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Transition of extractive industry governance: Effort towards an inclusive green economy

Transisi tata kelola industri ekstraktif: Usaha menuju green economy yang inklusif

Ahmad Sholikin✉, Yendra Erison, & Eva Nur Laily Rohmah
Departement Politic and Government, Universitas Islam Darul 'Ulum
Lamongan, Jawa Timur, Indonesia – 62253
e-mail of corresponding author: ahmad.sholikin@unisda.ac.id

Abstract

The transition of extractive industry governance is one of the major challenges in realizing an inclusive green economy, especially in regions with a high dependency on this sector, such as Bojonegoro Regency. This study aims to analyze the efforts of Bojonegoro in transitioning the governance of extractive industries towards the implementation of an inclusive green economy, considering the dimensions of environmental sustainability, community participation, and economic growth. The research adopts a qualitative approach, with primary data analysis through in-depth interviews and secondary data from policy documents, official reports, and related literature. The findings indicate that the Bojonegoro local government has initiated various programs to improve the sustainability of the industry, such as economic diversification, capacity building for local communities, and strengthening environmental regulations. However, significant challenges remain, including fiscal dependence on revenues from the oil and gas sector and resistance from certain stakeholders. The study concludes that the success of the transition towards an inclusive green economy requires a more holistic policy integration, collaboration among stakeholders, and strengthening the role of local communities in decision-making. Recommendations include the formulation of long-term policies for local economic diversification, the development of renewable energy, and enhanced oversight of the environmental impacts of extractive activities. These findings are expected to serve as a reference for local governments and other stakeholders in developing sustainable and inclusive transition strategies.

Keywords: extractive industry governance; inclusive green economy; sustainable development

Abstrak

Transisi tata kelola industri ekstraktif menjadi salah satu tantangan besar dalam mewujudkan ekonomi hijau yang inklusif, terutama di wilayah dengan ketergantungan tinggi terhadap sektor ini, seperti Kabupaten Bojonegoro. Penelitian ini bertujuan untuk menganalisis upaya transisi tata kelola industri ekstraktif di Bojonegoro menuju implementasi ekonomi hijau yang inklusif, dengan mempertimbangkan dimensi keberlanjutan lingkungan, partisipasi masyarakat, dan pertumbuhan ekonomi. Pendekatan penelitian menggunakan metode kualitatif dengan analisis data primer melalui wawancara mendalam dan data sekunder dari dokumen kebijakan, laporan resmi, serta literatur terkait. Hasil penelitian menunjukkan bahwa Pemerintah Kabupaten Bojonegoro telah menginisiasi berbagai program untuk meningkatkan keberlanjutan industri, seperti diversifikasi ekonomi, peningkatan kapasitas masyarakat lokal, dan penguatan regulasi lingkungan. Namun, tantangan signifikan masih ada, termasuk ketergantungan fiskal terhadap pendapatan dari sektor migas dan resistensi dari pemangku kepentingan tertentu. Penelitian ini menyimpulkan bahwa keberhasilan transisi menuju ekonomi hijau yang inklusif memerlukan integrasi kebijakan yang lebih holistik, kolaborasi antar-stakeholder, serta penguatan peran masyarakat lokal dalam pengambilan keputusan. Rekomendasi penelitian mencakup perumusan kebijakan jangka panjang untuk diversifikasi ekonomi lokal, pengembangan energi terbarukan, dan peningkatan pengawasan terhadap dampak lingkungan dari aktivitas ekstraktif. Temuan ini diharapkan dapat menjadi acuan bagi pemerintah daerah dan pemangku kepentingan lainnya dalam mengembangkan strategi transisi yang berkelanjutan dan inklusif.

***Kata kunci**: tata kelola industri ekstraktif; ekonomi hijau yang inklusif; pembangunan berkelanjutan*

Introduction

Green growth and the green economy have numerous definitions, but there are also many commonalities among the definitions used by international organizations. Green growth aims to integrate the sustainability pillars of economic development and environmental preservation into a single intellectual

process and policymaking, thereby reshaping the nature of development models that can generate strong outputs and sustainable growth simultaneously (Arafah et al, 2018). The goal is to promote economic growth and development while ensuring that natural assets are used sustainably and continue to provide natural resources and environmental services for growth and well-being (OECD 2013). Green economic growth refers to growth that uses natural resources efficiently, minimizes pollution and environmental impacts, and is resilient in considering natural risks (Bank 2012). Essentially, the green economy seeks to improve human well-being and social justice, while significantly reducing environmental risks and ecological scarcity (Hinderer & Kuckertz 2024). Moreover, the green economy concept is based on the pillars of economic, environmental, and social sustainability. The broader concept of inclusive green growth or sustainable development integrates all aspects of social sustainability, particularly human development and the conditions of poor and vulnerable communities (Erison et al. 2023).

Natural resources, particularly the extractive industries like oil and gas, play a role in boosting economic growth in various regions, both from the producer and consumer sides. Furthermore, the oil and gas industry is a strategic sector because its products serve as energy sources for other industries, such as electricity production. Since the early days of modern petro-industrialization, the oil and gas industry has faced numerous cycles requiring continuous adaptation, particularly to environmental changes (Pratama 2019). However, it cannot be denied that the management of mining industry resources plays a crucial role in national revenue generation. The mining industry in Indonesia is particularly closed, especially in terms of revenue from cooperation contracts (KKS). The resource management model in the extractive industry has often been focused on exploiting resources to generate foreign exchange for the country, with dependency on the state budget (APBN), while paying little attention to the welfare of the people (Tr 2016).

According to the East Java Provincial Ministry of Communications and Information, the processing industry grew by 1.46% in the third quarter of 2023 compared to 0.26% in the second quarter of 2023. This increase was due to several subcategories, including tobacco processing, chemical industries, and non-metallic mineral industries (Jatim Newsroom 2023b). Meanwhile, the number of workers in the industrial sector in East Java in 2023 increased by 230,390 people, with the total workforce in East Java in August 2023 increasing by 999,750 people (Jatim Newsroom 2023a).

