Empowerment Of The Walikukun Village Community, Carenang District, Serang Regency, Banten Province, Indonesia Through Agriculture Land Optimization Based On Ecological Economics

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Abstract.

Ecological Economics has many benefits related to the right to life of organisms, cost and benefit factors, and aesthetic factors for humans. The value of ecological economics is as a protector of the balance of the hydrological cycle and water management, a guardian of soil fertility through the supply of nutrients from forest litter, preventing erosion, abrasion and controlling microclimates. The purpose of activities to increase community independence through optimization of agricultural land based on ecological economics is to realize the active role of the community in increasing food production, maintaining environmental sustainability based on ecological economics so as to increase use value, there is harmony between aspects of use and maintenance, improving aspects of health and community welfare and forming an entrepreneurial spirit. Need Assessment through a survey method approach, socialization, mentoring (workshops, counseling and training), active participation, monitoring and ending with program evaluation is expected to be able to increase community independence regarding the importance of land optimization based on ecological economics. The main programs implemented include community empowerment, increasing production, organizational management, marketing management, facilities and infrastructure and socio-culture. The results obtained are that the community periodically monitors agricultural land based on technology applications, the application of polyculture-based planting patterns to maintain the balance of soil fertility and is active in environmental conservation efforts.

Keywords : *Ecological economics; independence and land optimization.*

I. INTRODUCTION

Walikukun Village, Carenang District, Serang Regency, Banten Province, Indonesia is a lowland area located 45 meters above sea level. It has a temperate climate, directly influencing agricultural activities and cropping patterns. The total population is 4.891, and the land area is 48.500 square meters. Demographically, Walikukun Village is bordered to the east by Mandaya Village, to the west by Purwadadi Village, to the north by Ragas Village, and to the south by Teras Village. Most of the activity of Walikukun Village are farmers, as they have extensive agricultural land. During the dry season, the community of Walikukun Village experience difficulties in fulfing their daily needs.The availability of natural resources and the vastness of agricultural land provide the foundation for finding alternative land optimization strategies that add economic value while maintaining sustainable land fertility restoration and potentially fostering village independence. Therefore, agricultural land optimization based on ecological economics , designed to increase village community independence, is crucial as an alternative solution.Ecological economics is a transdisciplinary effort to broadly connect the natural and social sciences, particularly ecology and economics. Its goal is to develop a deeper scientific understanding of the complex relationships between humans and their interactions with the environment. Ecological economic concepts can be developed into policies that will lead to ecologically sustainable development, have a fair distribution of resources, and efficiently allocate scarce resources, including "natural" and "social" capital.

This requires a new approach that is comprehensive, adaptive, integrative, multi-scale, pluralistic, and evolutionary (1). Ecological economics refers to the analysis of efficient resource allocation and focuses on understanding the relationship between economic development and the exploitation of natural resources

within larger ecological systems. Ecological economics examines sustainability, quantifies ecologically based economic systems, models them at various scales, and develops innovative tools for environmental management (2). Ecological economics analysis, particularly for survival economics, is based on aspects of maintaining opportunities for future generations, based on a profound environmental hypothesis. Ecological economics also emphasizes anticipating threats posed by the expansion of the contemporary global economy to the stability of the global ecosystem, which directly impacts the well-being of future generations (3). Ecological economics is a blend of scientific understanding of the relationships between economic systems, humans, and nature, and how to utilize these concepts to develop effective policies that can lead to equitable resource distribution and sustainable ecological systems. The ecological economics paradigm offers a refreshing and timely perspective on the relationship between economics and ecology for progressives seeking sustainable alternatives to current patterns of economic growth and environmental degradation. In short, the central concept of ecological economics is sustainability, and this can be approached qualitatively and empirically (4).

Martínez-Alier and Muradian (2015) (5). identified the domains of ecological economics and their focus on future sustainability as:

a. Ecosystem services, biodiversity, and ecosystem governance, as well as related instruments in the policy mix, including instruments such as Financing for Ecosystem Services (PES) (6).
b. The interaction between increasing energy demand and climate change (the need for sustainable energy);
c. Socio-environmental conflicts (7). and (collective) management of common pool resources;
d. Experimental and behavioral economics (e.g., efforts to develop a theory of human action) (8).

