the development plan is well-targeted and can improve the welfare of rural communities. This research uses a qualitative approach, namely methods to explore and understand the meaning obtained by a number of individuals/groups of people who are considered to originate from social or humanitarian problems (Creswell, 2009). Therefore, the Soft System Methodology (SSM) is used in this research to capture several dynamic and intangible aspects, including social, economic, and environmental factors. The SSM method can be carried out in 7 (seven) stages (Checkland, 1998) Stage 1: Identify unstructured problem situations. Stage 2: Depict the identified problem situation; Stage 3: Define relevant systems (Root Definition). Stage 4: Develop a conceptual model. Stage 5: Compare the conceptual model with the empirical situation. Stage 6: Identify feasible changes. Stage 7: Action and Implementation.

Collaborative Planning with Regional Stakeholders

A collaborative approach helps facilitate the identification of strategic issues, planning needs, and program recommendations, serving as a Rapid Planning Assessment. This involves opening discussions with Bappeda, DPMPD, and other Regional Government Agencies (OPD) in Banyuwangi Regency. Field observation with a Planning Charrette involving residents aim to provide explanations regarding the activities to be carried out and to set the next agenda (Future Cities Laboratory, 2019). These activities were conducted in 7 research villages in Banyuwangi Regency for one week, from November 11 to 16, 2024.

Instrument Preparation as Indicators

Indicators in the collaborative planning instrument for the institutional dimension include: policies of district/city governments and/or community norms to minimize land conversion; local policies on local labor utilization; development of rural areas based on superior commodities; incentives/local policies on investment in the area; forums for regional/rural area economic development at the district/city level; local policies on established rural area development; regional commitment to funding established rural area development; local policies on corporate social responsibility for established rural areas; development of cooperation among local governments, village-owned enterprises (BUMDes)/joint village-owned enterprises, businesses, and local universities/research institutions to enhance innovation in superior commodity development; and local policies on rural area promotion.

Field Visits and Observations to Research Locations

Following coordination meetings at the DPMPD office, the focus shifted to visits and observations of strategic locations in each village within the research area. During the observation process, discussions were held with village government officials and community leaders from Village Community Institutions. The results of these observations were then summarized and will serve as the main material for discussion during the planning charrette, which is the next agenda.

Interviews, FGDs (Focus Group Discussions), and Planning Charrette

Before conducting collaborative planning, in-depth interviews were carried out with village officials, leaders of MSMEs (Micro, Small, and Medium Enterprises), Village-Owned Enterprises (BUMDes), the head of the Youth Organization (Karang Taruna), customary leaders, and farmer groups. This was followed by a Focus Group Discussion to deepen important themes identified in the interviews by including other community leaders, NGOs, local universities, and local government apparatus. The final agenda in the collaborative planning was for these stakeholders in the Selingkar Ijen Area to translate their input into the joint plan to be developed.

RESULTS AND DISCUSSION

Ecological Resilience and Ecological Citizenship

The Environmental Resilience Dimension in the Developing Village Index (IDM) and the Environmental Dimension in the IPKP are intrinsically linked instruments. They contribute positively to environmental quality. The Environmental Quality Index (IKLH) is a value that describes the quality of the living environment in a particular area at a given time. It's a composite value derived from the Water Quality Index (IKA), the Air Quality Index (IKU), and the Land Quality Index (IKL). Village SDGs (Sustainable Development Goals) and the Developing Village Index (IDM) are interconnected in village development in Indonesia, where Village SDGs is the implementation of the 17 UN Sustainable Development Goals (SDGs) adapted to the village context, while the IDM is a framework that measures the level of village development through three dimensions: social resilience, economic resilience, and environmental resilience.

The Sustainable Development Goals (SDGs), or Tujuan Pembangunan Berkelanjutan (TPB) in Indonesian, are a set of 17 global goals agreed upon by United Nations (UN) member states in 2015, aiming to achieve a better and more sustainable future by 2030. SDGs and disaster risk reduction are closely intertwined because both aim to create resilient and disaster-proof societies. SDG 11, for example, focuses on building sustainable cities that can withstand the impacts of disasters. SDG 13 deals with climate change, which exacerbates disaster risks. Similarly, SDG 16 promotes peaceful and inclusive societies, which are essential for reducing conflicts and violence that can lead to disasters.