Bojonegoro Regency, one of the largest oil and gas producers in Indonesia, contributes 30% of the national oil production (Jonegoroan 2013). Several villages in Bojonegoro, such as Wonocolo, have old wells from the Dutch colonial period, which have been re-utilized since the 1970s. By 2024, this means that the government, private sector, and local communities have been extracting oil and gas resources in Bojonegoro for about 54 years. Consequently, Bojonegoro's economy grew by 2.47% in 2023 compared to 2022. However, in 2023, the economic structure of Bojonegoro was still dominated by the mining and quarrying sector, contributing 48.77%, followed by agriculture, forestry, and fisheries at 12.13%, wholesale and retail trade, motor vehicle repairs at 8.83%, construction at 7.05%, processing industry at 6.45%, and information and communication at 6.09%. These six sectors together contributed 89.33% to Bojonegoro's economy, while other categories contributed less than 5% (Badan Pusat Statistik Kabupaten Bojonegoro 2023).

The extractive industry's challenges have been an ongoing issue for the government and communities. While the economic benefits derived from these industries have contributed to welfare, they have also led to new problems and conflicts within society (Kucera & Principi 2017). The anxiety over the resource curse is undeniable, meaning that a region like Bojonegoro could face disaster if it relies too heavily on natural resources, leading to disparities between what is expected (das sollen) and the reality on the ground (da sein). Therefore, the Bojonegoro government must implement various efforts to ensure that extractive industries contribute to both economic growth and environmental sustainability (Sholikin 2018).

From the above explanation, it can be concluded that the extractive industry sector remains an attractive area for individuals to exploit to the fullest. This is evident in both East Java Province and Bojonegoro Regency, where the mining and quarrying sectors still dominate. According to Law No.

23 of 1997 on Environmental Management, conservation of natural resources is the management of non-renewable natural resources to ensure their wise use, while renewable resources are managed to ensure their availability while maintaining and enhancing their quality (Paarlberg-Kvam 2021). Thus, the management of natural resources is part of a conservation program aimed at preserving, restoring, protecting, and fully utilizing natural resources in a sustainable, effective, and efficient manner for the prosperity and welfare of the community (Ademos 2023).

Therefore, this study aims to examine the strategies, steps, and innovations implemented by the Bojonegoro Regency Government in managing and utilizing extractive industries in an environmentally friendly manner, with the goal of achieving inclusive green economic growth in Bojonegoro.

Research Method

This study uses a qualitative approach with a descriptive analysis method approach with diverse data collection methods. This qualitative approach is also highly flexible in addressing the dynamics of rapidly changing social conditions. Through descriptive analysis, the researcher seeks to explore the reasons and methods behind the challenges that the extractive industry has posed for both the government and society. Although economic benefits are derived from the sector, they have also led to new problems and conflicts within the community (Creswell 1991). Research informants were purposively selected, including Bojonegoro local government officials responsible for energy and the environment (DLHK), representatives from extractive industry companies (Pertamina EP Cepu and Pertamina EP Sukowati), affected local communities (the heads of Ngampel and Sambiroto villages), and environmental organizations (ADEMOS, IdFos, Bojonegoro Institute).

Data were collected through in-depth interviews with key stakeholders, field observations related to industry practices and sustainable development initiatives, and document studies of policies and industry reports. Additionally, focus group discussions (FGDs) were conducted to explore the challenges and opportunities in the transition of the extractive industry toward an inclusive green economy. Data analysis in this study was carried out using a thematic analysis method, where key patterns and themes from interviews, observations, and documents were identified and categorized. To enhance the validity of the findings, data triangulation was conducted by comparing results from various data collection methods. The findings were analyzed in the context of green economy policies and extractive industry governance practices in Indonesia. Conclusions were drawn based on contextual interpretation of the collected data, considering policy implications and recommendations for local governments, industries, and communities in supporting the transition toward an inclusive green economy.

Results and Discussion

The transition from extractive industry governance to an inclusive green economy has become a crucial issue in sustainable development discussions. Bojonegoro Regency, known for its significant oil and gas resources, faces challenges in balancing economic growth, environmental sustainability, and social inclusion (Jensen et al. 2016). As extractive industries have long played a dominant role in the region's economy, transitioning towards a greener and more inclusive economic model requires effective governance, policy adjustments, and active stakeholder participation. This study explores how Bojonegoro is managing this transition, focusing on governance strategies, industry practices, and community engagement in achieving sustainable economic development (Yuan et al. 2023).

This research examines the policies, initiatives, and challenges encountered in Bojonegoro's efforts to shift towards an inclusive green economy. It investigates the role of local government, extractive industry players, and civil society organizations in promoting sustainability while ensuring economic benefits are equitably distributed (Veltmeyer 2013). By analyzing governance mechanisms and stakeholder interactions, this study aims to provide insights into how an extractive industry-dependent region can transform its economic landscape while prioritizing environmental and social well-being.

Challenges in the transition of extractive industry governance

The governance issues in Bojonegoro Regency related to the extractive industry encompass a range of complex challenges, particularly in balancing the exploitation of natural resources with environmental and social sustainability. As a region heavily reliant on the oil and gas sector, Bojonegoro faces significant risks of environmental damage due to exploration and production activities (Pel 2024). Intensive oil and gas extraction has led to land degradation, air and water pollution, and a decline in soil quality around operational areas. These damages not only affect the local ecosystem but also the health and quality of life of the surrounding communities. Unfortunately, the governance implemented often lacks sufficient responsiveness in addressing these negative impacts, causing environmental mitigation and recovery efforts to progress slowly or even fail to reach their potential (Sholikin 2019).

One of the main issues faced is the lack of community participation in decision-making regarding natural resource management. A village head from one of the affected areas stated: "We are often not involved in the policymaking process related to this industry. Decisions are made without considering our voices, even though we are the ones who directly experience the impact."

The lack of community involvement has led to dissatisfaction and protests from residents who feel that the presence of extractive industries brings more negative consequences than benefits for their well-being (Biehl et al. 2023). The absence of community participation in the decision-making process creates a gap between the needs of the people and the policies implemented by the government and companies.