Much of the decline in agricultural land quality is caused by humans. Therefore, finding solutions requires an understanding of humans and the factors that influence their behavior. Ecological economics can provide valuable insights into agricultural issues (9). Ecological economics can contribute to improving economic standards and independence, such as building local wisdom for empowerment and diversifying livelihoods. Ecological economics also plays a role in improving environmental quality, such as food safety, health, reducing the risk of pollution and household waste that has the potential to become waste. Ecological economics plays a crucial role in the ongoing transformation of economic policies and theories into ecological knowledge, thereby shifting behavior and pragmatic paradigms toward a sustainable attitude (10). Ecological economics has a use value related to the use of natural resources. The use value consists of: 1) Direct Use Value: directly related to the use of natural resources that are consumptive in nature such as the conversion of rice into rice from paddy fields, extraction of wood from forests, fish from the sea and non-consumptive in nature such as appreciation of natural scenery; 2) Indirect Use Value: related to environmental services for humans based on their functions such as forests as carbon providers, trees as soil stabilizers, wetlands as water reservoirs.

That is why indirect use value is said to be Ecosystem Services; 3) Option Value: is the value placed on environmental assets by humans who want to secure the use of goods or natural resources in the future; 4) Non Use Value: related to benefits that do not have direct implications between consumers and goods; 5) Bequest value: is the value received from knowledge or experience that humans will be able to pass on something to future generations. Based on a number of these components, both useful values and values that do not have direct implications, it is known as TEV (Total Economic Value) (11). In order to maintain the normal function of the environment so that the carrying capacity for human survival on earth remains sustainable and public health remains guaranteed, it is necessary to develop a new strategy, namely that every activity must be 1) based on human life needs; 2) aimed at the will of the community; 3) planned by all interested parties; 4) based on scientific principles and 5) implemented humanely (12). Based on the description above, the environment will maintain balance and benefit the community if the community itself has knowledge and concern for the interaction processes within that environment. If the intensity of these activities is not addressed to support environmental quality, environmental pollution will increase.

II. METHODS

The implementation stages of the community service program to improve community independence in Walikukun Village, Carenang District, Serang Regency, Banten Province, Indonesia through agricultural land optimization based on ecological economics are shown in Figure 1.

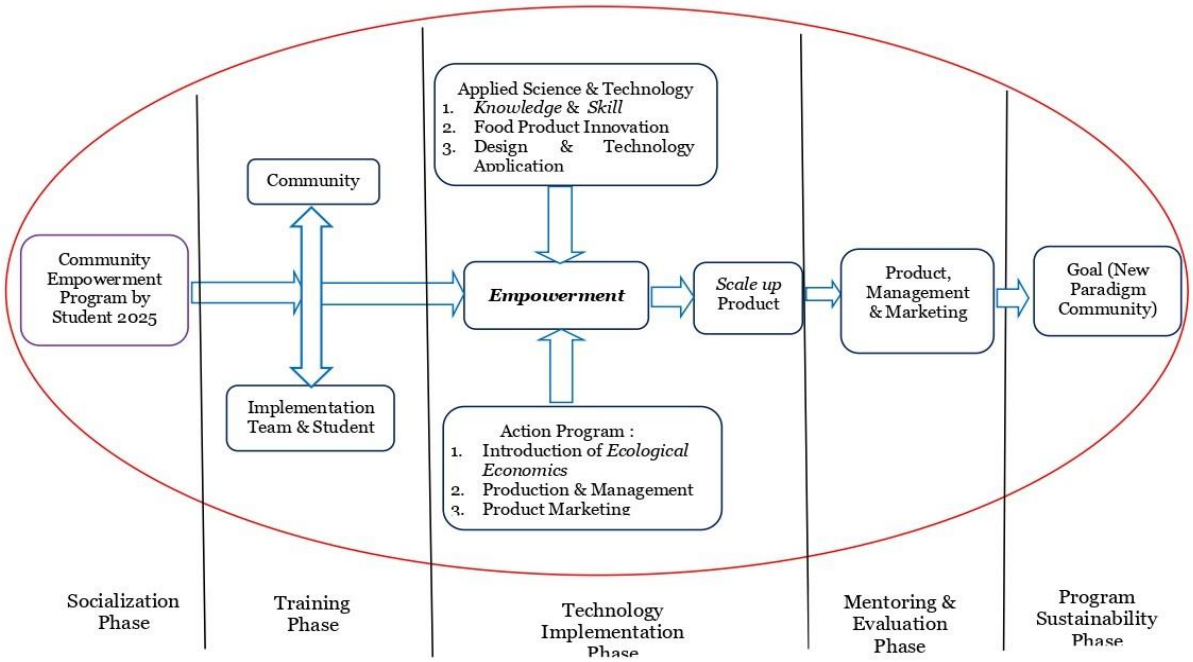

Fig 1. The downstreaming process expected to be implemented by Group Partners

According to Figure 1, the program socialization phase is the starting point for building stakeholder capabilities through participation in the PMM program. The training phase is expected to equip communities with knowledge, awareness, and skills, fostering a sense of belonging to their natural resources. The technology application phase is expected to diversify innovations to develop more valuable and marketable food products. The mentoring and evaluation phase is expected to foster confidence and independence in each activity, particularly in optimizing agricultural land based on ecological economics. The program's sustainability phase is expected to foster a vision and mission for sustainable development without the need for further mentoring.

