

Eco Friendly Farming Development to Support the Establishment of Sustainable Organic Agriculture : A Review

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Abstract: A systematic review has been done to collate all empirical evidence in order to answer a question regarding the development of ecofriendly farming. This farming system nowadays has been developed in order to overcome the negative impact of the application of green revolution technology. As we know, green revolution technology need more chemical inputs to double crop productions, which causes a negative impact on resources, a decrease in crops production, an increase pests and diseases, high residues of inorganic inputs, environmental unbalance and problem for human health. Several studies have proven that the application of organic farming can significantly improve land productivity and reducing the use of chemical inputs. This means that organic farming is a solution for sustainable agricultural development by utilizing renewable resources, avoiding the use of chemical inputs, improving land ecosystems, and maintaining environmental quality. In sustainable agriculture development, integration of livestock and crops is common, where organic waste from livestock and plants is used as organic fertilizer. All these need to be an aspiration as a policy step to build environmentally friendly agriculture towards organic.

Keywords: Organic farming, policy. sustainable developmen.

1 Introduction

Traditional agriculture has been applied to environment-friendly and sustainable agricultural systems. Farmers usually develop integrated farming systems. Traditional farming refers to agricultural practices that have been followed for generations and are often characterized by manual labor, simple tools, and reliance on natural resources. These farming methods vary across different regions and cultures but generally involve the cultivation of crops and rearing of animals for food and other agricultural products. Some key aspects of traditional farming are subsistence agriculture, crop diversity, organic farming, seasonal planting, traditional irrigation techniques, rearing livestock, manual labor, and using local and traditional knowledge. Traditional farming is still important in

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many parts of the world, as it promotes sustainability, preservation of cultural heritage, and the use of local resources. It also serves as a valuable source of knowledge for developing environmentally friendly and resilient farming practices. Since ancient times, farmers have carried out their farming business from generation to generation, following the original method of their predecessors, how they did it in the fields and fields until now [1]. From the concept of shifting cultivation to permanent farming, farmers are now learning to manage their traditional farming businesses such as handling farming around forests, raising livestock by using livestock waste as organic material for soil cover and fertilizer, as well as clearing the land by cutting down wood which is then burned to obtain ash for use. plants, all of this is still traditionally based on experiences received from their environment. Everything that is done actually provides good benefits for farming, can fertilize the land, and maintain environmental and sustainable aspects, except for the impact of logging which causes damage to the environment. However, everyone, both local and global, agrees that traditional agriculture is sustainable agriculture by producing healthy food.

Currently, discussing about favoring natural resources requires enthusiasm to improve soil conditions so that they are healthy and one way is seen by implementing organic farming [2]. Several steps can be taken without using chemical inputs that can pollute the environment. By implementing steps like this a sustainable agricultural pattern can be carried out, currently many examples have begun to be applied such as using waste treatment technology with microbes to produce organic fertilizers, and in rice farming can be introduced the application of intermittent irrigation as well as integrated pest management. [3]. By applying a holistic agricultural concept where each subsystem is able to provide impetus for improvement in other subsystems with the support of renewable technological innovations, environmentally friendly agriculture can be realized.

For this reason, policies are needed to implement environmentally friendly agriculture towards organic farming, which includes farming on irrigated land and dry land. Many concepts of integration as environmentally friendly agriculture that supports sustainable agriculture have been applied such as "plant farming systems" or crop livestock integration systems [4], integrated farming systems [5, 6] the development of innovation-based rural agriculture and others. Bali's tendency to become an organic island is also an example of a moral movement that gradually develops the "Simantri" (integrated farming system) program throughout Bali as the forerunner to becoming organic with the introduction of various agricultural technological innovations. In fact [7] informs that as a result of soil biological activity by utilizing organic inputs into the soil, in addition to the soil biology aspects, the physical and chemical aspects of the soil are also addressed so that they are able to support sustainable production. All these explanations show that farmers now have to move away from the term "farming for business as usual" to better farming even like modern precision farming with more organic inputs used and forgetting to mention the role of inorganic farming. This is to improve farmland for better environment and production. Improvement should not only cover technical aspects but rather increase knowledge and capacity building of farmers in dealing with farming. This article aims to discuss technical and policy aspects in the development of agricultural management towards organic farming for building sustainable development.

