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Building Green Capabilities through Green Supply Chain Practices

Anggraeni Pratama Indrianto[1], Titik Kusmantini[2,*]
[1,2] Departemen of Magister Management, Faculty of Economics and Business,
Universitas Pembangunan Nasional "Veteran" Yogyakarta, Yogyakarta, Indonesia
[*]Email: titik.kusmantini@upnyk.ac.id

Abstract: *Green capability is the capability of factories to produce more efficiently and competitively in the market in an environmentally friendly manner. This study aimed to analyze the ability of the "Lestari" Women Farmers Group (WFG) to develop their green products and to see the supply chain structure for their green products. This research was conducted using a qualitative research design and the research technique used was a case study. The result of this research was that green capability can be built through the green supply chain in the Sustainable Farmer Group. "Lestari" Women Farmers Group has succeeded in making business access to destination markets and was able to implement green capability quite well because the quality of the products produced was a product that was free of pesticides, chemicals and used natural ingredients as plant fertilizers such as fertilizers from fruit fermentation and rice washing water so that the quality of the vegetables is guaranteed.*

Keywords: *Green Capability; Supply Chain Practice; Women Farmers Group*

Introduction

All kinds of industrial practices have been criticized for their negative impacts on the environment such as high energy use, greenhouse gas emissions, and waste generation (Deshpande, 2012; Kim, Woo, Rho, & Chung, 2016; Selvaraj & Praharaj, 2012). Therefore, it is necessary to reduce the negative impact of industrial activities including agriculture on the environment by reconsidering traditional supply chain management (SCM) practices. Thus, green supply chain management (GSCM) can be identified as one of the solutions to solve the problems mentioned above (Gandhi, Mangla, Kumar, & Kumar, 2015 in Wyawahare & Udawatta, 2017). Green supply chain management is defined as incorporating "environmental thinking into the SCM, including product design, material selection, and sourcing, manufacturing practices, delivery of the final product to consumers, and end-of-life management of a product after its useful life (Wyawahare & Udawatta, 2017). As a result of increasing competition and marketing demands as well as regulatory pressures for environmental issues, organizations tended to integrate environmentally friendly practices into their work practices (Baresel-Bofinger & Ketikidis, 2010 in Wyawahare & Udawatta, 2017). Agriculture is one of the important sectors in Indonesia, this can be seen from the agricultural sector in providing employment, providing food, as well as a contributor to foreign exchange through exports and so on (Bukit & Sembiring, 2013). As an agricultural country, Indonesia has high potential to increase its additional value, competitiveness, and export to international markets. Indonesia's total export performance from 2007 to 2016 continued to fluctuate (Nurhayatia, Hartoyo, & Mulatsih, 2019). The export value of agricultural commodities from Indonesia to China in 2019 was USD 3.89 billion. Meanwhile, in the first quarter of 2020, agricultural commodities had a surplus of USD 164 million from China. In the horticultural sector, the trade balance grew positively up to 8.25% (Ministry of Agriculture, 2020). Horticultural commodities consisted of vegetables, fruits, decorative plants, and biopharmaceutical plants. The production of vegetable commodities in 2019 reached 13.4 million tons, an increase of 2.67%.

Vegetables were the biggest commodities of Indonesian export (Hasanah, 2020). The vegetable commodity itself is one of the horticultural products that is categorized as high value for producers and

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consumers. Vegetable producers have the potential to get high income from the business that they do because in general, vegetable commodities have high economic value. While for consumers, vegetable products provide good health benefits so that they become an alternative to food diversification. Imported fresh vegetable products tend to be cheaper or comparable to local products and have better quality so that imported products have a greater opportunity to enter modern markets (World Bank, 2019).

The government's efforts to spur production centers, especially horticultural crops, must be carried out optimally. The products produced must be able to compete globally. As a result, farmers must also participate in creating capabilities so they can produce more efficiently and increase in domestic and international markets. The development of high-value vegetable agribusiness clusters will increase the competitiveness capacity and income of vegetable producers in the era of free trade. The key factors for agribusiness cluster development are market orientation, technological innovation, geographic concentration, new farming business, and multi-stakeholder engagement (Nurfatiasari, 2014). The development of high-value vegetables in Indonesia through the development of agribusiness clusters was aimed at meeting the domestic market, import substitution, and increasing export competitiveness. The types of high-value vegetables that need to be developed to meet the domestic market, import and export substitution include tomatoes, broccoli, potatoes, carrots, and beans.