III. RESULTS AND DISCUSSION

a. Results

The implementation of Community Empowerment Activities by Students (PMM), can be seen in Table 1.

Table 1. The PMM Program in Walikukun Village, Carenang District, Serang Regency, Banten Province, Indonesia

No.	Activities	Description
1.	Survey and Observation of the Implementation Team to the PMM location area in Walikukun Village, Meeting with the Head of Walikukun Village, Permits, Program Delivery, Internal Meeting of the PMM Implementation Team regarding survey results, creation and development of programs to be implemented	Accomplished
2.	Opening of PMM Activities by the Head of Walikukun Village	Accomplished
3.	Business Management: a. Strengthening Independent Farmer Awareness Group Partners b. Strengthening Environmental Awareness Group Partners c. Independent Management of Natural Resources d. Characteristics of Independent Villages and the Importance of Creative Human Resources	Accomplished

4.	Production Increase: a. Counseling on chemical, physical, and biological parameters that affect the quality and quantity of harvests b. Ecological Economics Training and the Role of Ecological Economics c. Cost and Benefit Analysis Training d. Entrepreneur and Entrepreneurship Training e. Workshop of Agricultural Land Optimization Techniques f. Farming Monitoring System (FMS) Technology Introduction and Application Workshop	Accomplished
5.	Community and Socio-Cultural Participation: a. Mutual cooperation in biopore construction b. Repair of the Walikukun Village neighborhood watch post c. Handicraft production d. Community service program to clean Walikukun Village	Accomplished

b. Discussion

1. Business Management

Business management is the process of organizing and managing all aspects of a business, from planning to control, to achieve business goals effectively and efficiently. Business management encompasses the management of human resources, finances, raw materials, marketing, and all other operational activities. Business management is a system for managing all activities within a business, including human resources, funding, raw materials, equipment, and marketing. Business management is crucial in determining an organization's success and sustainability. One of the most critical areas where effective management shines is retaining employees. Therefore, good management habits are essential for fostering a workplace culture that encourages long-term employee engagement and retention. Additionally, effective business management significantly impacts productivity within an organization.

The quality of leadership and management practices directly correlates with employee productivity levels. A supportive and inspiring leadership style motivates employees to perform at their best throughout the workday, driving higher productivity levels. Conversely, ineffective management practices or a toxic company culture can lead to communication breakdowns, demotivation and ultimately hindered productivity. Therefore, strong management practices are essential for optimizing employee performance and maximizing overall productivity.Community Empowerment Activities by Students (PMM) which are included in the Business Management category that have been implemented include Strengthening Independent Farmer Awareness Group Partners, Strengthening Environmental Awareness Group Partners, Independent Management of Natural Resources and Characteristics of Independent Villages and the Importance of Creative Human Resources. All of these PMM activities are carried out through training with the aim of aligning Goals, utilizing the best Resources, minimizing costs, increasing efficiency, surviving in a dynamic environment, handling important competition for community welfare as conveyed by Herawati A., (2025) (13) that management of a business is a process where a business unit plans, organizes, directs and controls business activities to achieve goals in an effective and efficient manner in an ever-changing environment.

Fig 1. Group photo after the Strengthening Training for Independent Farmer Awareness Group Partners and Environmental Awareness Group Partners with Students, Community and Village Officials

Fig 3. Atmosphere of Entrepreneur and Entrepreneurship Training with Students, Community and Village Official

2. Production Increase

Production increase refers to efforts to produce more goods or services, both in quantity and quality, using existing resources or even by adding existing resources. Quantity increase means producing more products or services in a given time period. Quality increase means improving the quality of the products or services produced, whether in terms of durability, function, or aesthetics. Production increase refers to increasing the quantity of goods and services produced by a business in a given period through various means, such as increasing the amount of inputs used in production, improving technology and production processes, or increasing efficiency and productivity. Key aspects of production increase involve of more output in quantity of goods and services, efficiency in labor and capital, production capacity and factor like technological advancements, improved management, employee motivation and even additions to the workforce. Community Empowerment Activities by Students (PMM) categorized as Production Improvement, have included training on chemical, physical, and biological parameters that influence crop quality and quantity, ecological economics training and its role, cost and benefit analysis training, entrepreneurship training, agricultural land optimization techniques workshops, and a workshop on the introduction and application of Farming Monitoring System (FMS) technology.