2 Method

2.1 Past Experience : Development Of Conventional Agriculture

This article was written based on data and information which were analysed using systematic review. In a systematic review, it is necessary to pay attention to the following things, namely collecting things that are still unclear, explaining about the participants, being directly involved and assessing information from one another and measuring the outcomes of checking the data; use references from systematic reviews; describe all data

and information; and answer correctly to the data and suggestions. The “green revolution” technology is a technology that predominantly uses chemical inputs in agricultural cultivation to increase crop production. According to [8], many bad problems are generated in conventional agricultural activities such as land and water damage, environmental aspects, reducing soil fertility, and resulting problems to people for their healthiness. [9] explains that the existing impacts are in line with the opinion [8] which informs, among other things (a) the occurrence of pollution of agricultural land and damage to soil and environmental aspects due to pollution, (b) as a result of not using organic inputs, there is a decrease in the levels C organic to very low, and (c) the damage is also supported by the use of wasteful superior varieties with chemical inputs such as high doses of fertilizers and pesticides. On the contrary [10] explains that according to SWOT examination, the application of environmentally friendly agriculture increases the quality of production. Therefore [11, 12], suggested that one way to suppress the use of high chemical inputs, it is necessary to introduce knowledge about integrated crop management to farmers and [13] explain the use of important microorganisms in environmentally friendly agriculture. Then [14] stated that a good understanding the organic agriculture term at farmers field need to be supported by the ability to produce non chemical inputs such as organic pesticides, organic fertilizers and crop rotation is believed to produce a pattern of sustainable farming systems. In addition, a good understanding is also needed related to the social aspects of farmers related to the development of sustainable organic agriculture [15], while [12] explains that after increasing the capacity of human resources of farmers there has been an increase in the application of environmentally friendly agriculture. In contrast [2] explained the impact of chemical inputs on agriculture with a high risk of contamination and land degradation, decreased water quality due to eutrophication of river and lake water from nitrate and phosphate elements, and pesticide residues. While the dangers of herbicides and insecticides that are often used by farmers include their chemical components being transported in crop residues and damaging the surrounding plants, drifting through erosion into the water can kill aquatic plants and cause poisoning.

The problem of environmental pollution is the concern of many parties and suggests that it should be anticipated immediately by conservation, improving soil structure and changing farmer patterns to reduce the use of chemical inputs in their farming business. By improving farming through the use of organic inputs, some data indicate an improvement in land productivity (table 1).

Table 1. Plant productivity that has been assessed using more environmentally friendly inputs.

Commodit y	Treatment	Prod (ton/Ha)	Commodity	Treatment	Prod (ton/Ha)
Production of var. ciherang in the peat swamp land of Central Kalimantan [16]	<ul style="list-style-type: none"> With perombak organic M dek Trikoderma Mol Petani No organic (Kimiawi) 	5,497 a 5,160 a 4,500 a 3,413 b	Application of Org Fertilizers in Rice Plant Systems [17]	<ul style="list-style-type: none"> combination treatment of solid and liquid org fertilizer The addition of liquid organic fertilizer 	real influence the outcome of rice. able to increase 4.4% - 17.4%. dry grain yields
Application of the cattle and rice crop integration system [6]	<ul style="list-style-type: none"> Use only org fertilizer 50% inorganic fertilizer + 50% organic fertilizer addition of liquid organic fertilizer 	<ul style="list-style-type: none"> low 6.08-6.20 ton/ha increase rice yield by 25% (8.34 tons/ha) increase rice yield 27% (8.6 tons/ha) 	Average Number of Chili Fruits per Plant in Pemuteran Baturiti Tabanan Hamlet [18]	P0:NPK 100-50-50 P1: Compost 5 t/ha P2 Kascing 5 t/ha P3:(1/2 P0 + 1/2 P1) P4 (1/2 P0+1/2 P2)	91.20 a 128.90 d 140.56 e 114.00 b 117.10 c

From the data above, it is clear that all applications with applying organic fertilizers resulted better production rates when compared to applications with in-organic fertilizers. In soils with high organic C content, nutrients become more available to plants, so fertilization is more efficient.

3 Discussion

3.1 Integrated Agricultural System As The Foundation Of Eco-Friendly Agriculture

Integrating farming practices means that its system is holistically integrated with each other, where each sub-system is interdependent to produce further benefits as added value to support other sub-systems [19, 20]. Some research results show that an integrated agricultural system approach that integrates crop and livestock commodities is able to provide a source of organic matter to produce both solid and liquid organic fertilizers as soil repair fertilizer and a source of plant nutrition so as to increase productivity friendly, improve production quality, and increase income. farmer. This agricultural concept is able to increase resilience to fluctuations and climate change by reducing emissions which play a role in sustainability thereby maintaining biodiversity [21]. Several studies show that there is a sustainable increase in land resources and crop productivity. This is also evidenced by [3] who studied lowland rice cultivation with balanced fertilization added organic fertilizer, integrated pest control, with row cropping systems and intermittent irrigation systems that can increase productivity up to 47%, farmer income ranges from 29-76% and reduces GHG emissions 18-26%. This shows that the role of environmentally friendly organic inputs can improve soil conditions, whereas [22] mentions that applying organic resources or reducing chemical inputs can create environmentally friendly ecosystems, suppress potential pests with a biological balance, and still support rice productivity.