Furthermore, the region's heavy dependence on the extractive industry creates long-term economic risks. Bojonegoro is exposed to the volatility of global commodity prices, making its economy vulnerable to unpredictable market fluctuations. When oil prices drop, the regional income, which depends on this industry, is also affected, reducing the budget available for social programs, infrastructure, and other development projects. In this case, the existing governance system has not been able to provide innovative solutions to overcome the economic dependence on this non-renewable and unstable sector (Sholikin & Sena 2024).

The Natural Resource Governance Theory approach emphasizes the importance of multi-stakeholder participation in the sustainable management of natural resources (Graham 2020). According to this theory, effective governance must be inclusive, transparent, and based on public participation. However, in the case of Bojonegoro, this theory has not been fully implemented, as local communities continue to experience marginalization in the decision-making process.

In comparison, the Green Economy and Sustainable Development Theory (Southcott & Natcher 2018) highlights that the transition from an extractive-based economy to a green economy must take social and environmental aspects into account. In the context of Bojonegoro, economic dependence on oil and gas creates long-term risks. A government official from the Bojonegoro Environmental and Forestry Agency (DLHK) stated: "We recognize that the regional economy heavily depends on oil and gas. However, we are striving to promote economic diversification, including the development of sustainable agriculture and ecotourism."

Another issue is the limited participation and inclusivity of local communities in decision-making related to natural resource management. Local residents often feel marginalized in the policymaking process, especially when the policies directly impact their environment and livelihoods. This leads to dissatisfaction and protests from citizens who believe that the presence of extractive industries brings more negative consequences than benefits for their welfare (Chu et al. 2024). Their absence from decision-making processes creates a gap between community needs and the policies implemented by the government and companies. Moreover, the lack of oversight and the weak enforcement of regulations exacerbate this problem, as environmental violations often go unpunished, allowing them to recur.

To address these challenges, Bojonegoro Regency requires governance reforms that are more inclusive, sustainable, and participatory. Policies supporting the transition to environmentally friendly and sustainable sectors, such as eco-tourism and sustainable agriculture, are necessary. Additionally, strengthening the capacity of communities to actively participate in decision-making processes is crucial, as they are the ones who directly feel the impact of policies related to natural resources in their area (Makinde & Le Billon 2023).

However, this economic diversification effort still faces significant challenges, particularly in terms of funding, technology, and the readiness of local human resources. In an interview with a representative from an environmental NGO, they stated: "The biggest challenge is how we can transition the workforce from the oil and gas sector to other more environmentally friendly industries. Many of them lack skills outside of this industry." (Interview with the Chair of ADEMOS). In relation to Dependency Theory by (Stark et al. 2023), Bojonegoro experiences a high dependency on the extractive industry, making its economy unstable when oil prices decline or resources begin to deplete. Therefore, a more systematic green economy policy is needed to ensure that the transition to sustainable sectors is not merely a discourse but can be effectively implemented.

To accelerate this transition process, the Community-Based Development Theory (Biau 2011) can serve as a solution. This theory emphasizes that successful development must involve the community as key actors, rather than just passive beneficiaries. A community representative highlighted the importance of community participation in environmental management, stating: "If we were given training and access to capital, we could develop organic farming or ecotourism. But so far, the existing programs have been top-down and do not align with local conditions." (Interview with the Head of the Farmers' Group in Ngampel Village). This indicates that the green economy transition policies in Bojonegoro still face challenges in terms of inclusivity and sustainability (Ashamole 2019). The local government needs to adopt a more participatory, community-based approach and strengthen the capacity of local communities so that the transition to a green economy can proceed more effectively.

The importance of an economic transition in Bojonegoro is increasingly apparent given the region's heavy reliance on the extractive industry, particularly oil and gas, as its main source of income. However, this dependence on non-renewable resources poses a serious challenge to long-term economic sustainability, as the sector has a limited lifecycle and is vulnerable to global price fluctuations. Declining oil and gas prices or resource depletion could lead to economic slowdowns, impacting development budgets, community welfare, and overall stability. This uncertainty affects local populations reliant on the industry for livelihoods and hinders the growth of other economic sectors.

A transition to a more diverse and sustainable economy, such as a green economy, is urgently needed to reduce this dependency and build a more resilient regional economy. A green economy not only prioritizes environmental sustainability but also creates inclusive economic opportunities for local communities. For instance, developing eco-tourism, organic agriculture, renewable energy, and creative industries can provide new income sources for Bojonegoro. These sectors not only diversify the economy but also create environmentally friendly job opportunities aligned with sustainability principles. However, this transition requires significant shifts in governance policies and development approaches. The regional government must implement policies that encourage investment and innovation in sustainable sectors, such as offering incentives for eco-friendly businesses and providing technical assistance for farmers transitioning to sustainable agriculture. Meanwhile, extractive industries should adopt cleaner technologies to minimize environmental impacts during the transition.

The issue of inclusivity in Bojonegoro's green economy is crucial, as the transition has the potential to create social and economic inequalities if not managed properly. Many residents who previously relied on extractive industries, such as oil and gas, risk being marginalized due to limited access to new technologies, resources, and information related to the green economy. This exclusion is exacerbated by the lack of active community participation in policy planning and decision-making, resulting in programs

that may not align with local needs. For example, while eco-tourism and sustainable agriculture hold great potential, the absence of education and training based on local knowledge leaves communities ill-equipped to participate in these sectors. Furthermore, gender inequality remains a significant barrier, as women often lack access to education, training, and economic resources, limiting their ability to contribute to and benefit from the green economy.

To address these challenges, Bojonegoro needs a comprehensive approach that strengthens community capacity and ensures equitable access to opportunities. Providing green skills training, such as environmentally friendly farming techniques and renewable energy technology, is essential. These initiatives should incorporate local wisdom to empower communities in protecting their environment. The local government must also create inclusive policies that involve all stakeholders, especially vulnerable groups, in planning and implementing green economy strategies. Expanding funding programs and microcredit for small and medium-sized enterprises focusing on green sectors is another critical step. Without these measures, the transition to a green economy risks exacerbating existing inequalities, leaving many residents unable to benefit from the economic and environmental opportunities it offers.

