Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang Regency

Anne Friday Safaria[1], Dhesti Widya Nurhasanah Ningrum[2], Rika Kusdinar[3]

[1]Program Studi Magister Administrasi Publik, Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Sebelas April (UNSAP), Indonesia.'
[2, 3]Program Studi Administrasi Publik, Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Sebelas April (UNSAP), Indonesia.
*Corresponding Author E-mail: anne_friday@unsap.ac.id

Abstract

This study examines the application of collaborative innovation in the implementation of a green economy in Sumedang Regency, as a sustainable development approach that combines economic prosperity with environmental conservation. The background of this study is the challenges faced by local governments in integrating green economy principles, including cross-sectoral coordination, limited resources, and low public awareness. Collaborative innovation is seen as a potential strategy to overcome these obstacles, by involving the active participation of the government, the private sectors, academia, and communities in designing and implementing sustainability-based programs. The method used was a qualitative case study. Data were collected through literature review, focus group discussions, and field studies that included observation, interviews, and documentation. Data analysis was conducted using the iterative model of Miles and Huberman. The results indicate that collaborative innovation in Sumedang Regency is developing in various sectors, such as waste management, organic farming, environmental conservation, and renewable energy. Various innovative green economy collaborations have been implemented, including the Reduce, Reuse, Recycle (TPS 3R) Waste Processing Facility, the Waste Bank Unit, the RDF (Refuse-Derived Fuel) processing partnership, maggot processing, the development of microbial-based organic fertilizer QRR (Quantum Rotan Revo), and the Climate Village Program. Policy support, the government's role as a facilitator, multi-stakeholder involvement, and synergy between public and private actors are key driving factors. However, technical, managerial, and financing challenges still limit program optimization. Collaborative innovation has great potential to strengthen the implementation of a green economy in Sumedang. Success can be achieved by expanding the scale of implementation, integrating cross-sector programs, enhancing the government's role as a facilitator, intermediary/liaison in collaboration, improving human resource capacity, and establishing a clear regulatory framework. Thus, this research is expected to contribute to the theory and practice of public administration, especially for the role of government as a policy maker and implementer.

Keywords: Public Policy, Collaborative Innovation, Green Economy Policy, Collaborative Governance

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

INTRODUCTION

The implementation of green economy policies is increasingly gaining attention in various regions in Indonesia, including Sumedang Regency. A green economy is a development approach that aims to improve community welfare while reducing environmental risks and natural resource scarcity (Sugianto, et al., 2024).Green economy policies play a crucial role in creating sustainable development through efficient resource management, the adoption of environmentally friendly technologies, and improving the community's quality of life (Rahman & Astria, 2024). Sumedang Regency has significant potential to implement these policies due to its valuable natural resources and the local government's commitment to sustainable development. However, the implementation of these policies faces various challenges, including cross-sectoral coordination, resource constraints, and the level of public and business awareness of the importance of a green economy.

This study is considered important because Sumedang faces serious environmental challenges. The urgency of Sumedang's environmental issues is demonstrated by the current rate of deforestation, with 14 hectares of natural forest lost by 2024, releasing 10.7 kilotons of CO2 emissions. Furthermore, the lack of effective waste management, particularly related to household waste, contributes to unhealthy conditions and is exacerbated by the lack of community or government programs addressing this issue (Fatimah, et al., 2024; Global Forest Watch (GWF), 2025). Cikijing River in the area is also classified as lightly polluted, further highlighting the need for intervention (Putri & Afdal, 2023).

One strategy to address these challenges is through collaborative innovation involving various stakeholders, including the government, the private sector, academia, and civil society. There is emphasized the need for collaborative innovation to address socio-economic challenges in West Java Province, Indonesia (Ardhiyansyah, et al., 2023). Collaborative innovation enables various parties to share resources, knowledge, and technology to develop more effective solutions for implementing green economy policies (Wiradinata & Malik, 2021). Collaborative innovation principally operates within an ecosystem involving multiple stakeholders and aims to create various innovations

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

(Safaria, et al., 2019). Furthermore, the goal of innovation in the public sector is to improve public services to be more effective and efficient (Safaria, et al., 2018).

In Sumedang Regency, several collaborative initiatives have begun to be developed, such as community-based waste management programs and the development of a sustainable agricultural sector. However, the effectiveness of collaborative innovation in supporting the implementation of green economy policies requires further research.

This study aims to analyze how the application of collaborative innovation can accelerate and increase the effectiveness of green economy policy implementation in Sumedang Regency. The primary focus of this research is to identify existing collaboration models, evaluate their impact on environmental sustainability and the local economy, and formulate strategies that can strengthen synergy among stakeholders. Thus, this research is expected to contribute to the development of more adaptive and participatory policies to achieve environmentally friendly and inclusive development.

The urgency of this research lies in the increasing pressure on the environment due to unsustainable resource exploitation and the need for more innovative approaches to public policy implementation. The Deputy for Food and Agriculture Coordination at the Coordinating Ministry for Economic Affairs emphasized that collaboration between the government, the private sector, and communities is key to realizing a green economy and achieving the Sustainable Development Goals (SDGs) by 2030. Without effective collaboration, green economy policies risk not achieving optimal results or even stagnating (Permana & Wahyu, 2024). Therefore, understanding the dynamics of collaborative innovation in the context of a green economy is crucial so that implemented policies can provide maximum benefits for society and the environment.

Previous research by Firmansyah and Hasri emphasized the importance of cross-sector collaboration to accelerate regional innovation in order to achieve sustainable development (Firmansyah & Hasri, 2024). Meanwhile, another study by Valentika and Turisno emphasized the importance of holistic regulations and strong policy support in maximizing the benefits of carbon exchanges for the environment and society (Valentika & Turisno, 2024). This confirms that green economy policies require innovation in financial instruments and the involvement of various actors in their implementation.