The application of environmentally friendly agriculture to improve soil quality and crop production has been carried out in several locations in Indonesia. Several studies have shown that the use of organic matter (such as crop and livestock waste) and reduced use of chemical fertilizers and pesticides increase agronomic efficiency [5, 18]. Integrated farming systems are expected to create socially, ecologically and economically sustainable subsystems through mutual support. [23] emphasizes that in principle when using local inputs and reducing the use of external inputs, this concept provides efficiency that economically benefits farmers because it reduces external inputs and protects the environment and biodiversity, maintains social aspects and local cultural harmony. 'Figure 1' below shows the integration flow holistically. Although rice self-sufficiency has been achieved in 2022 [25], technological improvements are still needed to overcome inefficient and stagnant production. To achieve sustainable production, the dimensions of equity, increased income, and guaranteed employment for rural communities need to be commensurate with achieving economic growth [26] and to understand that a system can function equally, both now and in the future. [27] showed that the efficiency and effectiveness of land use can be achieved by implementing a crop-livestock integration system and can increase farmers' income and added value from environmentally friendly agricultural processes.

Eco friendly agriculture can directly support the ecosystem conservation by applying organic fertilizers. Application of organic fertilizer can improve soil properties (improve soil structure, porosity, permeability, increase the ability to hold water, etc.), chemical properties (improve nutrients intake from macro and micro elements), and in the soil can increase pH and suppress Al solubility by forming Al-organic complexes), and soil biological properties (fixing soil respiration and increasing the number of soil microorganisms and earthworm populations [7]. Organic fertilizer is essential to improve farmers land. Therefore, the role of technology in preparing organic fertilizer support at the farmer level is very important (see figure 1).