The Bojonegoro Regency Government has taken initial steps toward this transition, as evidenced by the Green Economy Workshop held in August 2023, which aligned with the Ministry of Home Affairs' mandate to integrate green economy principles into the 2024-2026 Development Plan. This plan emphasizes sustainability and environmental preservation, reflecting a commitment to long-term ecological and economic balance. However, to ensure inclusivity, the government must prioritize community involvement, equitable resource distribution, and targeted support for marginalized groups. By fostering collaboration, providing accessible financing, and leveraging local knowledge, Bojonegoro can achieve a just and inclusive green economy transition, setting an example for other regions facing similar challenges.

Infrastructure, technology, and regulatory challenges in Bojonegoro

The challenges related to infrastructure and regulation in Bojonegoro Regency, East Java, have become significant barriers in the transition toward an inclusive and sustainable green economy. Despite having vast potential to develop environmentally friendly sectors such as renewable energy, sustainable agriculture, and eco-tourism, the inadequate infrastructure has worsened the region's inability to realize its potential. One of the main issues is the limited access to sufficient renewable energy, which is key to supporting green economic sectors (Faruque 2006). Most areas in Bojonegoro still rely heavily on fossil fuels, particularly in the extractive industries sector, which contributes topollution and ecological imbalance.

An eco-tourism entrepreneur in Bojonegoro stated: *"We have great potential to develop eco-friendly tourism, but the main obstacle is poor transportation access. Our ecotourism products struggle to reach a wider market due to inadequate roads."* Dependence on inadequate infrastructure, such as transportation, is one of the key aspects hindering the sustainability of the green economy. In this case, the development of a sustainable eco-tourism sector requires infrastructure policies that not only focus on transportation but also on local empowerment through easier access to markets and environmentally friendly facilities. The lack of infrastructure to support renewable energy development, such as solar panels or small-scale hydroelectric power plants, prevents the region from shifting to more environmentally friendly energy sources. Additionally, limited and inefficient transportation systems make it difficult and costly to distribute environmentally friendly products, such as organic agricultural products and eco-tourism goods, ultimately reducing the competitiveness of local products in wider markets (Sholikin 2019).

On the regulatory side, Bojonegoro faces deep structural challenges. Although there are several policies initiated by the central government to support the transition to a green economy, their implementation at the regional level is often inconsistent and not adapted to local conditions. The misalignment between existing policies and the needs of the community often exacerbates development disparities (Suratin et al. 2023). For example, policies regulating natural resource management are often not accompanied

by effective supervision, allowing extractive industries to continue dominating despite their significant environmental and social impacts. The current regulations also do not provide sufficient incentives for the development of green sectors, such as renewable energy, organic farming, or more environmentally friendly waste management. Even when policies aimed at supporting green economic development are in place, lengthy and overlapping bureaucratic processes between the central, provincial, and regional governments create uncertainty for investors and local entrepreneurs. This slows the adoption of green technologies and sustainable practices at the community and industrial levels.

Moreover, the inconsistency between regulations and the local government's ability to enforce existing rules is a significant issue. Although policies regulating natural resource and environmental management exist, the local government's limited capacity in terms of human resources and technical expertise weakens enforcement and supervision. Many policies fail to be effectively implemented due to the lack of training and capacity building for government officials to execute green programs, as well as insufficient budget allocation for this sector (Hilson & Maconachie 2008). As a result, existing policies often remain rhetoric without significant impact on the ground. This is further exacerbated by the lack of transparency in policy planning and implementation, which leads to public distrust in the government. When the community feels excluded from decision-making processes or does not understand how policies will affect their lives, support for such policies becomes limited.

A striking example of this is in the development of the renewable energy sector. Although the central government has pushed for the development of renewable energy as part of its national agenda, regional regulations are insufficient to accelerate this energy transition. Existing policies often do not provide adequate fiscal incentives to attract investment in green technologies, while fossil fuel subsidies still exist in some sectors, exacerbating dependence on energy sources that harm the environment. Furthermore, more environmentally friendly agricultural sectors, such as organic farming or agroforestry, do not receive adequate attention in regional policies, despite the fact that these sectors could provide jobs and improve food security in a sustainable manner (Kasih 2024).

It is important to note that these challenges are not only due to government issues but also arise from the private sector, which is not fully prepared to transition to more sustainable business practices. Many companies in Bojonegoro still rely on production methods that exploit natural resources on a massive scale without considering long-term environmental impacts. This is compounded by the lack of stringent regulations requiring companies to implement clean and environmentally friendly technologies (Awuah 2019). Without stronger regulatory incentives and better oversight, the private sector will continue to neglect its social and environmental responsibilities in favor of short-term profits.

Addressing these infrastructure and regulatory challenges requires a more holistic and systematic approach. The Bojonegoro Regency government must strengthen coordination between the central, provincial, and regional governments to align existing green economy policies with local conditions and simplify bureaucratic processes for more effective policy implementation. Strengthening the local government's capacity, especially in terms of supervision and policy implementation, is also crucial. Green infrastructure, such as renewable energy-based power grids and eco-friendly transportation systems, needs to be improved and expanded to support green economic development. Additionally, the creation of fiscal incentives for sectors investing in environmentally friendly technologies should be a key part of regional policy. Without improvements in infrastructure and regulation, the transition to an inclusive and sustainable green economy in Bojonegoro will face significant obstacles, which will slow down the achievement of sustainable development goals in the region.

A farmer in Gayam Subdistrict explained: *"Although we understand the importance of renewable energy, we still rely on fossil fuels for our daily needs. In fact, to develop solar energy in our village, we need support from the government or relevant institutions."* (Interview with a Farmer from Sambiroto Village). Economic dependence on extractive sectors like oil and gas places the region in a vulnerable position to price fluctuations and environmental degradation. The use of renewable energy, though

seen as a sustainable solution, is still hindered by limited access to technology and funding. Therefore, policies are needed to facilitate the energy transition in this region, adopting the Green Economy Theory that more thoroughly considers social and economic aspects. A community leader stated: *"We were not invited to participate in policy planning, even though we are the ones who will directly experience its impacts, both positive and negative."* (Interview with a Community Leader from Ngampel Village).

