



Review Paper

Organic Farming for Healthy Food Production and Land Sustainability for Supporting a Smart Agriculture in Indonesia

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Abstract

Recently, people have suffered from many serious illnesses, such as kidney, cancer, osteoporosis, etc. One of the triggers is that the food eaten by human is not free from heavy metals. These heavy metals enter through the food chain during the crop cultivation. These heavy metals can come from artificial agrochemical inputs (such as synthesis P fertilizers and pesticides). One way to avoid the entry of heavy metals into plant is by implementing organic farming. Organic farming is an agricultural system that does not use synthetic chemical. The implication of organic farming are (1) maximizing the use local resources, (2) minimizing the use of chemical inputs, (3) ensuring biological functions, (4) maintaining a diversity of plant and animal species, (5) creating an attractive overall landscape that provides satisfaction for local communities, and (6) increasing the intensity of plants and animals in the form of polyculture, agroforestry, crop/animal systems integrated livestock etc. If organic farming principles are followed consistently then the food produced will be healthy and safe for humans and animals and save for land sustainability to support smart farming. Another benefit of organic farming is that natural resources will be sustainable and the environment will be protected from pollution and damage. To convince the Indonesian and global community, the organic products produced must be certified independently, the basis of which is SNI 6729-2016.

Keywords

Heavy metal, Organic farming, Pesticides, Synthetic fertilizer

1. INTRODUCTION

Recently, many people have been affected by various types of diseases, both in the form of diseases triggered by microorganisms (bacteria, viruses, etc) and there are also diseases caused by other triggers, for example due to food poisoning, due to heavy metals in food. Common disease triggers caused by heavy metal include cancer, kidney disease, osteoporosis and even autism in children. Heavy metal toxicity can trigger the emergence of various types of diseases due to heavy metals accumulation such as lead (Pb), cadmium (Cd), mercury (Hg) and arsenic (As) entering the food chain in plants during cultivation (Agustina, 2014).

Heavy metals are pollutants that are very dangerous for the environment system, because it is toxic, cannot be decomposed naturally and these heavy metals can accumulate in waters, soil and the bodies of organisms (plants and animals) (Siringoringo et al., 2022). Rahman (2023) und that Pb accumulation in paddy soil was ranging from 9.90 up to

12.18 g g⁻¹, meanwhile Cd accumulation in paddy soil and rice plant were ranging from 0.70 up to 1.47 g g⁻¹ and 0.48 up to 0.66 g g⁻¹ respectively Budianta et al. (2022). The entry of heavy metals into the human body such as lead (Pb), mercury (Hg), arsenic (As) and cadmium (Cd) will have a very negative impact on the human body because the body will experience disturbances (Darmono., 2015). When cultivating plants, the inputs used are not sterile from heavy metals impurities that enter together or are mixed with the production inputs used, for example agrochemical materials, the heavy metals will stay in the human body. Even the process of P (TSP/SP-36) fertilizer which comes from phosphate rock naturally contains heavy metals from its origin, even the soil parent material for cultivation and soil amendments to improve soil fertility also contain heavy metals (Alloway, 1995). Meanwhile, Setyorini et al. (2003) showed the presence of heavy metals Pb, Cd and Cr in various phosphate rocks and SP-36 fertilizer. Budianta et al. (2023) have reported that intensive rice farming in Musi Rawas Regency, South Sumatra, Indonesia has been indi-

cated to be contaminated with heavy metals Pb and Cd in the soil and rice. Pollution occurs in intensive agriculture which has been implemented for more than 20 years.

Safe and healthy food is an important factor in improving public health. According to Republic of Indonesia Law No. 7 of 1996, food safety is defined as the conditions and efforts necessary to prevent food from possible biological, chemical and other contamination that can disturb, harm and endanger human health (Agustina, 2014). Food-borne illnesses can come from various sources, namely pathogenic organisms including bacteria, mold, parasites and viruses, from chemicals such as poisons, heavy metals, pesticides, hormones, antibiotics, dangerous additives and other agricultural materials (Ferdiaz., 1996). (Agustina, 2014) further stated that lead (Pb) causes nervous system disorders, damage to brain function, DNA and chromosome damage, allergic reactions, produces skin rashes, fatigue and headaches. Negative reproductive effects such as sperm damage, birth defects and miscarriage. Damage to brain function can cause decreased learning ability, changes in personality, tremors, vision problems, deafness, impaired muscle coordination and memory loss. Lead poisoning in children can reduce intelligence. If lead levels are found in their blood three times the normal limit (normal intake is around 0.3 milligrams per day) it causes a decrease in intellectual quotient (IQ) below 80. Meanwhile, cadmium (Cd) can disrupt kidney function and damage and other impacts are diarrhea, stomach ache and vomiting- vomiting, bone fractures, reproductive failure and even infertility /sterility, damage to the central nervous system, damage to the immune system, psychological disorders, DNA damage or cancer (Agustina, 2014). Communities who are negatively impacted by heavy metals also occur in communities living around tailings resulting from gold mining who eat fish from water contaminated with heavy metals (Maddusa et al., 2022).