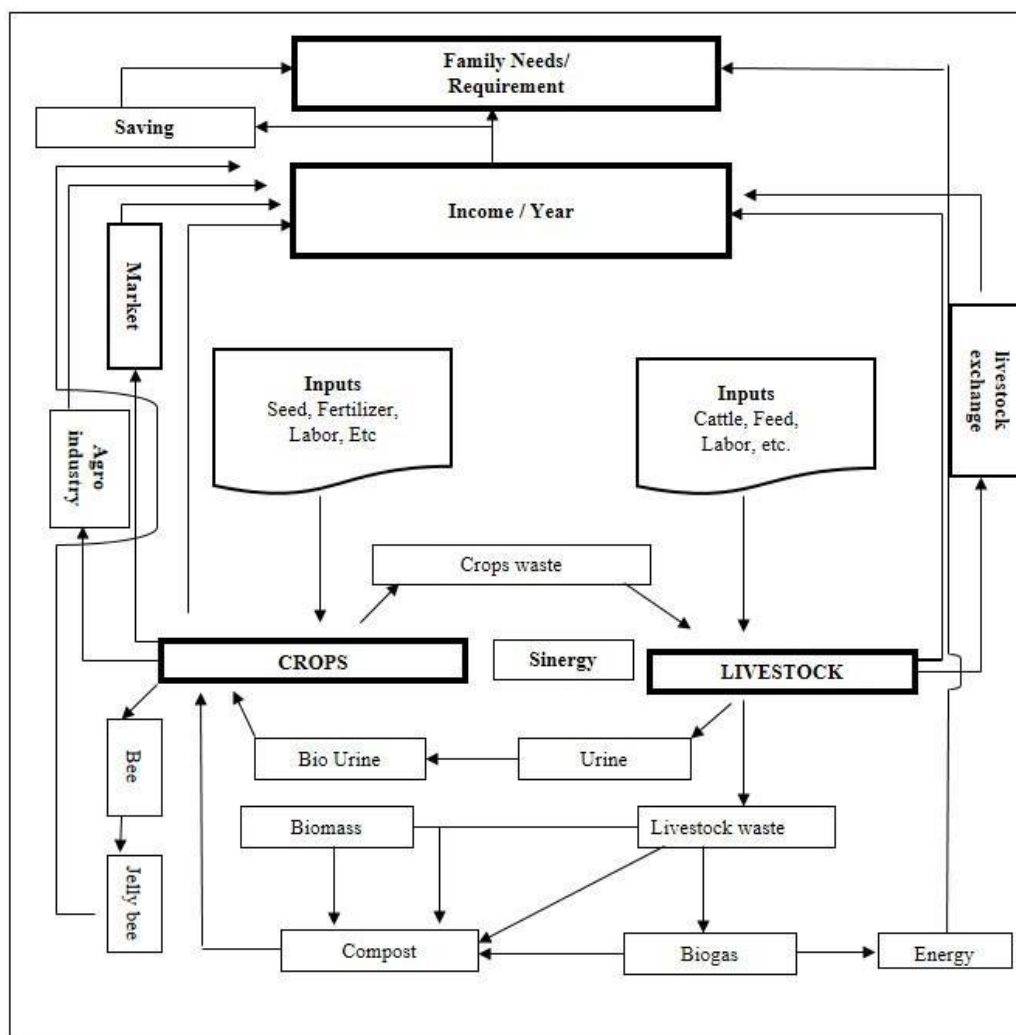


Fig 1. Integrated agricultural development activities through innovation 24]

Simple and appropriate organic fertilizer technologies have been developed. [28, 29] inform that organic fertilizer can be made through fermentation process by using frementors such as microorganisms like worms, cellulosic microbes, bacteria (*Bacillus*), fermenter *Trichoderma* sp., and IMO (indigenous microorganisms) in processing organic waste. Other technology used high quality worm decomposer to produce organic fertilizer from livestock waste [9], or using decomposer *Rumino bascillus* (RB) produces RB compost, using IMO to proceed cow urine and waste of liquid coffee processing [30]. Solid organic waste other than compost can also be processed to produce biogas energy, while biogas sludge can be

used as liquid organic fertilizer and compost for organic farming [31], which basically supports the concept of crop-livestock integrated agriculture toward environmentally friendly agriculture/organic farming (‘Figure 2’).. The microorganisms found in the decomposer solution were *Azospirillum* sp., *Azotobacter* sp., *Pseudomonas* sp., and cellulolytic microbes, which were obtained from the IMO, a mixture of rice, papaw, and cow urine. These microbes degrade organic matter, as well as free N binders and P solvents in the soil. Similar microorganisms have also been found in coffee waste [29]. These simple technologies must be transferred to the users to improve agricultural practices at the farmer level [14], and one of the best ways is to involve the provincial government or district government in preparing a budget for improving capability of farmers. With adequate training, field officers and farmers can quickly understand the process [12].