Ecological citizenship is a movement to encourage communities to promote environmental issues (Hayward, 2006; Melo-Escrihuela, 2008; Seyfang, 2006) The goal is to change the public's mindset towards environmental restoration and provide a platform for communities to actively participate in achieving program objectives. Changes in individual, institutional, and organizational behavior are prerequisites for sustainable development (Dobson, 2007). In addition to the community, the participation of business actors, religious leaders, academics, non-governmental organizations, and government officials in building environmentally conscious villages is key to controlling environmental degradation.

Civic responsibility refers to actions and attitudes related to civil responsibility as a form of voluntary participation. Civic responsibility is defined as active participation in the public life of a community in an informed, committed, and constructive manner, focosing on the common good (Gottlieb & Robinson, 2006). The development of civic responsibility is considered an important component of success, leading to higher performance (Wilcox, 2011) When our surrounding environment experiences damage, as good citizens, we

must actively participate in assisting local government programs. Citizen participation in preserving environmental sustainability is an important element because citizens are part of the environment itself (Aulia et al., 2018).

Ecovillages, or cultural villages, are formed with principles of harmony, aligning with the concept of ecological citizenship and civic responsibility because they share the role of encouraging communities to love their surrounding environment. This is also exemplified by the revitalized Kemiren Cultural Tourism Village in the Agrotourism Lingkar Ijen Banyuwangi, which leverages the local wisdom of the Osing community to maintain environmental balance.

Delineation of Selected Focus Locations

To determine the focus locations for the pilot project in Banyuwangi Regency, various aspects were considered, including the concentration of strategic areas, proximity to the city center, and development directives outlined in the Selingkar Ijen Rural Area Development Plan (RPKP). Based on this assessment, seven villages were selected as primary locations: Bulusari Village and Telemung Village in Kalipuro Sub-district, Kemiren Village, Tamansuruh Village, and Kampunganyar Village in Glagah Sub-district, Tamansari Village and Licin Village in Licin Sub-district

Kemiren Village, Tamansuruh Village, Kampunganyar Village, Tamansari Village, and Licin Village are situated along the tourism route to the Ijen Crater Nature Park, making them strategic buffer villages to support tourism in the area. This selection was made after discussions with Bappeda (Regional Development Planning Agency) and the Community and Village Empowerment Office of Banyuwangi Regency. With a total area of 195 km², this pilot project area has a population of 32,216 people, with a population density of 165 people/km². The selection of these seven villages serves as a representative study sample from the total of 14 villages in the Selingkar Ijen Area. These villages were chosen as an integral part of the entire region, with the expectation that the development concepts formulated here can later be applied to the other seven villages as well.

Planning Charrette for Environmental Aspects and Natural Resources

The Planning Charrette for environmental aspects and natural resources was conducted with the involvement of various stakeholders. These stakeholders included key figures from the village government, heads of MSMEs (Micro, Small, and Medium Enterprises), Bumdes (Village-Owned Enterprises), youth organizations (Karang Taruna), traditional leaders, NGOs, farmer groups, tourism awareness groups (Pokdarwis), and other community leaders.

Table 1. Statistical Data of Selected Locations

No	Village	IDM (2024)	Area (km2)	Population (People)			Density (People/km2)
				Male	Female	Number	
1.	Desa Bulusari	Maju	25,42	2.166	2.094	4.260	168
2.	Desa Telemung	Mandiri	20,18	2.564	2.487	5.051	250
3.	Desa Kemiren	Mandiri	2,97	1.243	1.375	2.618	881
4.	Desa Tamansuruh	Mandiri	10,47	2.205	2.350	4.555	435
5.	Desa Kampunganyar	Mandiri	31,08	2.272	2.336	4.608	148
6.	Desa Tamansari	Mandiri	100,39	3.579	3.558	7.137	71
7.	Desa Licin	Mandiri	4,67	1.963	2.024	3.987	854
Total			195,18	15.992	16.224	32.216	165

Source: Ministry of Villages, Development of Disadvantaged Regions and Transmigration and Central Statistics Agency (2024)