Achieving efficient production capability, strategic competitiveness in an environmentally friendly manner, of course, cannot be separated from supply chain management, especially green capability. Green capability is defined as assets, technology, and expertise that a producer can use to manage the diverse environmental needs of customers and other stakeholders. Of course, this is very important to pay attention in considering the management of production based on "green" (natural) is aimed at production efficiency. Benefits of Green Supply Chain Management include gaining goodwill, positive impact on financial and market performance, and lower cost of operation due to minimization of waste and avoidance of fines for violating environmental regulations (Nkrumah, Asamoah, Annan, & Agyei-Owusu, 2021). The Green Supply Chain Management Practices strategy that was implemented is expected to be able to encourage companies to have good capabilities towards environmentally friendly products (green capability). Green Capability is the producer's ability to more efficiently generate and improve the producer's strategic position in the market, both domestic and international, and as a signal of the producer's competitive aggressiveness, capabilities, and market position.

Women make up the majority of smallholders in most developing countries (ActionAid, 2012). There is no difference from Indonesia, one of the high-value vegetable agribusiness clusters in Kepek Village, Timbulharjo Hamlet, Sewon Subdistrict, Bantul Regency, Yogyakarta has succeeded in producing products that were produced from multiple sources scattered in one Hamlet area. Green capability development in the “L” Women Farmers Group specifically developed various green products that were free from pesticides, chemicals, safe for consumption, and uphold environmental values. In its development, some factors determined the success of “L” Women Farmers Group development, namely academics, business institutions, government, communities, and demand which were the driving factors. “L” Women Farmers Group members have succeeded in producing various kinds of products, with 11 multi-commodities including chili, tomato, spinach, water spinach, bean, mustard green, corn, potato, carrot, and banana. Six main commodities were produced and fulfilled the demands by “L” Women Farmers Group including chili, tomato, banana, corn, potato, and carrot. The main commodity from “L” Women Farmers Group was motivated by the interest of residents in planting non-pesticide crops and the high demand from destination markets outside the hamlet, namely chili, tomato, banana, corn, potato, and carrot which had the highest selling value among other

vegetables, while green mustard, spinach, bean, water spinach, chili, and tomato.

Table 1. Multi-Market and Market Commodity Demand

No	Destination Market	Commodities
1	Neighbors	Spinach, Water Spinach, Bean, Mustard green, Chili
2	Stalls	Spinach, Water Spinach, Bean, Mustard green, Chili, Tomato
3	Markets	Chili, Tomato, Banana, Corn, Potato, Carrot
4	Bantul Farmers Market	Banana, Corn, Potato, Carrot, Chili

Source: Observation at "L" Women Farmers Group (2021*)*

High-value commodities met consumer demand through "L" Women Farmers Group. Members of "L" Women Farmers Group at the beginning of the field school amounted to 20 people, when they received stimulants from *Kawasan Rumah Pangan Lestari* (KRPL - Sustainable Food House Area) stage 1 in 2018, there were 30 people, at stage 2 (development) in 2019, amounted to 40 people. Finally, the independence stage where "L" Women Farmers Group was considered to be able to "stand-alone" because it has gained experience, knowledge, and training with a total membership of up to 60 people. However, over time, the interest of "L" Women Farmers Group members in the cultivation of non-pesticide plants was considered to have decreased. This was because members of "L" Women Farmers Group had other activities besides farming and there were no certain binding and responsibilities when they became "L" Women Farmers Group members. The chairperson of "L" Women Farmers Group, Mrs. Lasmini, stated that residents who were members of "L" Women Farmers Group were voluntary and non-binding, so that currently (2020) active members of "L" Women Farmers Group were only about 30 members. This was of course very inversely proportional to the growing demand for non-pesticide vegetables in destination markets.

Of course, this was a problem and challenge in the logistics and distribution system because the product must meet the target market demand with minimal product returns. Since the product was distributed from the land to the destination market, it is necessary to apply the right method to support time and cost efficiency while still paying attention to product quality. The process of fulfilling the demands of many "L" Women Farmers Group members is not an easy problem considering that supply demand is required to be sustainable in quantity and quality according to the target market demand. It is important to be developed so that the "L" Women Farmers Group development system can run sustainably so that potential prosperity and market opportunities are achieved.