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

In this research, Kodama's collaborative innovation theory serves as the primary reference in identifying forms of collaborative innovation, consisting of two indicators: 1) co-creation and co-evolution, and 2) ecosystem partners (Kodama, 2018). The supporting theory is collaborative governance by Ansell and Gash which focuses on collaboration in public policy or public program management (Noor, et al., 2022).

The rationale for using these two theories is that collaborative innovation is linked to network-based collaborative approaches in the public sector and public governance, and is linked to citizen participation in public policy development (Lopes & Farias, 2022). Therefore, the novelty of this research emphasizes the importance of creating an innovation ecosystem through co-creation and co-evolution among stakeholders, unlike previous research that only highlighted aspects of cross-sector collaboration or policy regulation. With this approach, the research offers a new perspective in identifying the role of synergy between actors, governance structures, and active participation in supporting sustainable regional development.

LITERATURE REVIEW

Innovation, defined as the successful commercialization of new ideas, including products, services, processes, and business models, is a critical component of economic growth (World Economic Forum, 2015). Collaborative innovation, in a business context, is defined as the interaction of a company with various partners collaborating to accelerate internal innovation across multiple areas, including product or service innovation, process innovation, and management innovation (Shou & Li, 2025). Many view this as an opportunity to share knowledge with external partners and gain access to new knowledge, resources, and technologies. This impacts risk reduction, complementary resource sharing, increased productivity, and competitive advantage.

Innovation drives growth in two interrelated and complementary ways: by introducing new or improved products or services that capitalize on existing or latent market demand, thereby creating added value for both the company and consumers; and by increasing the productivity of the companies implementing the innovation. Collaborative innovation is divided into three levels in its implementation, as the general model for managing collaborative innovation includes three stages: Prepare, Partner,

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

and Pioneer. In the Prepare phase, organizations establish clear objectives, identify potential partners, and align cultural values to foster collaboration. The Partner phase involves building and managing relationships with these partners to effectively share knowledge and resources. Finally, the Pioneer phase focuses on the co-creation of new ideas and solutions, taking them from concept to commercialization through a concerted effort (World Economic Forum, 2015).

Innovation success is heavily influenced by collaborative networks, particularly in the triple helix model (Shou & Li, 2025). This model facilitates synergistic collaboration between three key actors. The government provides the policy framework and support, universities serve as centers for research and knowledge development, and industry is responsible for implementing and commercializing innovation outcomes.

A study from China demonstrated a strong and positive correlation between collaborative innovation and firm innovation performance. Furthermore, two different types of collaborations found that supply chain (SC) collaborative innovation had a more significant impact on firm innovation performance than the effect generated through industry-university-research (IUR) collaboration. Furthermore, the study revealed that formal and informal institutions strengthen the positive relationship between collaborative innovation and innovation performance (Xie, et al., 2023).

Another reference is research in the field of communications technology in Indonesia, which investigated the complex relationships between key factors influencing corporate innovation performance within supply chain networks. A survey of 100 unit leaders in an Indonesian telecommunications company revealed a significant positive relationship between collaborative innovation activities, knowledge sharing, innovation strategy, and corporate innovation performance (Hakim & Nasution, 2023).

This dynamic can be understood through the innovation ecosystems framework, which, according to Granstrand and Holgersson (2020), is a continuously evolving set of actors, activities, artifacts, institutions, and relationships, encompassing both complementary and substitutable relationships (Granstrand & Holgersson, 2020). This perspective views the success of innovation as dependent not only on the number of actors involved but also on the quality of the relationships, interactions, and policies that shape the system as a whole. This theory provides a starting point for understanding that

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

a strong innovation ecosystem requires interconnectedness among elements for sustainable collaborative outcomes.

To identify the forms, models, and implementation of collaborative innovation, we can explore them through two approaches, namely: 1) co-creation and co-evolution, and 2) ecosystem partners (Kodama, 2018). Co-creation and co-evolution in collaborative innovation include at least three indicators, namely business synergy, technology synergy, and partnership synergy. First, business synergy includes joint creative assessment and alignment through a matching process to bring new and higher value to customers (target users and end users); assessing whether costs can be reduced more efficiently by using the knowledge (assets) of other companies instead of their own knowledge (assets). Second, technology synergy. This synergy is the process of mutually integrating technical knowledge to create new products and services. Third, partnership synergy aims to strengthen each other's strengths while complementing each other's weaknesses, resulting in a higher level of synergy and creativity.

The ecosystem partner dimension is divided into four indicators: reciprocal synergy between various groups of companies and organizations; network structure; ecosystem business model (is it an open platform, vertically integrated, semi-open, or closed?); and profit structure (profit-sharing system).

Kodama's collaborative innovation theory focuses on the "National Innovation System" (NIS) model, which involves various actors, including the public and private sectors, universities, and non-profit organizations, not just the private sector. However, due to its commercial nature, the private sector is often the primary focus of research and application of innovation theories.

Meanwhile, Ansell and Gash's theory of collaborative innovation, or collaborative governance, positions the government as the primary facilitator collaborating with various public and non-public actors to solve complex problems (Ansell & Gash, 2007). The government's role is no longer as the sole decision-maker, but rather as a mediator and intermediary to build a process of trust and shared understanding, with the ultimate goal of reaching decisions that are acceptable to all parties and producing innovative solutions. This collaborative process in public policy formulation involves several key elements, namely: 1) initiatives from public bodies; 2) the presence of non-governmental

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

actors; 3) direct involvement of participants; 4) Forums are held formally and collectively; 5) Aim to reach decisions based on consensus; and 6) Collaboration focuses on public policy or public program management (Noor, et al., 2022). These two concepts and theories serve as valuable references that complement each other in collecting, analyzing, and presenting data in this research.

