

Social Innovation for Agroecological Transition: Insight into PT Pertamina Patra Niaga Integrated Terminal Tanjungwangi's CSR Integrated Agriculture Model

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ABSTRACT: Paradigm shifts in sustainable development demand a cross-sectoral approach that integrates social, economic, and ecological aspects. Few CSR-based studies explicitly integrate agroecology as a transformative innovation framework in Indonesia. This study examines the implementation of the Ketapang Integrated Farming program by PT Pertamina Patra Niaga as an example of social innovation that supports the agroecological transition in local communities. The approach employed is qualitative descriptive, utilizing triangulation of field data, participatory observation, and analysis of company documents. The analysis is based on the framework of ecological intensification, social innovation systems, and shared value creation. The study's results demonstrate that this social innovation enhances community capacity by developing an integrated agricultural system centered on organic waste, diversifying subsectors (crops, livestock, and fisheries), and strengthening local institutions through the Integrated Farming Ketapang. Economically, this model increases the value of Social Return on Investment (SROI) to 3.66, and socially, encourages the formation of bonding and bridging social capital. This program also serves as a living laboratory, connecting corporations, communities, and supporting institutions to produce contextually appropriate agroecological practices. The policy implications of this study confirm the importance of CSR's shift from a philanthropic paradigm to transformational social innovation, as well as the need to strengthen incentive policies for companies that contribute to food security and mitigate climate change. Thus, the Ketapang Integrated Farming model demonstrates potential for replication as a sustainable development strategy in Indonesia's agrarian regions, combining social and agroecological innovations.

KEYWORDS: Social Innovation; Transformative CSR; Agroecological Transition; Integrated Agriculture; Shared Value

I. INTRODUCTION

The transition to agroecology as a sustainable agricultural approach is becoming a global concern (Bonatti et al., 2025) in response to the challenges of climate change (Blaix et al., 2026), environmental degradation (Stark et al., 2026), and food security (Mockshell & Villarino, 2019). Ideally, this transition does not just stop at the replacement of agronomic practices (Billen et al., 2021; Ruttana, 1999) but also integrates the socio-economic aspects of the surrounding community as part of social innovation (Stroparo, 2025). An integrated farming model that involves collaboration between the private sector, communities, and environmentally friendly technologies is an ideal solution to create a holistic and adaptive agricultural system (Sheikh et al., 2021).

In its implementation, real challenges include the low adaptability of farmers to new technologies (Nnodim & Raji W.I, 2023), limited market access (Ma et al., 2024), and weak peasant institutions for collectively managing resources (Nababan & Regina, 2021). Zainal Arifin et al. (2023) examine the revitalization of rural economies, finding that the integration of social and economic aspects of farmers in agroecology remains lacking. Pratama et al., (2022) highlight the institutionalization of farmer groups that have not been optimal as agents of agroecological change, while Putri et al., (2018) expose the lack of sustainable adaptation mechanisms based on local wisdom to deal with climate change. Sulandjari & Suparwata (2023) affirm the potential of social innovation in strengthening social networks and market access. However, the integrated model of social innovation in integrated agricultural systems has not been widely studied. Daerobi & Suyono (2019) emphasized the importance of agricultural systems that combine local resources and environmentally friendly technologies holistically. The gap in this research lies in the lack of a social innovation model that integrates ecological, social, and economic aspects simultaneously as the basis for the agroecological transition. This research seeks to fill this gap by designing innovative integrated agricultural models that support sustainability and community adaptation.

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The study of social innovation in integrated agricultural models to support the agroecological transition is crucial, particularly in regions like Banyuwangi, which face environmental and social sustainability challenges. Previous studies have emphasized the importance of community empowerment and adaptive capacity enhancement in the face of climate change and agricultural market dynamics (Ismiasih et al., 2024; Wijaya et al., 2024). With a comprehensive approach, this research is expected to enhance the socio-economic resilience of the community while improving the efficiency of natural resources, thereby making a tangible contribution to sustainable development. The implications include strengthening appropriate technology, diversifying farmers' incomes, and strengthening social networks that are adaptive to environmental and economic pressures (Sihombing et al., 2023).

This research has high value in filling the gap in the study of an integrated agricultural model that combines social, economic, and ecological dimensions simultaneously. In theory, this research will enrich the literature on social innovation and agroecological transition, while also providing a practical basis for the development of policies and programs that support food security and sustainable smallholder empowerment (Partini & Sari, 2022; Bahari et al., 2024). Thus, this study is not only relevant for the development of science but also for driving inclusive and sustainable systemic change in the agricultural sector in Indonesia.