This study aimed to analyze the capabilities and abilities of "L" Women Farmers Group to develop its green products and see the supply chain structure for its green products (Figure 1). Several previous studies on green supply chain management related to green capability included research conducted by Supriatna, Perdana, and Noor (2016) which showed that the supply chain structure is said to be successful if an effective and efficient system is created so that it benefits all actors in the vegetable cluster and research by Chiu and Hsieh (2016) which showed green supply chain practices had a significant effect on green capability.

Literature Review

Green Supply Chain Practices

Green supply chain management (GSCM) covers green design, green purchasing, green production, green distribution, logistics, marketing, and reverse logistics. The green supply chain concept covered all phases of a product's life cycle, from the extraction of raw materials through the design, production, and distribution phases, to the use of the product by consumers and its disposal at the end of the product's life cycle. Clearly, GSCM practices were extremely extensive. In similarity to the concept of SCM, the boundary of GSCM

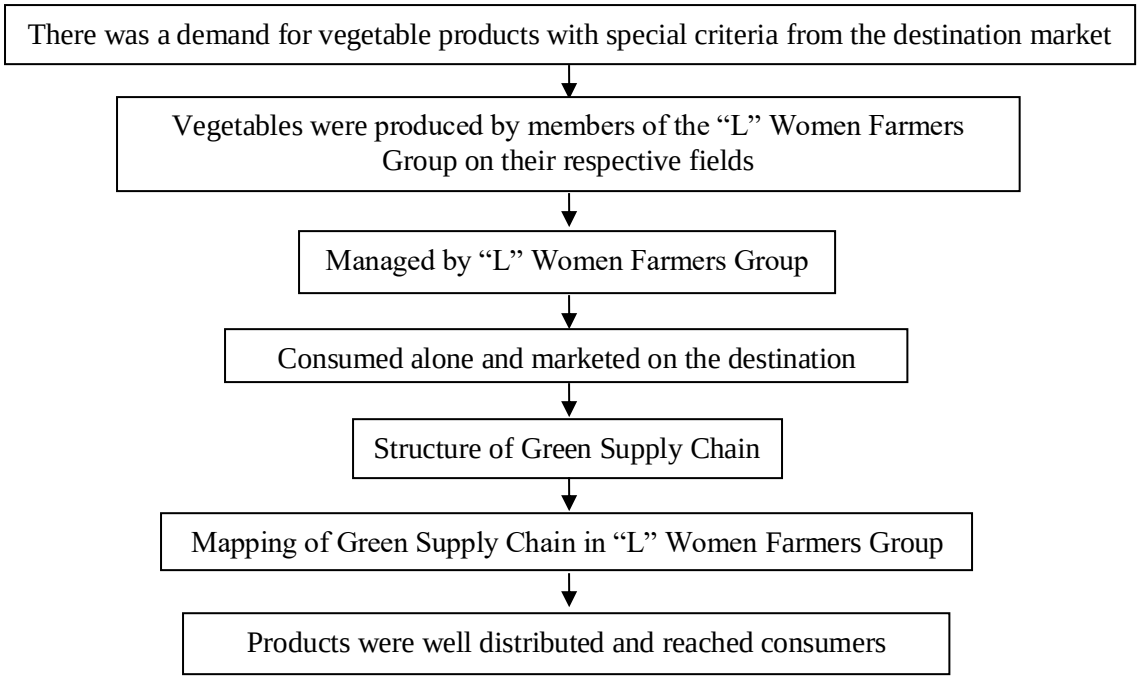

Figure 1. The flowchart and resolution of the creation of a Green Supply Chain structure in the Logistic system for the "L" Women Farmers Group

depended on the goal of the researcher (Cankaya & Sezen, 2018).

Green Capabilities

Green capability is related to the manufacturing plant's capabilities to more efficiently produce and improve firm's strategic position in the market, whether domestic or international, and as signals of a firm's competitive aggressiveness, capabilities, and market position (Chiu and Hsieh, 2016)

Method

This research was conducted using a qualitative research design in which this method was described systematically concerning the problems that occurred. The qualitative approach to this research was based on the consideration that research requires in-depth or exploratory information from various sources. The research technique used for this research was a case study, in which the case study or case study undertook an in-depth exploration and analysis of a phenomenon in its context using various data obtained from various sources (Thomas, Nelson, & Silverman, 2015). The data analysis technique used in this research was interactive analysis.

This model has 4 components of analysis, namely: data collection, data reduction, data presentation, and drawing conclusions. The case study was chosen because through this design a phenomenon can be explored and collected in detail a variety of information that can be used in accordance with data collection procedures for a certain period time. The research design was qualitative using a case study research technique by taking commodities from members of "L" Women Farmers Group, Bantul, DIY. In this study, a qualitative design was used to describe measuredly green product development activities (green capability).