One way to avoid the negative impact of these heavy metals is to implement organic farming. Organic farming is the answer to the green revolution that was promoted in the 1960s which caused reduced soil fertility and environmental damage due to uncontrolled use of chemical fertilizers and pesticides (Mayrowani, 2012). Excessive use of inorganic chemicals has negative impacts on land and plants (Yuriansyah et al., 2020). Indonesia has great potential to develop organic agriculture because of the available land and supporting technology. Demand for organic products is also predicted to increase in the future along with increasing public awareness about safe and healthy food (Ashari et al., 2017). However, organic farming initially produces lower products compared to conventional farming per unit area, but is guaranteed to be healthy, of guaranteed quality and safe for the environment, contains zero pesticides and is more hygienic (Reganold and Wachter., 2016).

2. Concept of Organic Agriculture

There are several concepts of organic farming. Organic farming was first initiated by Howard in 1920 due to the high cost of inorganic fertilizers in India. Howard, as Director of the Institute of Plant Industry at Indore, conducted agricultural research using manure, then continued with plant wastes and fallen plant branches. The initial results of this research were published in 1920 with the title The Waste Products of Agriculture: their Utilization as Humus. Howard emphasized the importance of mixing animal waste and plant remains with the help of microorganisms which can produce very effective materials for use as cheap plant fertilizer. Organic farming is free from heavy metal that is coming from P fertilizer (Tabel 1) and also coming from parent material (Table 2).

Table 1. Several heavy metals are found in various phosphate rocks and SP-36 (Setyorini et al., 2003)

Phosphate Rock (PR)	Cd	Cr mg kg ⁻¹	Pb
PR Christmast	38	-	60
PR Tunisia	76	-	42
PR Maroko	57	-	113
PR Jordan	5	344	nd
PR China Huinan	3	-	nd
PR. Ciamis	28	20	nd
PR. Sukabumi	6 5	-	65
SP-36	11	4	nd

Table 2. Type of soil-formed from parent rock containing Pb and Cd metals (Alloway, 1995)

Type of Materials	Lead(Pb) mg kg ⁻¹	Cadmium (Cd)
Ultra Basalt	1 – 14	0,01 – 0,12
Basalt	3 – 6	0,01 – 0,60
Granit	18 – 24	0,01 – 1,60
Sabs and Clay	20 – 23	0,017 – 11,00
Black Sabs	20 – 30	0,30 – 2,10
Sand	10 – 12	0,019 – 0,40
Lime	5 – 9	0,007 – 12

Howard has not defined organic farming (Barton, 2018). Behera et al. (2011) have revealed several characteristics of organic farming, namely (1) Maximum but sustainable use of local resources, (2) Minimal use of purchased inputs, only as a complement to local resources, (3) Ensuring basic biological functions of the soil-water-nutrient-human, (4) Maintaining the diversity of plant and animal species as the basis of ecological balance and economic stability, (5) Creating an attractive overall landscape that provides satisfaction for local communities, and (6) Increasing the intensity of plants and animals in the form of polyculture,

agroforestry, integrated crop/livestock systems etc. to minimize risks. The concept of (Notohadiprawiro, 1992) is that organic farming, also known as organic cultivation or ecological farming, is a crop production system that is based on biological recycling of nutrients. This means that organic waste from the harvest is not transported outside the agricultural system but is returned again for the next cultivation process. Apart from saving on the use of inorganic fertilizers, you can also utilize the nutrients contained in organic waste.