II. METHOD

This research employs a descriptive-qualitative field research approach (Creswell, 2020). The researcher uses this approach because it is necessary to explore the phenomenon (Gilstrap, 2007). The application of integrated farming to support the concept of agro-ecology through observation, interview, and documentation activities (Groenewald, 2004). Data collection is carried out purposively (Isaac, 2023) and snowballing (Parker et al., 2020), aiming to obtain information from multiple informants, including the community, beneficiary communities of CSR programs, the private sector, and the local village government. The data analysis employs thematic methods to identify patterns and gain in-depth insights (Hennink et al., 2017). To ensure the validity of the data, a triangulation technique is used, which involves comparing the results of various data collection methods (Zairul, 2021).

III. RESULT

Ketapang Village, Kalipuro District, Banyuwangi Regency, is one of the coastal areas with socio-economic characteristics that largely depend on the community's agricultural and fisheries sectors. Prior to the intervention of the CSR program, the community's agricultural practices were still dominated by conventional methods that relied heavily on chemical inputs, including the use of fertilizers and pesticides. This practice persists for a considerable period, resulting in several ecological issues, including declining soil fertility, degraded water quality, and reduced biodiversity on agricultural land.

In addition to ecological problems, the farming community also faces economic limitations. Dependence on single commodities, especially rice and seasonal horticulture, makes farmers' incomes highly vulnerable to fluctuations in market prices. Erratic crop yields, coupled with high production costs due to the use of chemical fertilizers and synthetic pesticides, further exacerbate the economic instability of farmers' households. Under these conditions, many farming families struggle to meet their basic needs sustainably, and some village youth tend to leave the agricultural sector to find employment in the city.

From a social perspective, the people of Ketapang Village also face the problem of weak local institutions in agricultural management. The existing farmer groups function more as an administrative forum to access fertilizer subsidies, rather than as a space for innovation or strengthening farmer capacity. The lack of agricultural innovation and limited access to information and modern technology make it difficult for people to adapt to new issues, including the need to transition to an environmentally friendly agricultural system. As a result, agriculture in Ketapang Village tends to be subsistent, less efficient, and has not been able to provide significant added value for improving community welfare.

The ecological challenges of coastal areas exacerbate this situation. As a village adjacent to the port and industrial area, environmental pressure is increasing, both in the form of pollution and land conversion. Thus, the initial condition of Ketapang Village before CSR intervention can be understood as a fragile agrarian system: ecologically degraded, economically vulnerable, and socially facing institutional weakness. This condition then became the basis for urgency for PT Pertamina Patra Niaga Integrated Terminal Tanjungwangi to design a CSR program based on social innovation through an integrated agricultural model based on agroecology.

As a form of social and environmental responsibility, PT Pertamina Patra Niaga Integrated Terminal Tanjungwangi, in collaboration with Rumah Literasi Indonesia, implemented the Ketapang Integrated Farming program in Gunung Remuk Hamlet, Ketapang Village. Integrated Farming Ketapang is an environment-based community empowerment activity that is one of the community's efforts in facing the Triple Planetary Crisis. Integrated Farming Ketapang is an agricultural system that integrates various agricultural sub-sector activities, including plants, livestock, and lobster, to increase the efficiency and productivity of natural resources. This approach aims to achieve independence, sustainable farmers' welfare, and environmental protection, grounded in local wisdom.

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Integrated Farming Ketapang starts in 2023. This program aims to achieve economic independence through the cultivation of freshwater vegetables and lobsters, the processing of culinary products, livestock production, and education. The Ketapang Integrated Farming Program, which is a sustainability integration of the previous program, namely:

1. Pelita Program (Economic Empowerment of the Ketapang Ring Environment)

The Pelita program began in 2020, encompassing community economic development activities that include culinary, handicrafts, hydroponics, motorcycle washing, meatball stalls, animal feed training, and urban farming land management training. Currently, those that are still running are culinary MSMEs, Kraft MSMEs, and hydroponics. The Ketapang Integrated Farming program strengthens culinary, hydroponic, and MSME actors, while the motorcycle washing business and meatball stalls are no longer operational.