Result and Discussion

General Description of "L" Women Farmers Group Members

The study was conducted on members of the "L" Women Farmers Group located in Kepek Village, Timbulharjo Hamlet, Sewon Subdistrict, Bantul Regency, Yogyakarta. Based on observations, research, and interviews from several sources, it was found

that "L" Women Farmers Group members planted these non-pesticide plants in their respective home yards. This was done because of limited land in the "L" Women Farmers Group area. However, this was also considered to be more effective and efficient because each member was responsible for his or her land. Although it could produce non-pesticide products well and got support from various parties, "L" Women Farmers Group has the principle of meeting the needs of its members before selling to other parties. So that the percentage of products consumed by themselves was quite large of 20%.

Table 2. Profile "L" Women Farmers Group

No	Member's Name Initial	Commodities	Land Area (m^2)
1	AP	Corn	3
2	JR	Chili, tomato	4
3	HGJ	Chili, tomato	4
4	SRD	Potato	6
5	RTJ	Bean, spinach	4.5
6	JDY	Water spinach, chili	4
7	DDT	Tomato, carrot	4.2
8	UR	Spinach, Bean	3.6
9	EN	Banana	2.8
10	WER	Potato	4
11	ASD	Chili, tomato, spinach	5
12	SS	Spinach, bean, chili	3.5
13	SL	Chili	4
14	SAID	Chili	3.8
15	RN	Tomato, banana	7
16	DCW	Banana, potato	6.5
17	RW	Carrot, corn	7
18	RR	Corn, chili	6.8
19	TJ	Corn	5
20	KKL	Spinach, mustard green	5
21	JKK	Tomato	4
22	MNN	Potato	3
23	MI	Banana	6
24	OP	Banana	5
25	RY	Corn	4.7
26	EL	Spinach	2
27	DP	Spinach, water spinach	2
28	SA	Water Spinach	3
29	SM	Water spinach, chili, tomato	4
30	IRP	Banana, corn	7
Total Area			134.4 m^2

Source: Observation at "L" Women Farmers Group (2021)

"L" Women Farmers Group is a forum for women who work as farmers to develop their agricultural products which are located in Kepek Village, Timbulharjo Hamlet, Sewon Subdistrict, Bantul Regency, Yogyakarta. "L" Women Farmers Group has activities in managing the crops that are carried out by the members of the farmer. There were 11 commodities managed by the "L" Women Farmers Group, including chili, tomato, corn, mustard green, spinach, water spinach, corn, carrot, banana, and bean. These various vegetable commodities were demand from personal consumption and from destination markets, namely consumers in the surrounding area, stalls, markets, and PASTAB (Bantul Farmers Market) which has partnered with "L" Women Farmers Group. To support the organized activities of "L" Women Farmers Group, an organizational structure has been formed in it, including the chairperson, deputy chairperson, treasurer,