The Natural Resource Governance Theory emphasizes the importance of community participation in the sustainable management of natural resources. In this case, the absence of communities in the policymaking process is a significant barrier to creating effective and inclusive governance. This is further supported by the Community-Based Development Theory, which posits that communities must be the main actors in sustainable development. Inclusive policies that actively involve communities will accelerate the transition to a green economy.

From the interview excerpts above, it can be concluded that the main challenges in the transition to a green economy in Bojonegoro are the high dependence on the extractive sector, the lack of supporting infrastructure, and the limited participation of communities in policymaking. The Natural Resource Governance Theory suggests that sustainable policies must be inclusive and involve all stakeholders, including local communities who are most affected. Meanwhile, the Economic Dependency Theory highlights that dependence on extractive industries, which have the potential to damage the environment, makes the region more vulnerable to global economic changes, particularly in terms of energy price fluctuations. Therefore, economic diversification based on sustainability, such as the development of renewable energy and organic farming, is necessary to reduce this dependence.

The involvement of local communities in the planning and implementation of policies is key to ensuring the success of this transition. The Community-Based Development Theory advocates that successful development must be driven by the communities themselves, with policies that support and facilitate their participation in every stage, from planning to implementation. Thus, inclusive, community-based, and adaptive policies that take local conditions into account are crucial to ensuring an effective and sustainable transition to a green economy.

The utilization of environmentally friendly technologies in Bojonegoro faces various barriers that hinder the region's vast potential to shift to a more sustainable development model. Although green technologies have many benefits, such as reducing negative environmental impacts and providing cleaner energy alternatives, their adoption in Bojonegoro is still very limited. One of the main obstacles is the inability of local communities and the private sector to access adequate green technologies. Environmentally friendly technologies, although proven effective, are often considered expensive and unaffordable for many. This is particularly true in the agricultural sector, which still relies on traditional and conventional farming technologies that are not environmentally friendly. In the energy sector, although there is great potential to develop renewable energy such as solar and micro-hydro, many areas in Bojonegoro still depend on non-renewable fossil energy sources. The lack of access to capital and green financing is a key factor preventing the widespread application of green technologies. Even when such technologies are available, the community and business actors are often not well-educated on the long-term benefits they can gain, both in terms of cost savings and environmental advantages.

The barrier of limited understanding and training in green technology

Furthermore, the limited understanding and training regarding environmentally friendly technologies remain major barriers to their implementation. Many people in Bojonegoro Regency lack the knowledge or skills to operate green technologies, even though they have the potential to apply these innovations in their daily lives. Education and training programs focused on green technologies are still very limited, resulting in a lack of awareness and knowledge necessary to transition toward more sustainable solutions (Poncian & Kigodi 2018). For example, in the agriculture sector, despite the availability of organic farming technologies and smart irrigation systems, many farmers still prefer methods they are familiar

with, which they perceive as easier, even though these methods are less environmentally friendly and can harm the ecosystem in the long term. Without adequate education and training on the benefits and application of green technologies, communities will continue to be stuck in old practices that hinder progress toward sustainability.

A farmer in Gayam District stated: *"I know that there are more environmentally friendly technologies, such as smart irrigation systems or organic farming, but we don't know how to use them. The cost and training for these are also very expensive."* The quote above highlights a significant barrier faced by the people of Bojonegoro in implementing green technologies: the limited understanding and training on environmentally friendly technologies. This underscores the importance of education and training in the success of the transition to a green economy, which aligns with the Community-Based Development Theory (Nugroho et al. 2024).

This theory emphasizes that successful development must involve the community as key actors in planning and implementing policies. In the context of Bojonegoro, the barrier of limited understanding and training shows that the local community lacks the necessary skills or knowledge to adopt more efficient and environmentally friendly green technologies. People tend to stick with the old methods they are familiar with, as they feel more comfortable, even though new technologies could provide long-term benefits both economically and environmentally (Andrews & Oppong 2023).

However, several regions in Indonesia have successfully implemented environmentally friendly technologies that can serve as examples for Bojonegoro Regency. In Bantul Regency, Yogyakarta, for instance, there has been the development of micro-hydro power plants that utilize small rivers to generate renewable energy for rural communities. These power plants not only provide clean energy but also empower the local population by creating new jobs in the management and maintenance of renewable energy installations. This success is not solely due to the adoption of technology but also because of intensive training for local communities, equipping them with the skills to operate and maintain the technology. In agriculture, Bantul has also succeeded in implementing organic farming that reduces dependence on harmful chemicals while increasing environmentally friendly agricultural yields. Here, collaboration between local government, the private sector, and the local community has been key to the successful adoption of green technology (Prijosusilo 2012).

A local eco-tourism entrepreneur in Bojonegoro expressed: *"We want to develop a more sustainable ecotourism business, but the lack of knowledge and green technology skills makes it difficult for us. The government should provide more training for us."* The Green Economy Theory is also relevant in this context, as it emphasizes the importance of integrating social, economic, and environmental factors in the transition process to achieve sustainable development. The lack of training prevents the community from understanding the long-term benefits of green technologies, such as organic farming and smart irrigation systems, which could help them reduce dependence on harmful chemicals and improve agricultural yields. Without adequate understanding of the benefits, the community will not be motivated to adopt these technologies, even though they offer more sustainable solutions.

Another success story comes from Bali, where biogas-based waste management technology has been implemented in several villages. In this system, organic waste produced by the community is converted into biogas, which can be used for household needs, while also reducing pollution and dependence on fossil fuels. Bali's success in waste management and the application of renewable energy demonstrates that environmentally friendly technologies can be well accepted and implemented with strong support from the government, community, and the private sector. Additionally, this waste management system has created new economic opportunities by processing waste into valuable products, such as compost and biogas, which provide both economic and environmental benefits (Super Updt 2023).