Table 2. Results of the Planning Charrette for Environmental and Natural Resource Aspects

No	Aspect	Potential	Problem	Development Needs
1	Disaster Risk	The community is making efforts to mitigate disasters from a spiritual perspective through 'village cleaning' activities.	'This area is located in a volcanic and earthquake-prone zone, as stated in the Banyuwangi Regency Spatial Plan (RTRW) 2022–2024, with a total area affected by volcanic hazards of 1,754.33 hectares."	The need for a comprehensive mitigation policy that adjusts to variations in vulnerability in each village, especially in villages located near Ijen Crater, including Tamansari, Telemung, and Bulusari Villages.
		-	Tamansari Village, as the gateway to Ijen Crater, has high vulnerability to earthquakes.	-
2	Characteristics around Mount Ijen	The characteristics of the crater lead to sulfur mining areas.	Risk of ecosystem damage due to mining.	The need for more sustainable and safe sulfur mining management in Ijen Crater for workers.
3	Land Use	Most land use is mixed plantations, with potential commodities such as coffee, secondary crops, mangosteen, and durian.	Some plantation lands are at risk of being affected by volcanic ash.	The need to diversify the planting of volcanic ash-resistant commodities, especially in villages located near Ijen Crater, including Tamansari, Telemung, and Bulusari Villages.
4	Water Resources	There is the Sendang Seruni spring, currently utilized as a tourist attraction.	-	The need for conservation efforts for the Sendang Seruni water source and Jagir Waterfall, which are currently tourist areas.
5	Natural Ecosystem Management	There are natural ecosystems that need to be preserved so that the appeal of Ijen Crater's nature tourism activities can be sustainable, both economically and in terms of preserved natural tourism.	-	The need for adequate waste management development, or a more intensive waste processing schedule, as currently, visitor waste cleaning activities are only carried out once a month.

Source: Primary Data Analysis (2024)

Utilizing Plantation Land to Produce Superior Commodities

Based on Banyuwangi Regency's Regional Spatial Plan (RTRW) data, land use in the seven villages within the Selingkar Ijen area is dominated by mixed plantations and secondary low-lying forests. Kampunganyar Village has the largest mixed plantation area (1980.82 ha), followed by Bulusari (508.44 ha). Secondary low-lying forests are predominant in Bulusari (4146.57 ha) and Licin (2875.83 ha). Irrigated rice fields cover a smaller area, with the highest coverage in Kampunganyar (372.89 ha), while settlements are scattered across several villages, with Kampunganyar and Tamansari recording the largest settlement areas.

This land use is significantly influenced by history, topography, and local culture, particularly that of the Osing community. The topography of the area around the foothills of Mount Ijen plays a major role in determining land use types, with agriculture and plantations being the majority. This dominant land use for plantations and agriculture reflects the harmony between the community's culture, geographical conditions, and a long history of sustainable spatial utilization. The Osing community maintains traditional land management practices passed down through generations, prioritizing environmental sustainability and local wisdom, as reflected in thanksgiving rituals like the "ider bumi" tradition, which expresses gratitude for the earth's bounty.

The natural resource potential of the seven villages in the Selingkar Ijen area is divided into three main classifications: nature tourism, cultural tourism, and artificial tourism. In addition to currently developed and well-known tourist destinations, the Selingkar Ijen area is also designated as a strategic area of Banyuwangi Regency. This area is designed to support three primary functions: developing environmental carrying capacity, increasing economic growth, and preserving and strengthening socio-culture. Various agricultural products such as coffee, secondary crops, mangosteen, durian, and goat milk have promising prospects for further development.

The Selingkar Ijen Rural Area faces various disaster challenges with varying hazard levels, influenced by its geographical conditions and volcanic activity. On the northern side, adjacent to Ijen Crater, the threat of forest fires and landslides is classified as moderate to high. This threat increases during the dry season, when dry vegetation becomes potential fuel for fires, while steep slopes trigger landslide risks, especially during high rainfall.