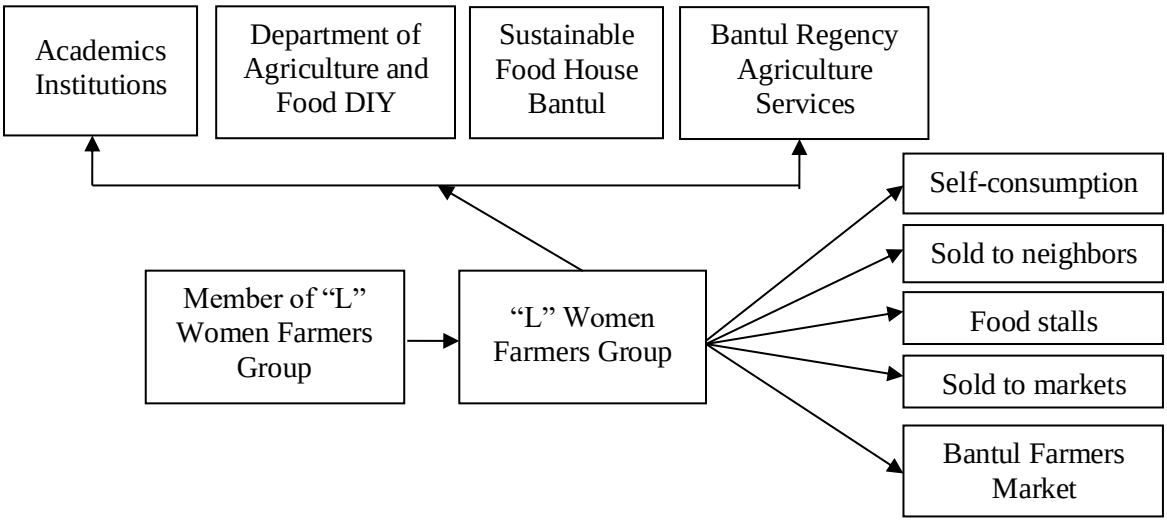

Figure 2. The Supply Chain Structure of "L" Women Farmers Group

secretary, the person in charge of marketing, and members.

In addition to forming members of the management of "L" Women Farmers Group also received full support from the Bantul Regency government to form an independent and self-sustained hamlet. At the independence stage in 2020, "L" Women Farmers Group remains committed to actively providing reports on the progress of "L" Women Farmers Group to the government as a form of responsibility and evaluation material in the future.

Green Supply Chain of "L" Women Farmers Group

Based on interviews with members of "L" Women Farmers Group, relevant governments, and academics who helped "L" Women Farmers Group to manage their business, "L" Women Farmers Group is considered to have had quite good upstream and downstream flows. The members of "L" Women Farmers Group had a vegetable flow to the "L" Women Farmers Group. After carrying out the post-harvest processing and sorting the products that were consumed by themselves and those that would be sold, then distributed from members to "L" Women Farmers Group and then the distribution of vegetables was aimed at destination markets including neighbors, stalls, markets, and PASTAB (Bantul Farmers Market) which is located in Sewon, Bantul, DIY. For PASTAB itself is a work program of the Bantul "L" Women Farmers Group Association which consisted of 17 districts that hold a 'spilled market' to sell various "L" Women Farmers Group products in Bantul Regency. Business actors or main members of the supply chain consisted of members of "L" Women Farmers Group, Neighbors, Stalls, Markets, Bantul Farmers Market. Meanwhile, members of the support chain included Academic Institutions (Universitas Pembangunan Nasional "Veteran" Yogyakarta, Universitas Gadjah Mada, Universitas Sarjanawiyata Tamansiswa, Universitas Mercu Buana Yogyakarta, etc.), Department of Agriculture and Food Security Yogyakarta (DPP KP DIY), Sustainable Food House Bantul (KRPL), and Bantul Regency Agriculture Service (Figure 2).

Mapping of Vegetable Supply Chain in "L" Women Farmers Group

To expand market share, the "L" Women Farmers Group was assisted by the aforementioned parties. In establishing a partnership, the "L" Women Farmers Group must be responsible to two parties, namely the relevant government and their partners. "L" Women Farmers Group has established partnerships with destination markets. In this partnership, an agreement was made to be responsible for managing the quality of the product during production, post-harvest to the end, while maintaining the quality of the product which was known for its pesticide and chemical-free vegetables. Therefore, farmers or members of "L" Women Farmers Group

Table 3. Commodity Specifications of "Lestari" Women Farmers Group

No	Destination Market	Commodities	Demand per Week	Group Production Capacity
1	Neighbors	Spinach	50 bunches	50 bunches
		Water spinach	50 bunches	60 bunches
		Bean	15 kgs	12 kgs
		Mustard green	50 bunches	30 bunches
		Chili	10 kgs	12 kgs
2	Stalls	Spinach	100 bunches	70 bunches
		Water spinach	150 bunches	130 bunches
		Bean	19 kgs	15 kgs
		Mustard green	150 bunches	100 bunches
		Chili	30 kgs	27 kgs
		Tomato	40 kgs	35 kgs
3	Markets	Chili	60 kgs	40 kgs
		Tomato	50 kgs	40 kgs
		Banana	100 hands	50 hands
		Corn	70 kgs	50 kgs
		Potato	80 kgs	60 kgs
		Carrot	75 kgs	50 kgs
4	Bantul Farmers	Banana	250 hands	150 hands
	Market	Corn	90 kgs	70 kgs
		Potato	90 kgs	75 kgs
		Carrot	95 kgs	79 kgs
		Chili	85 kgs	75 kgs

Source: Observation at "L" Women Farmers Group (2021)

who became vegetable producers were the responsibility of "L" Women Farmers Group. Several commodity specifications entered "L" Women Farmers Group from members (Table 3).