According to (Papendick and Elliott., 1984) there are three types of nutrient recycling that are of interest to organic cultivation farmers. The first type is nutrient cycling within the farm with sources originating from outside the farm. The second is the recycling of nutrients in farming with sources originating from the farming itself in the form of crop residues or residual harvest biomass. The third type is nutrient recycling within the planting plot. The first type of recycling is useful for adding nutrients to the soil from outside the farming area. The materials used are residential waste, household waste or industrial waste. This method is similar to conventional fertilization with artificial chemical fertilizers. But there is a big difference in terms of power of influence and consequences. Artificial chemical fertilizers supply certain nutrients in the form of high levels of inorganic compounds that are easily soluble. Organic materials supply various kinds of nutrients, especially in the form of low-level and insoluble organic compounds. Apart from that, organic compounds have the power to improve the physical and chemical behavior of soil and nourish the life of soil flora and fauna. The second type of recycling can involve livestock or composting. This method does not add nutrients to the soil, it only returns nutrients that are not transported out with the harvest. The nutrient content in the soil continues to gradually decrease because each time some are carried out along with the harvest. Its use is to extend the productive life of the soil. Returning crop residues through livestock digestion or composting can improve the quality of organic material from a physical, chemical and biological perspective. The third type of recycling usually involves legume plants to meet the basic part or all of the N nutrient needs of main crops. In this case, N nutrients are added from outside, namely from the atmosphere. Legume crops can be planted in rotation or alternating with main crops in the same plot, or planted in a row with main crops in separate plots according to the alley cropping system. Those planted in rotation or alternating with main crops can be legume plants which also produce important commodities (soybeans, peanuts), or legume plants which specifically produce green manure. What is planted using the alley cropping system are tree legumes whose leaves are harvested for green manure or mulch. Tree legumes provide the additional benefit of firewood. Green manure and alley crops add nutrients from other plots to the main crop plot. Another opinion about organic farming is a cultiva-

tion system without the use of artificial agrochemicals such as the use of inorganic fertilizers and artificial pesticides. In this cultivation, the production inputs used are organic fertilizers and organic or vegetable pesticides. Indeed, at the beginning of organic farming, the results are still low because organic fertilizer is a slow-release fertilizer, but after the next cycle or next planting, production results will increase and match the production of conventional agricultural products. As a result, organic farming continues to increase both in Indonesia and globally (Table 3) along with increasing public awareness of healthy food ingredients (Puwartini and Sunarsih., 2019; Durrer et al., 2021).

Table 3. The development of organic land area in the world, Asia and Indonesia, 2014 - 2017 (FiBL and IFOAM., 2019)

Area	Organic land area (ha)(in Million)				Growth % year
	2014	2015	2016	2017	
World	48,7	50,5	58,2	69,8	12.95
Asia	-	3,9	4,8	6,1	16.14
Indonesia	113,6	130,4	126,0	208,0	25,49
% Indonesia /world	0.23	0.26	0.22	0.30	-
% Indonesia /Asia	-	3.29	2.57	3.40	

Organic farming is an integrated agricultural system that optimizes natural agro-ecosystem productivity which is capable of producing quality and sustainable food (Sulaeman, 2008; Rachma and Umam., 2020). Minister of Agriculture Regulation number 64/permentan/ot.140/5/ 2013 concerning organic farming systems, an organic farming system is a holistic production management system to improve and develop the health of agroecosystems including biodiversity, biological cycles and soil biological activity. This shows that the organic farming system does not only focus on the cultivation process but is a holistic management starting from the cultivation process (on farm process) to handling and transport (off farm process). So all controlled organic farming system activities are not contaminated with inorganic materials. All organic farming system activities must be truly organic. This understanding of organic farming is in line with the opinion of Behera et al. (2011) that organic farming is a holistic agricultural production system, avoiding the use of synthetic fertilizers and pesticides. This organic farming system saves natural resources and the environment. If the rules of the organic farming system are followed carefully and consistently, agricultural production will produce healthy organic food. Organic food comes from organic agricultural land that implements organic management practices aimed at maintaining the ecosystem in achieving sustainable productivity, and controlling weeds, pests and diseases, through various methods such as recycling plant and livestock remains, selection