2. Saru Sandang Program (Empowerment of Goat Farmers, One House, One Cage)

The clothing program assists goat farmers in Pancoran hamlet, Ketapang village. A total of 15 farmers received intensive assistance on goat rearing management. The construction of communal cages is a primary activity that assists farmers. Here are some of the activities of the Ketapang Integrated Farming program, namely:

- a. MSME business development
- b. Hydroponic vegetable cultivation
- c. Development of freshwater lobster cultivation
- d. Procurement of communal goat livestock enclosures
- e. Livestock management training
- f. Composting training
- g. Briquette making training
- h. Procurement of tools (lasers) for bamboo straw craftsmen
- i. Training on making goat milk processed beverage products
- j. Integrated agricultural knowledge sharing with school or community students

The assistance activities of the Ketapang Integrated Farming program can be grouped into three, namely: infrastructure development, environmental protection, and capacity building. The impact of the Ketapang Integrated Farming program on the environment includes being able to meet agricultural irrigation in the program system with a total discharge of 350 liters/minute, and the impact of the program contributes to efforts to overcome pollution, climate change, and biodiversity loss, often referred to as the triple planetary crisis. As for the social aspect, this program has a positive impact on increasing cohesiveness among group members to achieve the program's goals and the formation of the Ketapang Ring Economic Empowerment Group (PELITA), involving a total of 65 vulnerable individuals.

From an economic perspective, the impact of this program is evident in the data on educational tourism visits from 2018 to 2025, which totaled 2,157 individuals. The harvest from Integrated Farming Ketapang for vegetable crops (lettuce and pakcoy) since 2021 has amounted to IDR 14,500,000. For medicinal plants, the harvest since 2022 has amounted to IDR 3,000,000. For corn plants, the harvest since 2023 has amounted to IDR 35,000,000. Additionally, the lobster harvest has been ongoing since 2021. It has generated IDR 7,500,000, as well as income from the culinary sector and micro, small, and medium enterprises (MSMEs), totaling around IDR 42,575,000 since 2018. SROI value of the Ketapang Integrated Farming program from 2020 to August 2024 is 3.66. With this value, it means that for every investment of IDR 1, - get a benefit of IDR 3.66,- or from an investment value of IDR 636,134,204,- get a benefit of IDR 2,330,542,260,- which means that the value of the benefit of the Ketapang Integrated Farming program is 366% greater than the investment value.

IV. DISCUSSION

PT Pertamina's CSR Integrated Farming Social Innovation in Supporting Agroecology

The results of the study show that the Ketapang Integrated Agriculture Program, initiated by PT Pertamina Patra Niaga, is a significant social innovation that facilitates the agroecological transition at the local community level. The program features a cross-sectoral collaboration model that connects communities, village governments, and corporations in a single sustainable agricultural system oriented towards resource efficiency, economic independence, and environmental conservation. This concept is in line with the agroecological transition framework, as explained in *Agroecology: The Ecology of Sustainable Food Systems*, that the transformation towards agroecology is not only a matter of technical changes in agronomic practices, but also systemic changes in the social, economic, and cultural structures that support food systems (FAO, 2016).

An integrated approach that combines crops, livestock, and fisheries in a single production ecosystem exemplifies the application of the principle of ecological intensification. This strategy enhances agricultural yields by leveraging ecological functions and environmental services as substitutes for synthetic external inputs. (Kleijn et al., 2019) Emphasized that ecological intensification focuses on optimizing ecosystem functions, such as natural pollination, biological pest control, and soil nutrient

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cycling, so that agricultural systems can increase yields without burdening the environment. In Banyuwangi, this principle is seen through the practice of processing organic waste into compost, reducing dependence on chemical fertilizers, and diversifying crops and freshwater fisheries.

Furthermore, (Garratt et al., 2018) in Enhancing Soil Organic Matter as a Route to the Ecological Intensification of European Arable Systems emphasize that increasing soil organic matter (SOM) content is an important prerequisite for strengthening the sustainability of agricultural systems through improving soil ecosystem function, water retention, and stability of agricultural yields. In the context of the Ketapang Integrated Agriculture program, strengthening the organic matter cycle through the composting system and integrating livestock waste into agricultural land demonstrates consistency with this principle. Thus, the company's social innovations act as a catalyst that connects ecological technology approaches with the social capacity of local communities, bridging the gap between economic needs and environmental conservation.

Furthermore, socially, the Integrated Farming Ketapang program demonstrates that social innovation encompasses not only the creation of new products or technologies but also the establishment of institutional orders and social norms that underpin sustainability. Formation Integrated Farming Ketapang is an institutional instrument that strengthens *Social Capital* and facilitates collective learning between community members. This model is in line with the findings (Bhinekawati, 2017) in his studies *Corporate Social Responsibility, Social Capital and Sustainable Development: Lessons from an Indonesian Palm Oil Company*, explaining that the success of CSR in the agribusiness sector depends on the ability to build *Bonding* and *bridging social capital* at the local level through participatory interaction and an inclusive institutional system.