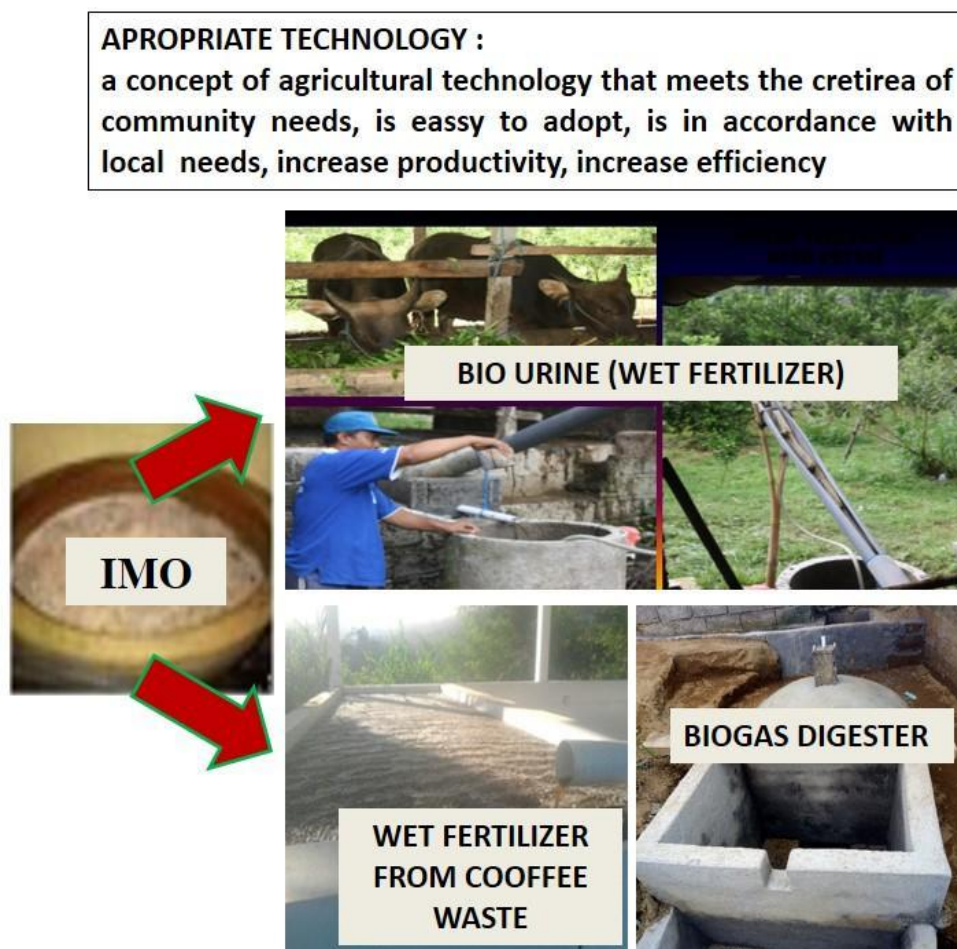


Fig 2. Appropriate Technology in Integrated Agriculture Development [29]

3.2 Growth and Strategy of Organic Agriculture Development

A balanced level of sustainability of crop productivity and the environment is strongly supported by the presence of friendly technologies such as organic farming. Likewise with the support of biological completeness, environmental balance which ultimately results in products that have adequate and healthy food standards. To produce healthy food products, the flow of commodity management must have management based on good agricultural product (GAP) and good handling product (GHP). In the next process, activities are needed that lead to the development of certification at the farmer level as a standard for healthy farming [32]. Organic farming reflects efforts not to damage land resources so that they are

free from contamination by residues of chemical/synthetic inputs in maintaining biodiversity and ecological balance. [33] pointed out that regulation in organic farming is a major strength and opportunity in Uzbekistan. It is often found there were several obstacles in implementing organic farming, especially the human resource capacity of farmers which was still low and low investment in the agricultural sector so that growth was very low.

The definition of organic farming includes aspects of mutually supportive production that are able to maintain and improve environmental conditions properly, conserve biodiversity, maintain the existence of biological systems and improve the life cycle in the soil.[34]. Meanwhile, the application of food product standards is required to follow the rules required for good agro-ecosystem sustainability including the application of a labeling system [35]. In carrying out organic farming to produce healthy food [36, 37] four principles of development are defined: “(a) the principle of health aims to maintain the health of soil, plants and humans to avoid the dangers of chemical inputs; (b) the principle of environmental aspects in order to be able to maintain the balance and sustainability of living and cyclical ecological systems; (c) the fairness principle means guarantees a harmonious relationship with the environment and the opportunity to live together; and (d) the principle of concern, which is carried out with care, protecting the health and welfare of present and future generations.

It is suspected that there are several obstacles/problems in the development of organic agriculture, namely low productivity, which raises the inquiry that organic application will be able of being the spearhead in providing a source of food for the entire population. Furthermore, who are the users of organic agricultural products? Some researchers state that organic farming is productive and sustainable [27, 38], and the main findings of research on organic farming results (Mendoza, 2002 in [39] show that (a) the results obtained are not much different from agriculture in general, although often also lower; (b) in the conversion phase from conventional farming to general productivity decreases but slowly production then increases slowly; and (c) the use of organic fertilizers to soil can increase activity of soil biology which finally improve soil biodiversity.

In the development of organic farming, statistical data shows that there has been a change in people's mindset in managing agricultural activities as indicated by the trend of a significant increase in the world community developing organic farming patterns, while when seen in several countries, Asia and Africa have not shown real growth. In 2005 it was around 28.94 million hectares of land in the world that has been classified organic, and it continued to increase in 2006, 2007 and 2008 respectively, namely 30.08, 32.21 and 35.13 million hectares. This increasing trend shows that the world community needs healthy food. The category of regions that are very serious about developing organic agriculture in 2008 was Oceania with an area of 12.14 million hectares (about 34.6% of the world's total organic land), followed by Europe and Latin America with 8.18 and 8.07 million hectares respectively. While Asia and Africa are still far below each of 3.30 million hectares (about 9.4% of the world's total organic land) and 880.90 thousand hectares. If you pay attention 10 years later, in 2017 there was a large increase in the world, reaching 69.85 million hectares, while in Asia it only reached 6.12 million hectares, while growth in Indonesia as shown in ‘Figure 3’ is still very low, namely 208.00 thousand hectares [41]. However, according to the latest global data cited [42], Australia showed the highest growth with a total of 35.69 million hectares of the world's organic farming area. [43] explained that implementing organic farming is difficult with several technical problems, markets, and cooperation networks are still hampered. Government support is critical in terms of political

will, and technical and financial support. These problems also hamper the development of organic agriculture in Indonesia, as shown in the following figure 3.