According to information from the Indonesian Ministry of State Secretariat, Indonesia's commitment to a green economy is manifested in policies such as the implementation of carbon pricing and incentives for renewable energy (Kementerian Sekretariat Negara, 2024). For example, cities and districts have initiated programs such as waste management and the development of tourist villages. First, Sidoarjo Regency has implemented good household waste management, converting waste into energy, as in Larangan Village, Candi District. Second, Luwu Regency has developed a sustainable agricultural sector in Tampa Village, Ponrang District. Third, Gresik City has developed tourist villages, such as Miru Village, an ornamental plant tourism area, which was inaugurated in 2021 (Kumparan, 2024).

As a comparison, the implementation of a green economy in various countries, Ghana for example, can serve as a guideline for sustainable development, and its benefits include not only economic aspects but also social aspects, such as increasing access to basic services, improving the quality of education, and creating more job opportunities (UNEP, 2021). Furthermore, the European Commission's study on the EU's green economy strategy developed a sustainable and environmentally friendly engine for economic growth. Implementing a green economy opens up opportunities for sustainability-based economic sectors, such as renewable energy, environmentally friendly transportation, and the circular economy (European Commission, 2022).

RESEARCH METHOD

This research employs a qualitative case study, an in-depth investigative method to thoroughly explore an event, organization, or subject, often focusing on a novel and "interesting" case to provide new insights into the phenomenon. This method utilizes narrative data from participants, such as stories and in-depth interviews with open-ended questions, to gain a comprehensive understanding from multiple perspectives (Sarosa,

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

2021). This is supported by leading experts who define a case study as "an intensive and holistic description and analysis of a bounded phenomenon such as a program, institution, person, process, or social unit" (Mtisi, 2022). In the context of this research, the cases considered interesting are contemporary issues of collaborative innovation and the green economy.

Based on this method, data collection techniques were conducted through literature and field studies (Sugiyono, 2020), with the following details:

a. Literature study, a data collection technique involving studying and analyzing various literature, including scientific books, documents, notes, written regulations, and other materials related to the implementation of green economy policies.

b. Field study, a technique conducted through direct observation of the research subjects. This technique includes observation, interviews, and documentation related to the implementation of green economy policies in Sumedang Regency.

For informant selection we employed purposive sampling and snowballing strategies. As a method used to identify initial participants for a purposive sample, we employed the snowballing technique, beginning with identifying the first key informant, the head of the economic division of the Sumedang Regional Secretariat, as district coordinator. From him, we obtained information about green economy programs in general and the Regional Government Agencies (OPDs) responsible for managing them. He also directed us to the individuals specifically responsible for these programs.

The nine key informants interviewed were officials and staff within the Sumedang district government who had knowledge and were involved in the green economy program, consisting of: 1 (one) person from the Regional Planning, Budgeting, and Performance Reporting Agency (BAPPPPEDA); 3 (three) people from the waste management program, and 2 (two) people from the forest conservation program of the Environment and Forestry Service (DLHK); 1 (one) person from the Cooperatives, Small and Medium Enterprises, Trade, and Industry Service (Diskop UKMPP); and 2 (two) people from the Agriculture and Food Security Service (DPKP) of Sumedang Regency.

The main questions asked of informants were what policies and programs are related to the green economy, and which parties are involved in these programs.

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Subsequent questions concerned the implementation of co-operatives, co-evolution, and partner ecosystems.

This research also utilized focus group discussions (FGDs) to gain an in-depth understanding of participants' perceptions, opinions, and experiences related to the research findings, with the ultimate goal of generating new understandings and consensus. The 30 invited participants included government work units acting as key informants, environmental observers, entrepreneurs, students and academics from the Public Administration study program, Faculty of Social and Political Sciences, Sebelas April University (UNSAP).

The data obtained was then analyzed using the iterative analysis model from Miles and Huberman (Sugiyono, 2020), which includes:

a. data reduction (simplifying and focusing data, namely the process of sorting data and focusing on information that leads to problem solving, interpretation, and findings to answer the research questions. The resulting data reduction will provide clearer descriptions and facilitate researchers in conducting subsequent data collection.

b. data presentation (displaying data in a structured form), namely displaying or presenting data transparently, either in narrative form or in tables or graphs. Coherent and systematic data presentation techniques greatly assist researchers in drawing conclusions or conducting verification.

The research duration was adjusted to the timetable, particularly the reporting deadline set by the grantor. We had approximately four months to collect data, process it, and present it in a report.

RESULT AND DISCUSSION

Although the nomenclature of green economy and collaborative innovation only officially emerged in Sumedang district government policy through the 2025-2045 Long-Term Development Plan (RPJP), its spirit emerged long before, through the vision of sustainable development. Its principles have been implemented through various cross-sector programs oriented towards sustainable development. These efforts include the development of green open spaces utilizing Corporate Social Responsibility (CSR)

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

support from the private sector, waste management based on the 3R principle (Reduce, Reuse, Recycle), and the use of renewable energy such as solar cells and biogas. Furthermore, empowering Micro, Small, and Medium Enterprises (MSMEs) that produce crafts from recycled materials is one concrete step towards creating economic value while reducing waste. According to Barbier, a green economy emphasizes achieving sustainable development through resource efficiency and emission reduction, which aligns with these programs. This demonstrates that, although not yet regulated by nomenclature, regional policy directions have internalized the core principles of a green economy (Barbier, 2016).