The process of mentoring, technical training, and knowledge transfer between companies, academic partners, and community groups shows the practice of *Co-creation of Knowledge*, which strengthens the social and ecological literacy of the community. (Moulaert, 2013) The International Handbook on Social Innovation refers to this phenomenon as "Collective Learning Process," namely a social learning mechanism that allows communities to create new solutions to economic and environmental challenges through a collaborative process. In the context of Banyuwangi, the mentoring process carried out by Pertamina and the Indonesian Literacy House serves as an Innovation Intermediary, i.e., an intermediary entity that connects scientific knowledge with local practice (Soltani et al., 2020).

This institutional model can also be categorized as part of *Transformative Social Innovation*, where innovation extends beyond the creation of new activities to encompass changes in the social structure that enable society to become the primary actor in resource management (Haxeltine et al., 2017). Within this framework, *Integrated Farming Ketapang*, it can be said that it has shown the dynamics towards local institutional independence. However, the social sustainability of the program still requires strengthening internal governance, especially in group financial management, benefit distribution, and equal participation mechanisms among members.

From an economic perspective, *Integrated Farming Ketapang* affirms the linkage between community empowerment and the creation of new economic value through the *Creating Shared Value* (CSV). (Porter & Kramer, 2011) A deep Harvard Business Review article emphasizes that the concept of CSV encourages corporations to link business strategies with the creation of social benefits, so that corporate social responsibility is no longer philanthropic, but integrative to economic goals. Pertamina Patra Niaga's CSR program shows this through the development of a local value chain that focuses on resource efficiency and diversification of community income.

The results of the program's economic analysis indicate a Social Return on Investment (SROI) value of 3.66, meaning that each investment of Rp 1 yields socio-economic benefits of Rp 3.66. This ratio indicates a high level of effectiveness in the context of CSR, particularly in terms of community empowerment. This value aligns with the findings (De Tommaso & Pinsky, 2022), which confirm that social investment that integrates economic and environmental dimensions has a multiplier effect on people's welfare while increasing the value of corporate reputation.

In addition to increasing the productivity of the agricultural sector, the development of the goat farming subsector and freshwater lobster cultivation strengthens the village's economic structure based on commodity diversification. This diversification is crucial for minimizing economic risks associated with dependence on a single commodity. These findings align with research (Pittelkow et al., 2015), which suggests that a low-input, sustainable farming system can generate 80–100% of the productivity of conventional systems when supported by crop diversification and strong organic integration. Thus, the integration of subsectors in this CSR program creates economic stability while reducing ecological pressures. Furthermore, the existence of *Agricultural Edutourism* is expanding the community's economic space towards the ecotourism-based service sector. (Rivera et al., 2024) affirms that *agroecotourism* not only expands people's income but also strengthens public awareness of sustainability values. In the context of Banyuwangi, *sharing knowledge* and agricultural educational tourism has a dual effect: increasing economic added value and strengthening the dissemination of environmental knowledge among the younger generation.

Despite showing positive results, the implementation of the Integrated Farming Ketapang program still faces several systemic challenges that need to be managed strategically. The first challenge relates to long-term ecological sustainability. (Tamburini et al., 2020) emphasizing that the ecological benefits of sustainable farming systems can only be measured after more

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than five years of consistent implementation, as the process of restoring soil ecosystem function and biodiversity requires a long adaptation time. Therefore, the short-term evaluation of this CSR program needs to be complemented by longitudinal monitoring based on measurable environmental indicators, such as soil organic carbon, soil microbial diversity, and the energy input-output ratio.

The second challenge is the variation in farmers' adaptation capacity. (Cronin et al., 2022) Identify *Knowledge asymmetry* as the main obstacle in the diffusion of agricultural innovation. Therefore, the sustainability of the program is highly dependent on the continuity of technical assistance activities, management coaching, and economic incentives that motivate the adoption of environmentally friendly technologies. Additionally, limited market access remains a significant obstacle. (Ma et al., 2024) Identify that smallholders are often trapped in asymmetrical market structures, where sustainable products do not obtain proportionate price incentives due to weak branding and distribution networks. For this reason, the economic sustainability of the program *Integrated Farming Ketapang* needs to be strengthened through green market partnerships (*Green Market Linkage*), eco-friendly product certification, and community-based digital promotion.

Conceptually, the *Integrated Farming Ketapang* occupies an intersectional position between *Community-based sustainable development* and *Corporate-Driven Social Innovation*. This model represents the shape of *inclusive business* where the corporation acts as a *Development Partner* that facilitates socio-ecological transition without eliminating community independence. (Gradl & Jenkins, 2011) *Deep Tackling Barriers to Scale: From Inclusive Business Models to Inclusive Business Ecosystems*, emphasizing that inclusive business models can create economic value while expanding the social participation of vulnerable groups through integration into value chains. The Program Integrated Farming Ketapang demonstrates the practical application of the paradigm by establishing a collaborative network among corporate actors, the community, and knowledge-based institutions.