The implementation of green technologies in Bojonegoro Regency can follow in the footsteps of these examples by first ensuring that policies supporting green technological innovation are effectively implemented. The Bojonegoro Regency government needs to enhance partnerships with the private

sector and non-governmental organizations to provide training and guidance to local communities in adopting green technologies suitable for local conditions. In this context, the private sector should also be more actively involved in providing practical, efficient technological solutions that prioritize sustainability over short-term profits. Local governments must strengthen policies that offer incentives to companies investing in environmentally friendly technologies, such as subsidies for purchasing green technology equipment, as well as easily accessible financing for small and medium-sized enterprises (SMEs) interested in transitioning to more sustainable business models.

A farmer from Kedungadem Village explained: *"We have not been taught about organic farming technology. We only use traditional methods because they are easier, even though sometimes the results are inadequate and harm the soil."* The Natural Resource Governance Theory also explains that effective natural resource management requires active participation from the community and other stakeholders. By increasing the understanding and skills of local communities through relevant training, the government can encourage the adoption of green technologies more effectively, thus creating a more inclusive and sustainable governance system.

The barriers to understanding and training in green technologies indicate that the transition to a sustainable green economy in Bojonegoro requires a more holistic approach that prioritizes community empowerment through education and training. By adopting the Community-Based Development Theory and Green Economy Theory, inclusive policies based on local knowledge can help accelerate the transition process and create long-term economic sustainability (Bünte 2018).

Additionally, it is important for Bojonegoro Regency to develop an ecosystem that supports Research and Development (R&D) of green technologies, collaborating with universities and research institutions to create innovations that are more suited to local needs and conditions. For example, more accessible renewable energy technologies, such as solar power systems for households and micro-hydro plants for off-grid villages, could be introduced more widely (Cusato 2021). Overall, the utilization of green technologies in Bojonegoro requires a more holistic approach, where the government, private sector, and community work together to create conditions that support the transition toward more sustainable development. Without this synergy, even though green technologies are available, the transition process will remain slow and unable to provide the optimal environmental and economic benefits for the region's sustainability.

Capacity building and community engagement in the transition process

Building capacity and raising environmental awareness in Bojonegoro Regency, East Java, is a complex and critical challenge in supporting the transition to an inclusive and sustainable green economy. The community in this region, which is largely dependent on extractive industries such as oil and gas and traditional agriculture, is often trapped in a mindset focused on short-term profits and immediate survival, without considering the long-term environmental impacts of their economic activities. This dependence on extractive industries, while beneficial in terms of regional income, exacerbates environmental degradation and creates growing socio-economic inequalities. The lack of knowledge about the long-term impacts of unsustainable consumption and production patterns hinders the community's shift toward more environmentally friendly economic practices, even though the potential to do so is considerable. For instance, environmentally friendly sectors such as organic farming and agroforestry are still relatively unknown, while people prefer using chemical fertilizers and pesticides that damage soil and natural resources, without realizing the long-term harm they cause.

The community in Bojonegoro, which largely depends on extractive industries such as oil and gas as well as traditional agriculture, is often trapped in a mindset focused on short-term profits and immediate survival, without considering the long-term environmental impacts of their economic activities. A farmer in Kedungadem Village stated: *"I've been farming this way for a long time. Using chemical fertilizers gives faster results, but if I'm told to switch to organic farming, I don't know how to do it. No one has taught us directly."*

This quote illustrates that the lack of training and understanding is a major barrier to adopting more sustainable agricultural practices. In fact, environmentally friendly sectors such as organic farming and agroforestry have great potential for development. Additionally, the low level of environmental awareness among the people of Bojonegoro worsens the situation. A small business owner in the ecotourism sector stated: *"Many people here don't understand that taking care of the environment can also bring economic benefits. They think that green technology is expensive and difficult to implement."* (Interview with small business owner in the ecotourism sector from Gayam Village). This reflects how public perception of the green economy is still influenced by the lack of available information.

Moreover, the low level of environmental awareness among the people of Bojonegoro worsens the situation. Many people are unaware that environmentally damaging practices, such as deforestation, land burning, or chemical use in agriculture, can lead to greater ecosystem destruction, ultimately harming their own livelihoods. Often, they perceive the transition to a green economy as too expensive or difficult to implement, as they fail to see the immediate benefits that could improve their daily lives. Even when there is awareness of climate change or environmental degradation, this is rarely followed by concrete actions due to a lack of understanding of the practical solutions or alternatives that are more environmentally friendly. For example, many farmers avoid organic farming practices because they are perceived as more difficult or expensive compared to conventional farming that relies on chemical inputs, even though the long-term benefits are more sustainable (Prijosusilo 2012).

The limited access to relevant education and training on the green economy is also a significant barrier to building community capacity. Training programs, although initiated by the government and non-governmental organizations, often fail to reach all segments of the population, especially those in remote areas or marginalized groups. Training programs that are not tailored to local needs and do not consider the economic capabilities of local communities lead to low participation in green initiatives. The people of Bojonegoro are also often constrained by limited resources, whether financial, technological, or access to markets. Without adequate access to training based on green skills—such as sustainable farming, renewable energy technologies, or waste management—communities will remain trapped in the same patterns, relying on unsustainable natural resources. If existing training and education programs are not designed inclusively and based on local wisdom, they will fail to significantly increase the community's capacity to adapt to the green economy.

Another challenge is the lack of opportunities for the community to engage in the planning and decision-making processes related to green economy policies. The Bojonegoro Regency government has not fully involved the community in the planning process for policies related to the green economy, which are often developed without adequate consultation with the most affected parties—the local people. The absence of community participation in decision-making forums may lead to policies that are irrelevant to their needs, or even worsen the gap between the policies being implemented and the realities faced by the community. This limitation is further exacerbated by the inequality in the distribution of benefits from the green economy. Marginalized groups, such as women, small-scale farmers, and indigenous communities, are often left out of the development of green economy policies. They frequently do not have equal access to resources, training, or business opportunities in green sectors, even though they possess significant potential to contribute. Gender inequality, unequal access to capital, and discrimination against certain groups prevent them from fully participating in this transition. Without efforts to empower them through inclusive policies and based on local economic empowerment, many of these vulnerable groups will remain marginalized in the development process.