and crop rotation, water management, land processing and planting and use of biological materials. Soil fertility is maintained and increased through a system that optimizes soil biological activity and the physical and mineral conditions of the soil with the aim of providing a balanced supply of nutrients for plant life and livestock as well as protecting soil resources. Production must be sustainable by placing plant nutrient recycling as an important part of the soil enrichment strategy. Pest and disease management is carried out by stimulating a balanced relationship between host and predator, increasing beneficial insect populations, biological and cultural control and mechanical removal of pests and infected plant parts. The basis of organic livestock cultivation is the development of a harmonious relationship between land, plants and livestock, as well as paying attention to physiological needs. Organic food is safe for health. If the society is healthy, the country will be strong. Furthermore, [Behera et al. \(2011\)](#) provides the basic concept of organic farming which includes (1) concentrating on building soil biological fertility so that plants absorb the nutrients needed from a stable nutrient cycle in the soil (produced and released) in harmony with plant needs, (2) pest control, diseases and weeds are achieved largely by the development of ecological balance in the system and by the use of bio-pesticides and various cultivation techniques such as crop rotation, mixed planting and cultivation, (3) organic farmers recycle all waste from cultivation production and manure within the farm will result in a steady flow of nutrients, except that all harvested products must be removed from cultivation and (4) improving the environment to such an extent that wild life thrives will consequently increase biodiversity. There are 4 principles of organic farming, namely (1) The principle of health: organic farming must preserve and improve the health of soil, plants, animals, humans and the earth as one and inseparable unit; (2) Ecological principles: Organic farming must be based on ecological systems and cycles of life. Working, imitating and trying to maintain the ecological systems and cycles of life. The principle of ecology places organic farming in the ecological system of life, which is that production is based on ecological processes and recycling. This cycle is universal but its operation is local-specific; (3) The principle of justice: Organic farming must build relationships that are able to guarantee justice regarding the environment and opportunities for life together; and (4) Principle of protection: Organic farming must be managed carefully.

According to [Mayrowani \(2012\)](#), organic farming is an agricultural cultivation technique that relies on natural ingredients without using synthetic chemicals. The main goal of organic farming is to provide agricultural products, especially food, that are safe for the health of producers and consumers and do not damage the environment. Such a healthy lifestyle has become institutionalized internationally, requiring guarantees that agricultural products must have the attributes of being safe for consumption, high

nutritional content and environmentally friendly. These kinds of consumer preferences and economic development lead to product demand. World organic farming is increasing rapidly. Modern organic farming in Indonesia was introduced by the Bina Sarana Bakti Foundation (BSB), by developing organic vegetable farming in Bogor, West Java in 1984 ([Prawoto and Surono., 2005](#); [Sutanto, 2008](#)). In 2006, there were 23,605 organic farmers in Indonesia with an area of 41,431 ha, 0.09 percent of the total agricultural land in Indonesia ([IFOAM., 2008](#)).

3. Organic Farming in Practice

Implementing an organic farming system in Indonesia is easy and there are procedures. So that the organic farming system does not go in the wrong direction and has the wrong aim, we just have to follow the Indonesian national standards (INS) regarding organic farming systems starting from cultivation techniques to harvest. The SNI that is followed is SNI 6729:2016 concerning organic farming systems. This SNI was prepared with the aim of providing provisions regarding production and labeling requirements for organic products. The objectives of this SNI are: (a) Protecting consumers from manipulation and fraud that occurs in the market as well as false product claims; (b) Protect organic producers and products from fraud by other agricultural products claiming to be organic products; (c) Provide a guarantee that all stages of production, preparation, storage, transportation and marketing can be checked and comply with this standard; (d) Harmonization in the regulation of production systems, certification, identification and labeling of organic products; (e) Providing organic standards that apply nationally and are also recognized internationally for export and import purposes; (f) Developing and maintaining an organic farming system in Indonesia so that it can play a role in preserving the environment both locally and globally. Organic farming is based on minimal use of external input materials and does not use synthetic fertilizers and pesticides. Organic farming practices cannot guarantee that the products produced are completely free from residue due to general environmental pollution such as air, soil and water pollution, however several methods can be used to reduce environmental pollution. To maintain the integrity of organic agricultural products, organic agricultural operators, processors and retailers must refer to these standards. The main goal of organic farming is to optimize the productivity of the community of organisms in the soil, plants, animals and humans who depend on each other. The organic agricultural production system is based on specific and thorough production standards with the aim of creating an optimal and sustainable agroecosystem both socially, ecologically, economically and ethically. Terms such as biological and ecological are also used to describe organic systems more clearly. Requirements for organically produced agriculture are different from other

agricultural products, where production procedures are an inseparable part of the identification and labeling, as well as recognition of the organic product.