"L" Women Farmers Group and group members (farmers) were responsible for supplying vegetables on the grade to the destination market. Group members distributed vegetables to the "L" Women Farmers Group, then post-harvest processing was carried out in the group which was then marketed to the destination market. When there are vegetable products that are not in accordance with market demand specifications or are off-grade, they are self-processed and consumed or used as animal feed. Given that apart from farming major vegetables and fruits, "L" Women Farmers Group members also cultivated livestock such as kampong (free range) chickens and catfish.

From Table 3, it can be seen that "L" Women Farmers Group has not been able to meet the weekly market demand, in addition, to have a fluctuating number of harvests this was also due to the lack of commitment of "L"

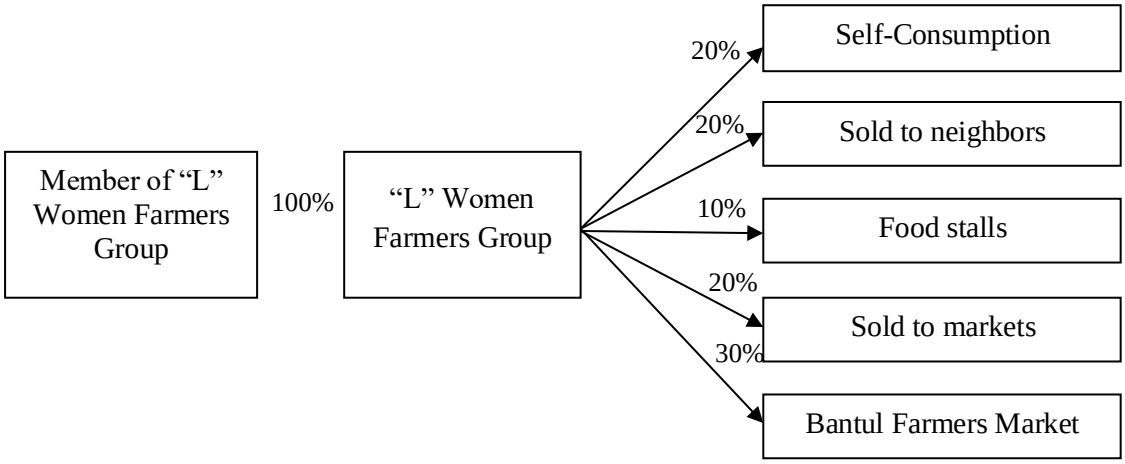

Figure 3. The Flow of Vegetables and Fruits to Destination Markets

Women Farmers Group members in meeting the needs of the destination market. After doing the research, this was also because the amount of product consumption that was consumed by "L" Women Farmers Group members was quite large, with a percentage of 20%.

"L" Women Farmers Group was focused not only on the most superior in the market but also to meet all market demands ranging from consumers in the surrounding area, stalls, markets, and PASTAB. Each commodity had specific specifications and criteria where specifications and quantities were determined by the destination market (Figure 3). From this, it can be said that although the "L" Women Farmers Group had good flows, its implementation in the field still had several obstacles. This of course must be considered and improved so that "L" Women Farmers Group can always maximize their business performance.

All vegetable commodities in Figure 3 were produced according to the harvest age of each commodity, therefore the destination market conducted demand before planting. At each harvest, select harvesting was carried out so that the selection and the weighing process was in accordance with market demand until it reached the destination market according to the high quality of vegetables.

Conclusions

"L" Women Farmers Group has succeeded in making business access to destination markets. However, "L" Women Farmers Group has not been able to meet the demand needs up to 100% because there were still many community-owned lands that cannot be used for farming, many residents did not want to join "L" Women Farmers Group and so on, so that market demand cannot be fully met. "L" Women Farmers Group was able to implement green capability quite well because the quality of the product produced was a product that was free of pesticides, chemicals and used natural ingredients as plant fertilizers such as fertilizers from fruit fermentation and rice washing water so that the quality vegetables guaranteed. Green supply chain mapping was able to build relationships between stakeholders and reduce the risk of loss and inefficiency.

Suggestions

Based on the research conducted, suggestions that can be given are: educating the community around "L" Women Farmers Group about the importance of farming programs and the benefits that will be obtained if you join as a member. With the increase in the number of members, it will certainly have an impact on increasing the

land used for farming so that the "L" Women Farmers Group can be better able to meet market demand. In addition, the researcher also suggests that future researchers can research with a wider scope of research and with different methods so that it can provide more benefits for both farmers and society in general.

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