In this context, the Sustainable Transition Theory is highly relevant for analyzing the challenges faced by the Bojonegoro community (Geels 2011). This theory states that the shift toward a more sustainable system must involve three main levels: niche (local innovations), regime (existing economic and social structures), and landscape (global macro trends). Barriers to capacity building and community engagement can be addressed by strengthening local-level innovations while promoting more supportive policies at the regional and national levels.

An environmental activist in Bojonegoro emphasized: *"We need more support from the government and other institutions to conduct training that is suited to the community's conditions. Don't just provide theory, but also practical sessions that can be applied."* (Interview with environmental activist in Bojonegoro). This aligns with the principles of empowerment theory, which emphasize that education and active community involvement will accelerate the transition process toward a green economy. To address these challenges, a more comprehensive capacity-building strategy is needed. Training programs focused on green technology, sustainable agriculture, and resource management must be expanded and adapted to local needs. Additionally, raising environmental awareness through campaigns based on real-life experiences and local wisdom will help communities recognize the direct connection between environmental sustainability and improvements in their quality of life. Without concrete steps to overcome these barriers, capacity building and community awareness in Bojonegoro will remain a significant challenge, hindering the realization of an inclusive and sustainable green economy.

To address these challenges, Bojonegoro Regency must implement a more comprehensive and targeted capacity-building strategy that involves all segments of society, especially marginalized groups. Training programs focused on green technologies, sustainable agriculture, and environmentally friendly resource management should be expanded and tailored to local needs. Furthermore, raising environmental awareness through campaigns based on real-life experiences and local wisdom will help communities see the direct connection between environmental sustainability and the improvement of their quality of life. Active community participation in planning and decision-making must be prioritized by creating inclusive, transparent, and accessible mechanisms. Economic empowerment of local communities, especially through more equitable access to resources, technology, and training, is crucial so that the transition to a green economy can truly benefit all members of society. Without concrete steps to address these issues, capacity building and community awareness in Bojonegoro will remain a significant challenge that impedes the realization of an inclusive and sustainable green economy.

Collaboration between government and private sector

Collaboration between the government and the private sector in Bojonegoro Regency, East Java, is one of the greatest challenges in the effort to transition to a sustainable green economy. Although both parties recognize the urgency of shifting to a more environmentally friendly economy, the gap between their goals and approaches often obstructs effective collaboration. The local government tends to focus on policies that promote sustainability, hoping to shift an economy still reliant on extractive activities to a green economy model. However, the private sector, predominantly dominated by large companies' dependent on non-renewable natural resources, is more focused on short-term profitability. Many companies have yet to see the immediate benefits of transitioning to more environmentally friendly business models, or they feel that this transition will require significant investment and impact their competitiveness, especially in a highly competitive market.

An official from the Bojonegoro Environmental Agency stated: *"We have initiated various renewable energy and resource efficiency programs, but the challenge is how to convince the private sector that these investments are not only beneficial for the environment, but also economically profitable."* One of the main issues in this collaboration is the lack of clarity between government expectations and ground realities. The Bojonegoro Regency government has initiated various programs to support the development of a green economy, such as sustainable resource management and investments in renewable energy. However, many policies are not supported by strong enough incentives for the private sector to change their business practices. For example, although there are policies supporting the use of renewable energy, the private sector often faces barriers in accessing the appropriate technology, environmentally friendly financing, and regulatory frameworks that are flexible enough to allow them to invest in green infrastructure. Without clear fiscal incentives, such as tax reductions or subsidies for investments in green technologies, the private sector may continue to maintain business models that are financially more advantageous despite their environmental harm.

On the other hand, the private sector often views government policies as overly regulatory and insufficiently supportive of a conducive investment climate. A manager from an energy company in Bojonegoro stated: *"Ever-changing regulations and complicated permitting processes are often the main obstacles for us in investing in green energy projects."* On the other hand, the private sector often views government policies as overly regulatory and insufficiently supportive of a favorable investment climate. Many companies consider existing regulations as obstacles that slow down their operations, especially when policies touch on operational aspects such as emission management or resource usage restrictions. Misunderstandings or disagreements between the private sector and the government often lead to tensions that impede progress toward common goals. The private sector is also frequently not given enough space to participate in the planning of green economy policies, which should create opportunities for collaboration between both sides to generate more practical and implementable solutions.

Another critical issue is the lack of effective and transparent communication between the government and the private sector. On many occasions, government policies aimed at supporting the green economy are not clearly communicated to the private sector, creating uncertainty that can harm businesses. The private sector may feel confused about how to comply with existing regulations or even believe that the policies are inconsistent with their needs and capacities.

A small business owner in the ecotourism sector stated: *"We want to contribute to the green economy, but we struggle to get clear information about the incentives or programs available to support small businesses like ours."* Conversely, the government may feel that the private sector is unresponsive to opportunities for investment in the green sector, or does not recognize the urgency to collaborate on sustainability solutions. This issue stems from a lack of dialogue between both parties, which should be the foundation for developing policies that are more inclusive and based on the needs of both the private sector and the community. In this context, the Co-Creation Theory can also be used to understand the importance of active private sector involvement in policymaking (Voorberg et al. 2015). According to this theory, more innovative and sustainable solutions can emerge when the private sector is given the opportunity to participate in the policy formulation process, rather than merely being a recipient of regulations.

It is crucial to foster stronger and more supportive synergies between the government and the private sector by increasing transparency and mutual understanding between the two. The Bojonegoro Regency government must develop policies that not only encourage investment in the green sector but also provide clearer incentives, such as subsidies for environmentally friendly technology or more accessible financing for the private sector, especially for small and medium-sized enterprises. On the other hand, the private sector should be more open to investing in long-term sustainability, recognizing that the transition to a green economy will bring long-term benefits in the form of operational efficiency, cost reduction, and improved company image. For this reason, more intensive dialogue forums between the government, private sector, and community are needed to design policies that not only advance the green economy but also strengthen collaboration that is more inclusive and beneficial for all parties. Without a strong synergy between the government and the private sector, the transition to a green economy in Bojonegoro will be hindered, and the region's potential to achieve sustainable development will be difficult to realize.