The research results show that collaborative innovation in green economy implementation in Sumedang Regency is developing in various sectors and forms. At least three sectors are dominant in implementing the green economy, including waste management, agriculture, forest conservation, and renewable energy. The collaborative models developed also vary, ranging from the triple helix to the penta helix. These green economy sectors will be discussed in detail in the dimensions of Co-Creation and Co-Evolution, as well as their ecosystem partners.

Collaborative Innovation Model of the Environment and Forestry Sector (DLHK)

In Sumedang, various actors such as local governments, communities, businesses, and educational institutions interact to form collaborative networks, enabling initiatives such as Loseda (*Lodong Sesa Dapur*) composting technology, waste banks, and Refuse-Derived Fuel (RDF) processing partnerships to support each other. To explain, the word "Sesa" in Loseda comes from Sundanese, meaning "leftovers." Loseda thus refers to a method of managing kitchen waste using a "*lodong*" or pipe-shaped container.

Table 1. Implementation of Collaborative Innovation in Waste Management (Environmental Sector)

Collaborative Innovation Indicators		Collaborative Innovation Models and Levels
Co-Creation and Co-Evolution	**Ecosystem Partners**	
1. Business synergy: ○ Reduce, Reuse, and Recycle Waste	1. Reciprocal synergy: between government, society, activist	○ Model of Triple and Quadruple Helix

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Processing Facility (TPS 3R) and o Waste Bank Unit (BSU) 2. Technology synergy: Waste shredding and sifting tools, Loseda (Lodong Sesa Dapur) compost technology, waste banks, and RDF (Refuse-Derived Fuel) processing technology. 3. Partnership synergy: Collaboration with industry for RDF (inorganic fuel production)	communities/NGOs, and industry 2. Network structure: open 3. ecosystem business model: multi-layered and multi-nodal	o Level of collaborative innovation: Partner o Network structure: open innovation (leveraging internal and external resources to find ideas and solutions)

Source: Analyzed from field findings (2025)

Another concrete manifestation of collaborative innovation is found in the waste management sector (Table 1) through the Reduce, Reuse, Recycle Waste Processing Site (TPS 3R) and the Waste Bank Unit (BSU) programs. Both programs rely on government policy support and community participation as driving forces. However, limited management capacity, low public awareness, and minimal operational funding are obstacles that reduce performance. This is supported by research from Sebelas April University (UNSAP) that indicates that the productivity of the Sumedang Regency Environment and Forestry Agency (DLHK) is quite good. The efficiency and effectiveness of waste management are reflected in the implementation of various programs and the utilization of existing facilities, infrastructure, and human resources to achieve optimal results. While services are provided based on Law No. 13 of 2008, service distribution remains uneven. The primary focus of services is directed toward the city center, while sub-districts in outlying areas have not received optimal attention (Nugraha, et al., 2021).

On the other hand, there are good practices that demonstrate the great potential of cross-sector collaboration, such as the partnership between the Hegarmanah 3R Waste Management Site (TPS 3R) and Indocement, a big private company, in RDF processing, which successfully reduced residue while increasing the economic value of waste. This success is inseparable from the support of environmental education

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

programs such as the Environmental Care Movement in Schools (GPBLHS), cleanliness competitions, awards for environmentally friendly offices, and the development of a sustainable waste management system. This condition aligns with the findings in the transformative governance theory of innovation ecosystems proposed by Kivimaa et al., which states that successful innovation requires adaptability, connectivity between actors, redundancy as backup solutions, and clear policy direction to maintain system resilience (Kivimaa, et al., 2021). By applying this principle, existing obstacles in Sumedang can be overcome by strengthening BSU institutions, diversifying management mechanisms, and expanding cross-sectoral involvement such as schools, communities, and industry, thus creating alternative collaboration pathways that ensure program sustainability even if obstacles arise in one model.

This development can be explained through the theory of the role of intermediaries in innovation ecosystems as proposed by Sultana and Turkina, who assert that "intermediaries" function as liaisons between actors, facilitators of knowledge exchange, and drivers of innovation diffusion (Sultana & Turkina, 2023). In the Sumedang context, intermediary actors such as local governments, schools, environmental communities, and industrial partners play a strategic role in uniting the interests of various parties, expanding program coverage, and ensuring the sustainability of innovation outcomes. Thus, when viewed as a whole, the innovation ecosystems framework, transformative governance, and the role of intermediaries form a conceptual thread that explains how collaborative innovation can function effectively in implementing a green economy in Sumedang.

Table 2. Implementation of Collaborative Innovation in Forest Conservation (Forestry Sector)

Collaborative Innovation Indicators		Collaborative Innovation Models and Levels
Co-Creation and Co-Evolution	**Ecosystem Partners**	
1. Business synergy: o The Grand Forest Park (Tahura) nature and cultural reserve as a tourist attraction	1. reciprocal synergy between various groups of companies and organizations: Cooperation between the government and the Palasari Forest Farmers Group and small traders.	o Triple Helix Model o Level of collaborative innovation: prepare (preparing for collaboration)

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

o The Tahura nature and cultural reserve provides economic opportunities for small traders in their businesses. 2. Technology synergy: No description 3. Partnership synergy: Collaboration with the Palasari Forest Farmers Group on flora and fauna conservation programs, boundary monitoring, and firebreaks. Collaboration with small vendors to provide snacks for tourists.	2. Network structure: close 3. Ecosystem business model: multi-layered	o Struktur jaringan: tends to be closed (utilizes internal resources to find ideas and solutions)

Source: Analyzed from field findings (2025)

However, the forestry sector has not been able to match the success of waste management programs (compare tables 1 and table 2). Furthermore, according to research by Universitas Sebelas April (UNSAP), one reason for the underdevelopment of the green economy within the framework of forest conservation is the inadequate promotion of the Grand Forest Park (Tahura) in Sumedang Regency. The Sumedang Regency Environmental Agency (DLH), which manages the Gunung Kunci and Gunung Palasari Forest Parks, has not fully implemented the four key promotional strategies (Ningrum, et al., 2024).