Theoretical Reflection: Social Innovation as a Mechanism of Systemic Transformation

Program *Integrated Farming Ketapang* reflecting a new paradigm in the implementation of CSR in the agrarian sector: a shift from the model *charity-based* towards *Transformative Social Innovation*. Suppose philanthropic models are only oriented towards direct aid. In that case, social innovation leads to systemic transformations that transform the way societies manage resources, organize social relations, and build long-term ecological resilience (Haxeltine et al., 2017). *Skeleton Transformative Social Innovation* underlining the importance of three components: (1) *agency* society, namely the collective ability to innovate in the face of challenges; (2) *Institutional reconfiguration*, namely the establishment of new governance that allows for cross-sectoral collaboration; and (3) *Value reorientation*, namely a change in the value system towards sustainability and social justice. All three are reflected in the CSR model of Pertamina Patra Niaga Integrated Terminal Tanjungwangi: the community becomes an active actor, local institutions are strengthened through the Integrated Farming Ketapang, and the value orientation shifts from just production to socio-ecological sustainability.

In the context of contemporary social innovation theory, this approach aligns with the perspective of the *Multi-Level Perspective (MLP)* developed by Jacob & Lefgren (2011). This theory explains that the transition to sustainability occurs when innovation at the *Niche* (micro) level successfully challenges the structure of the *Diet* (meso) and established social norms. In this case, *Integrated Farming Ketapang* serves as a "niche socio-technical experiment" that challenges the conventional agricultural paradigm based on chemical inputs, gradually constructing a regenerative agricultural model at the community level. In addition, the success of this program demonstrates the relevance of the *Quadruple Helix Innovation* theory, which emphasizes the involvement of four key actors: government, industry, academia, and civil society. (Kolehmainen et al., 2016) This suggests that social innovation is most effective when it involves horizontal interaction among those actors to create shared value and new knowledge. In this program, Pertamina plays a key role as the main driver (*industry-driven actor*), supported by the Indonesian Literacy House as an intermediary of knowledge (*Knowledge Intermediary*), and the community as users and creators of innovation. It is this multi-stakeholder involvement that makes *Integrated Farming Ketapang* not just a CSR project, but also a model *Living Lab* for the agroecological transition in Indonesia.

Empirical Contributions to the Discourse of Sustainable Development

Empirically, this research makes an important contribution to the discourse of sustainable development in Indonesia, especially in the context of integrating CSR with the agroecological transition. First, this study confirms that CSR-based social innovation can function as a *Policy Laboratory* to test green development policies at the micro level. As stated by Leach et al. (2013), Successful sustainability transformation requires social experimentation that enables cross-actor learning and testing of new collaborative models. Second, this program demonstrates how social innovation can enhance the community's resilience capacity in the face of ecological and economic challenges. The application of the principles of diversification, resource circularity, and integration of production subsectors has increased the adaptability of communities to climate change and market volatility. These findings align with the principle of *resilience thinking* (Folke et al., 2016), which emphasizes the capacity of socio-ecological systems to adapt and transform in the midst of uncertainty. Third, this study also confirms the relevance of the ecological modernization approach

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in the context of developing countries. (Mol et al., 2014) emphasize that sustainability can be achieved not by rejecting industrial modernization, but by integrating ecological innovation into the logic of capital economics. *Integrated Farming Ketapang*. It is proof that corporations can play a significant role in developing community-based green economic models without compromising business efficiency.

V. CONCLUSION

This research demonstrates that social innovation in corporate social responsibility (CSR) can promote systemic change toward agroecological transition at the community level. The Integrated Farming Ketapang program illustrates how a CSR initiative can evolve from merely philanthropic efforts into a transformative model that integrates technological eco-innovation, institutional capacity-building, and community empowerment. Through the combination of ecological intensification and collaborative governance, the program improves both social and ecological resilience. From a theoretical perspective, the findings reinforce the premise that sustainable transitions are driven not solely by technological advancements but also by the social and institutional capacity for adaptation and learning. Practically, the model underscores the strategic importance of corporate–community partnerships and innovation intermediaries in fostering ecological responsibility and generating shared value. Policy-wise, corporate social responsibility (CSR) should be redefined as an impact-oriented instrument that promotes food security, low-carbon development, and rural sustainability. The Integrated Farming Ketapang initiative thereby exemplifies a practical model for replicating community-based agroecological innovations within Indonesia's rural regions.

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