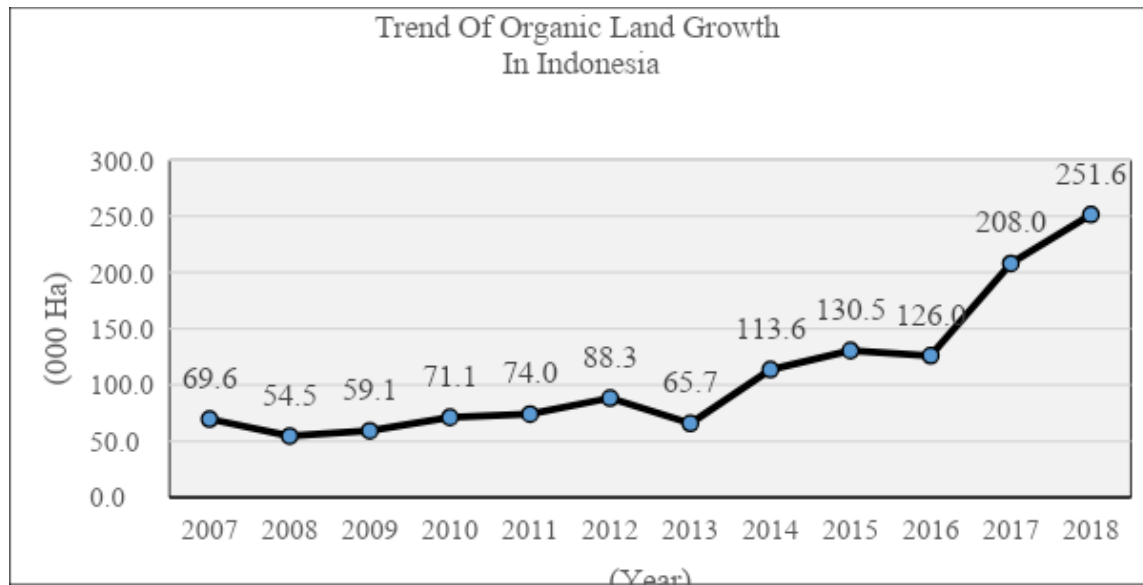


Fig 3. Trend of organic land growth in Indonesia. Source : processed data [44]

From figure 3 showed that the low growth of organic agriculture in Indonesia, however, it can potentially be developed considering the abundant sleeping land and large germplasm in Indonesia. On the other hand, Indonesia's population is very large, with a middle to upper level of life, which is increasingly providing opportunities as the main consumers of safe and healthy organic food. In addition, the potential for export opportunities is very good with a variety of tropical commodities owned by Indonesia, such as Arabica and Robusta coffee, cocoa, cashew, and palm oil. Domestically, organic food products are increasingly being promoted. For example, an increasing number of young people are opening opportunities for organic coffee (cafés). The more developed the terms back to nature, the more developing people are starting to care about a healthy environment so as to spur the development of friendly agriculture. Some fresh and processed products have begun to be seen in modern retailers and specialty stores that sell organic food products. The main weaknesses in the agricultural sector in the development of organic cultivation are small farmers with many problems, such as lack of capital. On average, they have narrow land, access to land certification has not been able to be carried out related to costs, the organic innovation capacity of farmers is still limited, and market access is still limited with a supply driven orientation. Some data show that agricultural development in the world is very fast; thus, opportunities to fill market share whose products are not owned by other countries are very open, while at the local level, with the desire to consume healthy food, including in tourism areas, organic farming opportunities are very good. Some of the challenges (threats) that arise include many uncertified products claiming to be organic due to the increasing demand for organic food products. Therefore, it is necessary to have standards in organic farming systems that can be understood by farmers in implementing their farming practices.