Regarding the FMS technology application, users can access all data, including numerical data, graphics, images, or photographs, through a developed website. This system allows continuous daily monitoring of environmental conditions, including rainfall, temperature, humidity, and sunlight in the field (14).All of these PMM activities are carried out in order to provide insight and understanding of the importance of 1). Cost Efficiency (increased productivity means more output can be produced with the same or fewer inputs, thereby reducing the cost per unit of product and increasing profitability); 2). Competitiveness (more productive businesses can offer products at more competitive prices and better quality, increasing competitiveness in the global market); 3). Economic Growth (increased productivity contributes to economic growth by increasing overall production capacity without the need to increase the amount of input proportionally); 4). Worker Welfare (high productivity can increase wages and better working conditions, because a business can share more profits with workers); 5). Technological Innovation (high productivity allows a business to allocate more resources to research and development, triggering further technological innovation).Therefore, the role of technology, quality of human resources, production processes and methods, management and organization, infrastructure and work environment are very significant in influencing the increase in agricultural production.

Fig 2. Atmosphere of the implementation of the Training on Characteristics of Independent Villages and the Importance of Creative Human Resources with Students and Community

Fig 4. Ecological Economics Training Atmosphere and the Importance of Ecological Economics with Students and Community

3. Community Participation

Community participation is the active involvement of citizens in the decision-making process, implementation, and evaluation of programs or policies that affect community life. This involves both mental and physical contributions, as well as awareness of their rights and obligations as community members. Community participation encompasses various forms of involvement, including: 1) Problem and potential identification (the community plays an active role in identifying existing problems and the potential that can be utilized to address them); 2) Decision-making (participation in the decision-making process, ensuring that policies are aligned with community needs and aspirations); 3) Implementation (the community is directly involved in implementing planned programs or activities, either voluntarily or through organizations). All forms of community participation in Walikukun Village utilize a community-based approach in implementing sustainable agricultural solutions (15).

Community Empowerment Activities by Students (PMM) which are included in the category of Community Participation and Socio-Cultural that have been implemented include mutual cooperation in making biopores, repairing the Walikukun Village neighborhood watch post, making handicrafts and community service cleaning in Walikukun Village. All of these PMM activities are carried out in order to 1). Increase program effectiveness (community involvement in increasing independence to ensure that the programs implemented are in accordance with local needs and conditions so that they are more effective and sustainable); 2). Community empowerment (community involvement can increase community participation in increasing awareness, independence and ability to manage natural resources and overcome existing problems); 3). Strengthening familiarity (community participation is one of the important pillars in strengthening an atmosphere of familiarity, because of its involvement in the decision-making process); 4). Improved welfare (through participation, the community can more easily access public services, utilize existing natural resources and improve the community's standard of living).

Fig 5. Atmosphere of Community Service with Students and Community

Fig 6. Atmosphere of the Environmental Awareness Movement with Students and Community

IV. CONCLUSION

Community Empowerment Activities by Students (PMM) in Walikukun Village, Carenang District, Serang Regency, Banten Province, Indonesia through Agriculture Land Optimization based on Ecological Economics, can be summarized as follows:

a. In terms of Business Management, there has been an increase in the strengthening of Independent Farmer Awareness Group Partners, the strengthening of Environmental Awareness Group Partners, the independent management of biological resources, the characteristics of an independent village, and the importance of creative human resources.

b. In terms of Production Increase, there has been an increase in insight and understanding after conducting outreach on chemical, physical, and biological parameters that affect the quality and quantity of harvests, training on Ecological Economics and the role of Ecological Economics, training on Cost and Benefit Analysis, training on Entrepreneurship, a workshop on Agricultural Land Optimization Techniques, and a workshop on the introduction and application of Farming Monitoring System (FMS) technology.
c. In terms of community participation and socio-cultural aspects, there has been a sense of belonging and responsibility after participating in mutual cooperation activities such as biopore construction, repair of the Walikukun Village neighborhood watch post, handicraft production, and community service activities to clean up Walikukun Village.

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