The Tahura in Sumedang Regency lacks a distinctive slogan or tagline. Without a slogan and tagline, it is difficult to establish the quality of the promoted product, and the public will likely not easily remember it. The limited number of attractions available in the Tahura, resulting in limited and less memorable tourist activities. Furthermore, the absence of public figures advertising the Tahura, results in less engaging promotional content.

These three aspects require improvement and special attention from the regional government in developing Tahura tourism in Sumedang Regency. Marketing

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

infrastructure alone cannot be relied on to increase tourist visits. Even if road access to the Tahura is excellent, if it is not supported by the other three promotional strategies, it will not have a positive impact on increasing tourist visits and ultimately will not contribute to the economic growth of the surrounding areas, whether Tahura Gunung Kunci or Tahura Gunung Palasari.

Collaborative Innovation Model in the Agricultural Sector

The development of the agricultural sector in Sumedang Regency is a concrete example of collaborative innovation in implementing a green economy, with Cikurubuk Village as a prime example of integrated organic farming. This initiative began as an independent farmer movement in 2011 and grew through multi-layered support from the Department of Agriculture, the provincial government, academics, ministries, and universities. This cross-actor collaboration aligns with the quadruple helix concept proposed by Carayannis and Campbell, which emphasizes synergy between government, business, academia, and the community in creating sustainable innovation (Carayannis & Campbell, 2015). This model recognizes four main actors in the innovation system: science, policy, industry, and society (Schütz, et al., 2019).

The Quadruple Helix model operates through a dynamic, multi-layered, two-way interaction (Schütz, et al., 2019). Here, communities play a key role in the national innovation system, emphasizing the importance of actively integrating communities into innovation projects (table 3). In this context, the role of village communities as key actors is key to success, as innovation emerges not only from the top down but also from local needs that are collectively addressed.

One key innovation resulting from this collaboration is the use of the microbial-based organic fertilizer QRR (Quantum Rotan Revo), developed by Prof. Maman of the University of Indonesia. This innovation has been proven to increase rice productivity while reducing dependence on chemical fertilizers, thus supporting more environmentally friendly agricultural practices. This aligns with the view of Dangelico and Pujari, who asserted that green innovation can provide dual benefits: improving environmental performance while achieving competitive advantage (Dangelico & Pujari, 2015).

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Table 3. Implementation of Collaborative Innovation in Rice and Organic

Fertilizer Development (Agricultural Sector)

Collaborative Innovation Indicators		Collaborative Innovation Models and Levels
Co-Creation and Co-Evolution	**Ecosystem Partners**	
1. Business synergy: Establishment of a cooperative institution to accommodate and sell organic fertilizer production 2. Technology synergy: Production and Use of QRR (Quantum Rotan Revo) microbe-based organic fertilizer, a result of academic (science) invention. 3. Partnership synergy: Collaboration with universities in research and mentoring in the development of digital-based packaging and marketing	1. Reciprocal synergy between various groups of companies and organizations: between government, civil society, farmers-business actors, academics, and the media 2. Network structure: using open platforms, and free use of patents or intellectual property 3. Ecosystem business model: multi-layered and multi-nodal	o Model of Quadraple helix o Level of collaborative innovation: Pioneer o Network structure: open innovation (utilizing internal and external resources to find ideas and solutions)

Source: Analyzed from field findings (2025)

Several flagship programs have demonstrated positive results in guiding Sumedang Regency toward sustainable development. For example, the development of integrated organic rice, which combines environmentally friendly practices with strengthening the local economy, maggot processing as a solution for managing organic waste and as an alternative feed source, waste management partnerships with industry that promote material circularity, and the implementation of the Climate Village Program in 30 villages, which strengthens community resilience to climate change. Consistent with

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

D'Amato et al., successful implementation of a green economy requires social innovations capable of creating behavioral change, strengthening local capacity, and building cross-sector networks (D'Amato, et al., 2017). This demonstrates that innovative collaboration based on multi-stakeholder participation can be a driving force in the transition to a sustainable society.

In the case of Cikurubuk Village, there was the challenge of facing broader market competition due to unattractive packaging and labeling. A team from the Widyatama University Research and Community Service Institute (LPPM) helped address this issue by developing modern, attractive, and informative label and packaging designs that emphasize natural qualities, health, and sustainability. Their efforts included training and mentoring local farmers in branding and packaging design, developing and testing new designs, and implementing them in the market. Their research showed that improved packaging significantly improved the image of organic rice products, increased consumer interest, and boosted competitiveness in local and regional markets. Positive market response confirmed the effectiveness of the new design, which is now being used by five partners to market organic rice. This initiative has opened up broader marketing opportunities for the village's organic rice products (Budiman, et al., 2025).

This success was also supported by policy and infrastructure support, such as the allocation of village funds for organic food security, the certification process, marketing strategies through cooperatives, and the modernization of agricultural equipment. This approach aligns with the concept of collaborative governance updated by Purdy, which emphasizes that collaborative governance must facilitate the distribution of power, the sharing of resources, and the building of trust between actors (Purdy, 2017). Through this support, the organic agricultural value chain in Cikurubuk was able to be built more solidly, connecting producers with markets that are highly environmentally conscious.

Strategy of Collaborative Synergy Strengthening

Collaborative synergy is the cooperative interaction of two or more parties that helps them connect, communicate, and collaborate effectively with cross-functional partners. This strategy is needed to overcome the problems, obstacles, and challenges faced in implementing green economy innovations.