3.3 Organic Farming And Sustainable Development

The definition of sustainable development is building without destroying existing resources for the livelihood of future generations [45]. Sustainable development incorporates three dimensions of well-being: economic, environmental, and social. Agriculture is one of the

areas most concerned with sustainable development, where its role has been proven since ancient times and in sustainable development this sector is very real in providing support that interacts with the balance of economic, social and environmental movements [46]. In carrying out sustainable agriculture, several studies show the importance of disseminating agricultural technological innovations to accelerate the realization of environmentally friendly agriculture that meets economic standards and social equity. Sustainable agriculture involves the integration of various physical, biological, social, and economic aspects for the development of safe and environmentally friendly agricultural practices. Sustainable agriculture must also be able to protect its productive resources, such as by maintaining soil fertility, protecting surface and groundwater supplies, and adapting to climate change. Must contribute to the sustainability of large areas and social communities and be seen as a solution and anticipation in tackling global climate impacts [47]. In principle, sustainable farming systems means the system which uses some applied and innovative technologies in increasing productivity and protecting the environment from damage. It is estimated that by 2050, approximately 70% more food will be needed than is currently produced to provide the recommended daily intake of calories to the world's 9.6 billion population [48]. Many ways were used to strengthen and describe sustainable agriculture such as by implementing crop livestock systems, integrated agricultural systems or application of eco friendly agricultural practices . Other terms were also come up such as biodynamic agriculture, urban agriculture, hydroponic and aquaponic agriculture, agroforestry and food forests, growing heirlooms and older varieties, and organic animal husbandry. natural, mulch, ground cover, natural sugar control, and natural pest management [49].

There are several opinions regarding how to interpret the sustainability of agricultural systems so that they are always sustainable, for example through environmentally friendly agriculture which shows how to handle agricultural resources properly by using technological innovations to minimize the impact of land damage, maintain ecosystem balance, avoid using chemical-based sources of raw materials. and can be adopted economically profitable, socially and local culture acceptable and avoid impact on environmental damage [50]. In line with these efforts, land productivity has also been gradually increased. All of this aims to maintain resources for generations to provide benefits to the community. So it is able to produce a good balance concerning economic, environmental and social aspects which ultimately leads to the goal of producing long-term agricultural production patterns [51]. In an era of new innovations related to sustainable agriculture, the role of innovative technology will effectively provide a positive response in overcoming various agro-ecological problems related to climate change, drought and other aspects related to disasters and food insecurity [52]. In 1972 production systems were directed to concern with agriculture to produce more healthy crops for human beings, provide protection to land resources and overcome risks to the environment, as well as encouraging equality and quality based on technology innovation and tradition [53]. This production system was labeled with the word 'organic' by IFOAM (International Federation of Organic Agricultural Movement). In organic farming applications that use organic inputs and avoid the use of chemical inputs, this farming pattern is a good, healthier choice. Directly positive impacts will result from this agriculture on the environment as a result of natural resources not being degraded. The implementation of organic farming really supports sustainable agricultural patterns [54]. The main goal of organic farming is to maintain a balance between land/soil and the environment and to produce healthy products for life as well as a quality food source. This is a result of the implementation of this

agriculture which does not use synthetic chemical inputs, but uses organic fertilizer inputs, by carrying out crop rotation and biological control. Recently, the trend in the use and consumption of organic products has increased significantly with access to local and global markets. With the concept of organic farming as the goal of building sustainable agriculture, this farming is closely related to long-term development goals, preserving resources and the environment as well as opportunities for export market access, financial stability and positive social impacts [55].

3.4 Organic Agriculture Development Strategy In Indonesia

In developing organic farming, it is important to develop certification bodies that are pro-smallholders. The existence of a certificate is the main thing referred to as an organic product, but this is often difficult to obtain because there are many rules that must be followed and farmers are often unable to follow them. The main obstacle that is often discussed is that it is expensive and only valid for 3 years and then re-certification is carried out at a fee. Things like this are burdensome for small farmers in building organic farming. However, there is a good gap that can be done, namely by building through farmer groups and facilitated by the government.

A good example of the government's role in supporting organic farming is Bali's vision to make Bali an organic island by providing full support to farmers in improving land conditions with assistance. To fulfill this vision [23] explains that there are several programs that have been launched by the governor of Bali. One program which are special for farmers is the integrated agricultural system (called Simantri). This program is fully financed by provincial budget through provision livestock and supported facilities for farmer groups. One simantri is consist of 20 cows and 1 bull. Each symantri is supported by solid and liquid organic fertilizer processing facilities, the results of which must be applied to the fields of farmer group members. It was informed that 752 Simantri had been built until 2018 throughout Bali and were able to produce approximately 70,000 tons of solid organic fertilizer and 580,000 liters of bio-urine, which can be used for \pm 32,000 ha of land. A program that is in line with Simantri has also been built, namely the Organic Fertilizer Processing Unit (UPPO), where 55 UPPO units have been built until 2019. In supporting organic farming in 2019, the Bali Provincial Government is also providing organic fertilizer subsidies to farmers capable of increasing soil C-organic content by 2-3% (although the minimum requirement must be 5%), with a land area of 25,000 hectares for rice, corn, horticulture, and coffee.