Opportunities and potential of the green economy in Bojonegoro

Local economic diversification in Bojonegoro Regency has become an urgent necessity due to the region's heavy dependence on the extractive sector, particularly oil and gas. Relying on non-renewable resources poses serious risks to long-term economic resilience, especially since the prices of these commodities are highly vulnerable to global market fluctuations and declining production from existing oil fields. This situation makes the local economy vulnerable and potentially susceptible to crises as oil and gas reserves deplete or market prices drop sharply. While Bojonegoro has acknowledged the

importance of economic diversification, concrete efforts to develop alternative sectors still face several challenges, such as infrastructure issues, financing, and the lack of skills among the local population who are not yet ready to adapt. Many economic actors in the region lack the necessary skills to transition to non-extractive sectors like tourism, sustainable agriculture, or the creative economy, causing efforts to diversify the economy to encounter frequent obstacles (Suara Desa 2023).

An official from the Bojonegoro Environmental Agency stated: *"We have been trying to encourage the adoption of environmentally friendly technologies in the agriculture and energy sectors, but there are still many challenges, especially in terms of infrastructure support and investment."* This reflects that although the local government is aware of the importance of transitioning to a green economy, its implementation on the ground still faces complex challenges. One of the critical factors hindering economic diversification in Bojonegoro is the lack of adequate infrastructure. Many potential sectors, such as ecotourism and agrotourism, still face limited accessibility, making it difficult to attract tourists or investors. Moreover, the agriculture sector, which has the potential to become the backbone of the local economy, remains dominated by conventional farming methods that are less productive and often harmful to the environment. Farmers in Bojonegoro often struggle to adopt more modern or organic farming methods due to limited access to training, technology, and capital. The absence of sufficient incentives for farmers to switch to more sustainable farming methods exacerbates the economic dependency on the extractive sector. However, through organic farming or high-value exportable commodities, Bojonegoro could start building a more stable economic resilience, independent of the extractive sector.

Several regions in Indonesia have successfully implemented economic diversification, which can serve as models for Bojonegoro Regency. One such example is Banyuwangi Regency in East Java, which has effectively developed the tourism and creative economy sectors. Banyuwangi once relied on conventional agriculture but, with strong support from the local government and innovations in tourism, has transformed into a famous tourist destination attracting both domestic and international visitors. This diversification strategy has not only boosted the local economy but also created new jobs and improved the welfare of local communities. Banyuwangi's success is supported by infrastructure development, massive promotion, and collaboration between the government, businesses, and local communities. The local government provides full support, including financing and training for small and medium-sized enterprises (SMEs) involved in tourism and the creative economy. Additionally, Banyuwangi has successfully built a strong brand, positioning itself as a model for sustainable tourism development (Erison 2023).

In the Special Region of Yogyakarta, Kulon Progo Regency also serves as a relevant example of economic diversification, particularly in the agribusiness and village-based tourism sectors. By developing local potentials such as organic farming and village tourism, Kulon Progo has been able to increase rural incomes and expand job opportunities beyond traditional agriculture. A key success of Kulon Progo is the development of village tourism focused on cultural and natural preservation, attracting tourists seeking authentic, community-based experiences. Besides tourism, the Kulon Progo local government encourages innovation in agriculture by promoting agribusiness products with added value, such as processed organic agricultural products and local products marketed beyond the region. With support from the government and collaboration with educational institutions, the people of Kulon Progo have received training in business management and sustainable farming techniques, enabling them to become more economically independent and resilient in facing market changes (Erison 2023).

Bojonegoro can draw lessons from the approaches of Banyuwangi and Kulon Progo by developing the necessary infrastructure to support economic diversification and ensuring that training and mentoring programs for the local population are available to build skills that align with the needs of a new economy. The Bojonegoro local government should pay more attention to local tourism sectors, such as the development of ecotourism, cultural tourism, and community-based education tourism, which can highlight Bojonegoro's uniqueness and attract visitors. Additionally, sustainable agriculture can be promoted by encouraging farmers to switch to organic farming and modern technologies that enhance

productivity without damaging the environment. Financial support programs such as microcredit schemes or green financing models should also be enhanced to allow small businesses to participate in a more diverse economy.

Without economic diversification, Bojonegoro faces significant risks to economic stability and community welfare, especially given the uncertainties in the oil and gas sector, which is currently the backbone of the economy. By learning from regions that have successfully implemented diversification, Bojonegoro can create a more resilient and inclusive economy, offering its people wider and more varied opportunities. Economic diversification will also help reduce the environmental impact of extractive activities and create a more equitable and sustainable socio-economic environment.

Conclusion

This study makes a significant contribution to understanding how regions dependent on extractive industries can transition toward an inclusive green economy, focusing on the efforts of the Bojonegoro Regency Government. The findings enrich the sustainable development literature by highlighting the role of local policies, multi-stakeholder collaboration, and challenges in the transition process. The novelty of this research lies in its analysis of participatory governance implemented in Bojonegoro, which differs from the top-down approaches commonly discussed in previous studies. Additionally, this study explores the intersection between extractive industry governance and green economy policies, an area that remains underexplored in academic discourse. Through the Bojonegoro case study, the research provides empirical evidence on how regulatory frameworks and institutional arrangements influence economic diversification efforts.

The study recommends several steps to accelerate the transition to a green economy. First, local governments should strengthen financial incentives, such as tax reductions or subsidies for businesses adopting green technologies. Second, capacity-building programs for local communities and SMEs need to be expanded to enable their active participation in the green economy. Third, regulatory clarity should be improved to reduce uncertainty for private sector investments in renewable energy and sustainable industries. Fourth, multi-stakeholder dialogue forums should be institutionalized to ensure ongoing collaboration among the government, private sector, and civil society. Finally, Bojonegoro can adopt best practices from other regions that have successfully diversified their economies. While this study provides valuable insights, limitations in data coverage, regional specificity, and the analysis of socio-economic impacts indicate the need for further research to develop more effective and inclusive strategies.

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