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

These challenges include changing the mindset of farmers accustomed to conventional methods, limited production infrastructure, high organic certification costs, and market uncertainty. According to Kanda et al., the successful adoption of green innovations requires the role of intermediary organizations that connect business actors, researchers, policymakers, and consumers (Kanda, et al., 2018). In the Cikurubuk context, this role is played by cooperatives, agricultural extension workers, and academic partners who help facilitate the flow of knowledge, expand marketing networks, and ensure product quality standards are maintained. By optimizing these roles, Cikurubuk Village has the potential to become a leading model of organic farming that combines environmental sustainability with collaboration-based economic growth in Sumedang Regency.

Collaboration is at the heart of these programs' implementation, with the local government acting as a facilitator connecting various stakeholders. Support comes from the provincial government, relevant ministries, academia, the private sector, banking institutions, farmer groups, and community groups. This approach aligns with the concept of collaborative governance described by Emerson and Nabatchi, a collaborative governance process involving various actors from the public, private, and civil society sectors to collectively solve complex problems (Emerson & Nabatchi, 2015). In the Sumedang context, this mechanism strengthens the region's capacity to pool resources, reduce program duplication, and expand benefits to the wider community.

Other obstacles and challenges include low public understanding of the concept of sustainability, limited regional budget allocations, a lack of indicators capable of comprehensively measuring environmental quality, and rampant land conversion that threatens ecosystem sustainability. According to Bina, one of the biggest obstacles to implementing a green economy is the gap between conceptual understanding at the policy level and implementation on the ground, which is exacerbated by limited technical and financial capacity (Bina, 2016). Therefore, solutions that combine public education, financing innovation, and the formulation of evidence-based indicators are key to overcoming this obstacle.

Overall, these findings demonstrate that collaborative innovation in Sumedang Regency is multi-sectoral in nature, capable of synergizing the strengths of various actors,

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

including government, the private sector, academia, and community groups. This collaboration goes beyond sharing resources and creates a productive dialogue space for formulating joint strategies to achieve sustainable development goals. This approach allows each sector to contribute according to its capacity, enabling the green economy implementation process to be more effective and adaptive to changing conditions.

The implementation process on the ground also faces technical, managerial, and financial challenges. Infrastructure limitations, the limited technical capacity of some actors, and budget constraints are obstacles that need to be addressed in a structured manner. Furthermore, differences in perspectives and priorities between actors sometimes create friction that can hinder coordination. Therefore, more robust governance mechanisms are needed, including improving human resource competencies and strengthening cross-sector communication systems to ensure consistent and sustainable collaboration.

On the other hand, existing collaborative innovation practices demonstrate significant potential for strengthening program integration and expanding implementation. Initial local initiatives can be replicated in other regions, adapting to local contexts and needs. Establishing a clear regulatory framework will be a crucial foundation for ensuring consistent policy direction and strong impetus. Thus, the implementation of a green economy in Sumedang Regency will not only be sustainable but also develop into a model for other regions in Indonesia.

From this discussion, we can glean the essence of the recommended strategies, including: cross-sectoral program integration strategies, enhancing the government's role as an intermediary/liaison in collaboration, enhancing human resource capacity, and establishing a clear regulatory framework.

CONCLUSION

Overall, the results of this study indicate that collaborative innovation in Sumedang Regency has been implemented across multiple sectors (such as waste management, agriculture, forest conservation, and renewable energy), with various collaborative innovation models ranging from the triple helix to the penta helix, from the preparatory to the pioneering stage. This collaboration combines the strengths of various actors, such

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

as local governments, provincial institutions, ministries, academics, business actors, farmer groups, communities, and financial institutions. This collaboration allows for the utilization of diverse resources, complements mutual expertise, and encourages the creation of programs relevant to local needs. From organic farming and renewable energy to 3R-based waste management, all these initiatives demonstrate a positive trend toward realizing a green economy at the regional level.

This success is also influenced by the role of the local government as a facilitator, capable of connecting various stakeholders. This support is provided not only in the form of policies and regulations, but also through funding facilitation, technical assistance, and program promotion through cross-sectoral networks. This synergy has given Sumedang Regency a collaborative innovation ecosystem that is beginning to take shape, although not yet fully optimized.

However, despite these achievements, real challenges remain, ranging from limited supporting infrastructure, high certification costs, low public understanding, and a lack of indicators that comprehensively measure environmental quality. These obstacles highlight the need for capacity-building strategies for both field actors and policymakers to ensure consistent and sustainable implementation of green economy programs. These factors can be a barrier to the success of the program.

The potential for future development is significant, given Sumedang Regency's abundant natural resources, active community base, and support from the private sector and universities. Integrating programs across agencies and expanding the scale of implementation across various regions will be key to maximizing the benefits of a green economy. Furthermore, sustainable partnerships must be maintained to ensure that existing innovations are not merely short-term projects but are integrated into the regional development system.

To ensure sustainability, a clear, measurable regulatory framework is needed that provides a strong impetus for all sectors. This regulation must accommodate various existing initiatives, integrate sustainability indicators, and ensure stable funding. With a solid legal foundation, collaborative innovation in Sumedang Regency can develop into a green economy implementation model that is inclusive, adaptive, and provides real benefits to the community while preserving the environment.

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

As a further note, our research is limited to a general overview of collaborative innovation in green economy implementation. Further research is needed to understand the complexity and diversity of ecosystem network structures assumed to influence the success of collaborative innovation.