The program that builds human resources for the general public is the development of organic villages based on food crops, horticulture, and plantations, where 28 units of organic villages were developed in Bali until 2018, consisting of six, eight, and 14 organic villages based on food crops, horticulture, and plantations, respectively, including the Development of Biological Agencies and Vegetable Pesticides. With good awareness of building environmentally friendly agriculture towards organic crops, since 2008 -2018 there were 49 organic food crops and horticulture operators were built and two operators for certification-based plantations from accredited domestic LSOs. Technological support and local government policies are important for developing environmentally friendly organic agriculture. What can be learned from these conditions? Under the guidance of the Ministry of Agriculture, there are many competent institutions for this certification, which has been accredited by the Ministry of Agriculture, and it is hoped that the role of local governments will also accelerate its application because the Ministry of Agriculture pays great attention

to the development of organic agriculture with the 2010 motto go organic. Meanwhile, [44] explained the various aspects of the inhibiting factors for the adoption of organic agriculture, such as the availability of information and knowledge, technical skills, and environmental awareness, but the role of the government is very important to convince farmers about the benefits of organic farming and technical assistance for farmers.

To produce organic agricultural products, it is mandatory to have an organic certificate guaranteed by an institution that already has an accreditation standard or a credible institution. In the certification process, an assurance agency/certification body assesses the suitability of a product and provides a written guarantee that the resulting product follows established procedures or standards [40]. In the implementation to assess the suitability of a product standard, in the field, tests and checks are carried out on how production is produced with the support of documented records. At the field level, especially for farmer groups participating in certification guarantees, an internal institution called the Internal Control System (ICS) must be developed. Documentation from the ICS agency in the farmer group can then be used by an external certification body to delegate the annual inspection of group members through a designated certification operator. At the farmer group level, the ICS institution summarizes agreed activities as farmer commitments, conducts internal inspections and guides farmers, implements internal approval mechanisms and handles non-conformances, carries out agricultural data documentation, and monitors product flows. As an ICS institution, the concept of reward and finality applies as a group consensus strictly so that the sustainability of certification can still be implemented.

Considering the explanation of organic farming above, when discussing the past experience in farming activities by farmers, actually the concept of natural agriculture as ancestral heritage is needed again, challenges are required to improve the current damage of the land such as the degradation of agricultural land as a result of chemical input-based agriculture. In addressing these various issues of environmental damage and land resources, sustainable agricultural development needs to be addressed by applying several development patterns. There several studies has been conducted on sustainable agricultural development in various agroecological zones. Even lately, many issues regarding the development of advanced and precision agriculture have been widely discussed, in essence, they want to restore the concept of sustainable agriculture. One model that is appropriate to be applied to farmers who have limited land resources is to develop a pattern of integration between livestock and crops as a choice and strategy to both improving land resources and income generation. In this pattern, several scopes of activities related to aspects of livestock and plants are implemented in a holistic system. A holistic system is a combination of a chain of each component in the system that provides added value to each other

4 Conclusion and suggestion.

Indonesia has a long experience in setting agriculture program, starting with the development of traditional agriculture, followed by the development of green revolution technology, which took a long time to claim that environmental damage is now being pursued again in environmentally friendly agriculture. In supporting this environmentally friendly agriculture towards organic matter, many technological innovations have been introduced with ease of use for farmers. Integrated farming systems, such as crop livestock systems, are an alternative for farmers, where by using microbes to prose organic materials, farmers can produce compost to improve their land. With the involvement of the

Government Will, such as the local government, to support farmers in improving their land by providing an organic programme with a sufficient budget, this programme finally improves and sustains crop production development. For example, Bali has succeeded in developing an integrated agricultural concept called the Simantri program, which is very feasible for use as one of the policies in developing organic agriculture in other provinces with the support of financing involvement from national and local budgets (called the APBN and APBD) in each province. It is believed that Indonesia will quickly develop organic agriculture in the future, with huge potential for foreign and domestic markets. Therefore, building environmentally friendly agriculture towards organic matter requires the will of various parties and government support in financing and fostering it.

Technically planning and implementing this activities is not difficult, therefore we suggest to local government that in every five year development plan especially for agriculture, it is important to delivery the concept of organic agriculture for farmers by providing all necessary tools, equipment and budget needed in its implementation.

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