On the southern side of the area, extreme weather poses a major challenge, with moderate to high hazard levels. Extreme weather, such as strong winds and heavy rains, can disrupt community activities, damage infrastructure, and impact agricultural yields, which are the main livelihood of residents. Furthermore, the slopes in this area face the threat of flash floods, ranging from low to high hazard levels. The risk of flash floods significantly increases during Ijen Crater eruptions when volcanic material mixes with rainwater, creating destructive lahar flows that can damage downstream areas. Facing these challenges, integrated mitigation steps are needed, such as strengthening landslide-retaining vegetation, early warning systems, and improving disaster-resilient infrastructure to protect the community and the environment.

Located at the Foot of Mount Ijen, Several Villages Face Volcanic and Earthquake Disaster Risks

Kalipuro Sub-district (Bulusari and Telemung Villages) and Licin Sub-district (Tamansari Village) face a high risk of volcanic hazards, with a total affected area of 1,754.33 hectares. This area is divided into two zones: Zone 1, covering 855.42 hectares, is at risk of direct material ejection, and Zone 2, covering 898.92 hectares, is at risk of pyroclastic fall. Tamansari Village is the most vulnerable area within both zones.

In addition to volcanic risks, earthquake vulnerability analysis shows varying risk levels across regions. Tamansari Village in Licin Sub-district has a total area of 5,205.90 Ha, with 472.24 Ha classified as high vulnerability and 1,764.94 Ha as moderate vulnerability. This high exposure to risk necessitates a risk-based mitigation strategy to minimize the destructive impact of earthquakes in the area. On the other hand, Kampunganyar Village and Licin Village have a relatively low earthquake risk, with their entire areas falling into the very low vulnerability category (1,567.50 Ha and 431.95 Ha, respectively).

Nonetheless, preventive measures are still necessary to maintain environmental stability. A flexible mitigation policy is needed to adjust to the varying vulnerabilities in each area. Kemiren and Tamansuruh Villages in Glagah Sub-district also show diverse earthquake risk profiles. Kemiren Village records 171.71 Ha in the non-vulnerable category and only 5.96 Ha classified as very low, indicating relative stability against disasters. Conversely, Tamansuruh Village has 493.23 Ha in the moderate vulnerability category and 1.33 Ha as non-vulnerable.

Mitigation sites and community gathering points in case of disaster have also been mapped in the Banyuwangi Regency RTRW document. For the 7 supporting villages in the Selingkar Ijen area, these locations are planned to be at the Kemiren Village office and the MI Sunan Giri field in Tamansari Village. On the other hand, the communities in the Selingkar Ijen area have long-standing traditions and beliefs for coping with disasters, one of which is through annual thanksgiving events. This activity is carried out as an expression of gratitude and is known as "bersih desa" (village cleansing), believed to ward off disasters from the village. The community believes that by taking care of nature, nature will also take care of them. Nevertheless, a comprehensive and risk-based mitigation approach is still necessary, especially for villages with high and moderate vulnerability such as Tamansari, Bulusari, and Telemung.

Preserving the Natural Ecosystem of the Ijen Tourism Area

The Ijen Crater tourism industry is currently experiencing rapid growth, attracting numerous domestic and international tourists. However, this growth presents significant challenges in managing the tourism area, as Ijen Crater is a natural tourist destination whose ecosystem must be protected and preserved. One prominent environmental issue arising from tourism activities in this area is waste management, particularly plastic waste generated by tourists. On average, 100 to 150 kilograms of plastic waste are collected from the area each month. To address this problem, the Rijig Ijen program, a routine waste clean-up initiative, is implemented. This activity involves environmental enthusiasts, safety volunteers, and the local community, and it takes place daily.

CONCLUSION

Based on the results and discussion, the Selingkar Ijen Rural Area has already taken the aspects of environment and natural resources into account. These aspects are an inseparable part of the environmental dimension in the Rural Area Development Index (IPKP) and the environmental resilience dimension in the Developing Village Index (IDM). The villages within this rural area utilize the local wisdom of the Osing culture to maintain the ecological balance of their surroundings during development. This establishes ecological resilience, which strengthens ecological citizenship as a form of community awareness and participation through the utilization of local wisdom. This approach allows for early anticipation of the impacts of climate change and natural disasters in an effort to maintain sustainable development.

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