ACKNOWLEDGEMENT

REFERENCES

Ansell , C., & Gash, A. (2007). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory Advance, 18*(4), 543-571. doi:https://doi.org/10.1093/jopart/mum032

Ardhiyansyah, A., Sulistyowati, N. W., & Handayani, E. (2023, Juni 28). Inovasi Berkelanjutan: Pendekatan Kolaboratif untuk Mengatasi Tantangan Sosial-Ekonomi di Provinsi Jawa Barat. *Jurnal Pengabdian West Science, 2*(6), 460–467. doi: https://doi.org/10.58812/jpws.v2i6.451

Barbier, E. B. (2016). Building the Green Economy. *Canadian Public Policy, 42*(S1), S1–S9. doi:https://doi.org/10.3138/cpp.2015-017

Bina, O. (2016). The green economy and sustainable development: An uneasy balance? . *Environment and Planning C: Government and Policy,, 31*(6), 1023–1047. doi:https://doi.org/10.1068/c1310j

Budiman, Hadijah, I., Pertiwi, A. B., & Rinaldi, M. F. (2025). (Development of Organic Rice Labels and Packaging in Cikurubuk Village to Improve Product Image. *JUKESHUM: Jurnal Pengabdian Masyarakat, 5*(1), 102-114. doi: https://doi.org/10.51771/jukeshum.v5i1.1381

Carayannis, E. G., & Campbell, D. F. (2015). *Emerging Regional Innovation Ecosystems: The Role of Quadruple Helix and Dynamic Knowledge Production.* New York: Springer. doi: https://doi.org/10.1007/978-3-319-09967-6

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

D'Amato, D., Droste, N., Allen, B., Kettunen, M., Lähtinen, K., Korhonen, J., & Toppinen, A. (2017). Green, Circular, Bio Economy: A Comparative Analysis of Sustainability Avenues. *Journal of Cleaner Production, 168,*, 716–734. doi:https://doi.org/10.1016/j.jclepro.2017.09.053

Dangelico, R. M., & Pujari, D. (2015). Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability. *Journal of Business Ethics, 95*(3), 471–486. doi: https://doi.org/10.1007/s10551-010-0434-0

Emerson, K., & Nabatchi, T. (2015). *Collaborative Governance Regimes.* Georgetown: Georgetown University Press. doi:10.1353/book44406

European Commission. (2022). *The European Green Deal Striving to be the first climate-neutral continent*. Diambil kembali dari commission.europa.eu: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en#:~:text=It%20sets%20out%20a%20plan,through%20the%20Europe

Fatimah, S., Deliana , Y., Rasmikayati, E., & Trimo. (2024). Towards Ecovillage Through Rural Waste Management Institution in Cinanjung, Sumedang Regency, West Java. *Proceedings of the 6th Plano Cosmo International Conference (PC6), IOPC.*

Firmansyah, J., & Hasri, D. A. (2024). Innovation Hub: Strategi kolaborasi Pemerintah Daerah sebagai Upaya Pembangunan Berkelanjutan (Studi di Kabupaten Sumbawa Barat). *Jurnal Tambora, 8*(3), 43–52.

Global Forest Watch (GWF). (2025). *Sumedang, Indonesia, Jawa Barat: Deforestation Rates and Statistics*. Diambil kembali dari www.globalforestwatch.org: https://www.globalforestwatch.org/dashboards/country/IDN/9/25/?map=eyJjYW5Cb3VuZCI6dHJ1ZX0%3D

Granstrand, O., & Holgersson, M. (2020). Innovation ecosystems: A conceptual review and a new definition. *Technovation, 90–91* (102098.). doi:https://doi.org/10.1016/j.technovation.2019.102098

Hakim, D. N., & Nasution, Y. (2023). The Impact of Collaborative Innovation Activities and Innovation Strategy on Innovation Performance in the Telecommunications Industry: Mediating Effects of Knowledge Sharing. *Al Qalam: Jurnal Ilmiah*

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Keagamaan dan Kemasyarakatan, 17(4), 2806- 2824. doi:
http://dx.doi.org/10.35931/aq.v17i4.2312

Kanda, W., Hjelm, O., & Clausen, J. (2018). Boosting Eco-Innovation: The Role of Public
Support Organizations. *Journal of Cleaner Production, 269*, 122-129.
doi:https://doi.org/10.1016/j.jclepro.2018.06.162

Kementerian Sekretariat Negara. (2024, February 12). *Green Infrastructure dan Green
Economy Membangun Masa Depan Berkelanjutan di Indonesia*. Diambil kembali
dari   www.setneg.go.id:
https://www.setneg.go.id/baca/index/green_infrastructure_dan_green_econom
y_membangun_masa_depan_berkelanjutan_di_indonesia#:~:text=Lebih%20lanj
ut%2C%20pada%20tahun%202023,dalam%20mendukung%20pembangunan%
20yang%20berkelanjutan.

Kivimaa, P., Boon , W., Hyysalo, S., & Klerkx, L. (2021). Towards a Typology of
Intermediaries in Sustainability Transitions: a Systematic Review and a Research
Agenda. *Research Policy, 50*(4), 104–109.
doi:https://doi.org/10.1016/j.respol.2020.104119

Kodama, M. (2018). *Collaborative dynamic capabilities for service innovation.* New York:
Springer International Publishing.

Kumparan. (2024, September 17). *Penerapan Ekonomi Hijau di Indonesia dan Contoh
Suksesnya* . Diambil kembali dari kumparan.com: https://kumparan.com/berita-
hari-ini/penerapan-ekonomi-hijau-di-indonesia-dan-contoh-suksesnya-
23XXrHw1mcY

Lopes, A. V., & Farias, J. S. (2022). How Can Governance Support Collaborative
Innovation in the Public Sector? A Systematic Review of the Literature.
International Review of Administrative Sciences, 88(1), 114–130.
doi:https://doi.org/10.1177/0020852319893444

Mtisi, S. (2022). The Qualitative Case Study Research Strategy as Applied on a Rural
Enterprise Development Doctoral Research Project . *International Journal of
Qualitative Methods, 21* (December 2022).
doi:https://doi.org/10.1177/16094069221145849

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Ningrum, D. N., Sister, W. A., & Susilawati, S. (2024). Strategi Promosi Objek Wisata Taman Hutan Raya (Tahura) di Kabupaten Sumedang. Journal of Regional Public Administration (JRPA). *9*(2), 139-145.

Noor, M., Suhaedi, F., & Mardianta, A. (2022). *Collaborative Governance: Suatu Tinjauan Teoritis dan Praktis*. Yogyakarta: Bildung.

Nugraha, D. S., Maulida, C., Sintha, I., & Khodyzah. (2021). Kinerja Bidang Pengelolaan Sampah di Dinas Lingkungan Hidup dan Kehutanan Kabupaten Sumedang. *Journal of Regional Public Administration (JRPA), 6*(2), 47-53.

Permana, N., & Wahyu, E. (2024). Kolaborasi antara ekonomi hijau dan ekonomi Islam dalam mencapai kesejahteraan sosial dan lingkungan: Analisis terhadap strategi pembangunan berkelanjutan Society 5.0. *Al-Urban: Jurnal Ekonomi Syariah dan Filantropi Islam, 8*(1), 106–121.

Purdy, J. M. (2017). A framework for Assessing Power in Collaborative Governance Processes . *Public Administration Review, 72*(3), 409–417. doi:https://doi.org/10.1111/j.1540-6210.2011.02525.x

Putri, D. A., & Afdal. (2023). Profil Pencemaran Air Sungai Cikijing di Kabupaten Bandung dan Kabupaten Sumedang. *Jurnal Fisika Unand (JFU), 12*(4), 541 – 547. doi:https://doi.org/10.25077/jfu.12.4.541-547.2023

Rahman, A., & Astria, D. (2024). Studi literatur kebijakan ekonomi hijau dalam mendorong inovasi berkelanjutan. *Jurnal Ekonomi Bisnis, 30*(2), 63–72.

Safaria, A. F., Muhtar, E. A., Irawati, I., & Widianingsih, I. (2018). Manajemen inovasi open data dalam layanan informasi publik pada Pemerintah Kota Bandung. *Jurnal Administrasi Publik, 9*(2), 135-152. doi:https://dx.doi.org/10.31506/jap.v9i2.4759

Safaria, A. F., Widianingsih, I., Muhtar, E. A., & Irawati, I. (2019). Model inovasi kolaboratif dalam implementasi program open data: Tantangan dan manfaatnya bagi publik. *Jurnal Administrasi Publik: Public Administration Journal, 9*(1), 9-20. doi:https://doi.org/10.31289/jap.v9i1.2150

Sarosa, S. (2021). *Analisis Data Penelitian Kualitatif*. Yogyakarta: Kanisius.

Schütz, F., Heidingsfelder, M. L., & Schraudner, M. (2019). Co-shaping the Future in Quadruple Helix Innovation Systems: Uncovering Public Preferences toward

PUBLICA, Vol. 18 No. 1: 1-24
Collaborative Innovation for Green Economy Implementation: A Case Study in Sumedang
Regency
Anne Friday Safaria et.al

Participatory Research and Innovation. *She Ji: The Journal of Design, Economics, and Innovation.* doi: 10.1016/j.sheji.2019.04.002

Shou, S., & Li, Y. (2025). Exploring the Collaborative Innovation Operational Model of Government-Industry-Education Synergy: a Case Study of BYD in China. *Asian Journal of Technology Innovation, 33*(2), 389-424.

Sugianto, A., Hidayat, D., & Wahyuni, S. (2024). Transformasi Ekonomi: Membangun Kesejahteraan Masyarakat Melalui Pendekatan Ekonomi Hijau. *Jurnal Ekonomi dan Pembangunan Indonesia, 24*(2), 131–145. doi:https://doi.org/10.61132/jepi.v2i2.579

Sugiyono. (2020). *Metode Penelitian Kuantitatif, Kualitatif, dan R\&D.* Bandung: Alfabeta.

Sultana, S., & Turkina, E. (2023). Collaboration for Sustainable Innovation Ecosystem: The Role of Intermediaries . *Sustainability, 15*(10). doi:https://doi.org/10.3390/su15107754

UNEP. (2021). *Green Economy and Trade - Trends, Challenges and Opportunities*. Dipetik 09 25, 2025, dari www.unep.org: https://www.unep.org/resources/report/green-economyand-trade-trends-challenges-and-opportunities

Valentika, F., & Turisno, B. E. (2024). Integrasi Inovasi Keuangan dan Kebijakan Lingkungan dalam Bursa Karbon: Tinjauan Hukum dan Praktik Terbaik di Indonesia. *Jurnal Pembangunan Hukum Indonesia, 6*(3), 479–497. doi:https://doi.org/10.14710/jphi.v6i3.%p

Wiradinata, M., & Malik, A. (2021). Inovasi dan teknologi untuk mendukung pembangunan ekonomi berkelanjutan di era digital Indonesia. *Jurnal Media Akademik, 6*(2), 101–112. doi:https://doi.org/10.62281/v2i12.1286

World Economic Forum. (2015). *Collaborative Innovation Transforming Business, Driving Growth.* European Innovation Management Academy.

Xie, X., Liu, X., & Chen, J. (2023). A Meta-Analysis of the Relationship Between Collaborative Innovation and Innovation Performance: The Role of Formal and Informal Institutions. *Technovation, Elsevier, 124*(C). doi: https://doi.org/10.1016/j.technovation