In the practice of organic farming systems it starts with land selection. Land must be free from heavy metal pollution or pesticides. Land used for conventional seasonal agricultural crops to be converted to organic agricultural planting must be converted first for a minimum of around 2 years, if initially used for plantation crops it must first be converted into organic land for a minimum of 3 years or both land used for non-organic planting must undergo conservation at least 1 year. During the land conversion period, it is not used for conventional agricultural cultivation or can be planted with natural plants. Next is the selection of seeds. It is certain that the seeds that will be planted are not genetically engineered seeds or genetically engineered hybrid seeds that require a lot of plant nutrients. Once the seeds are believed to be safe against pesticides and other substances, they can be used as organic farming seeds. Furthermore, production inputs in the form of fertilizers and pesticides must be truly organic, not artificial or synthetic agrochemicals. Organic fertilizers that can be used include compost, manure, green manure or artificial organic fertilizers such as NASA, ecoenzym, biosaka and the like. There are many organic pesticides and they are easy to find on the market. Table ?? shows how to make organic pesticides to eradicate pests (Hamka et al., 2018). Because it does not use synthetic agrochemical materials (artificial fertilizers and pesticides), the organic farming system is an agricultural cultivation activity that energy efficient and cost effective. For example, in Germany, Italy, Sweden and Switzerland it was found that organic farming uses less energy per hectare than conventional farming. Organic farming can save around 70% energy, while conventional farming only saves 30% (Gattinger et al., 2012). Organic farming systems really support sustainable agriculture where the future of agriculture will continue because natural resources and the environment are not damaged.

Irrigation is also an important factor for successful plant cultivation. This irrigation must also be considered to support organic farming, the water used to irrigate organic farming is not water that comes from upstream through plantation areas or non-organic agricultural fields/fields. If the water passes through this location, it must first be put into a pond so that it settles and is neutralized to make it safe for organic farming. During plant maintenance against pests and diseases as well as weeds that grow, their organicity must be maintained. Once the harvest is approaching, the organicity of the harvest is also maintained starting from the harvest tools, place or container for the harvest and transport to carry the harvest. For processing harvests, conventional products and organic products must also be separated. The two products should not be mixed in the same container and processing equipment.

4. Benefits of Organic Farming

There are many benefits of organic farming. The organic farming system is based on health, both food health, agroecosystem health and environmental health. Because the organic farming system uses non-chemical materials (fertilizers and pesticides), this organic farming system is believed to be healthy for the environment, the environment is not polluted, both the aquatic and terrestrial environments.

According to Charina et al. (2018), organic farming systems have seven advantages and priorities as follows: 1. Original. Organic farming systems rely more on the authenticity or originality of plant or animal cultivation systems by avoiding genetic engineering or the introduction of technology that is not in harmony with nature. Human cultivation intervention on plants or animals still follows natural rules that are harmonious, harmonious and balanced. 2. Rational. The organic farming system is based on rationality that the law of natural balance is God's most perfect creation. Rationality values must be used in balance with religious, ethical and aesthetic value systems, which place humans as noble creatures. 3. Global. Currently, organic farming systems have become a global issue and have received a serious response among the agricultural community, especially in developed countries where people are very aware that environmentally friendly agriculture is a determining factor in human health and environmental sustainability. 4. Safe. The organic farming system places the safety of agricultural products, both for human health and the environment, as the main consideration. 5. Neutral. The organic farming system does not create dependency or is neutral so it does not favor one part or actor in the agroecosystem system. 6. Internal. Organic farming systems always strive to utilize the potential of internal natural resources intensively. This means that the introduction of agricultural inputs from outside the agricultural ecosystem should be avoided wherever possible to reduce disharmony in agroecosystem cycles that have been going on for a long time and are under control. The organic farming system is not short-term oriented, but rather long-term considerations to ensure the sustainability of millions of lives, both for current and future generations. As a result, biodiversity will be maintained and will even increase. There are several benefits of organic farming, including (1) healthy food. Healthy food is desired by every creature, both human and animal. Healthy food will prevent the emergence of various types of diseases that no one expects. Healthy food will also provide healthy and intelligent offspring. This organic farming will provide healthy food, because the food is free from various pollutants, both pesticides and heavy metals. (2) The soil will remain fertile. In an organic farming system we always do not use chemicals. As a result, there is no pollution in the soil either by chemicals to eradicate pests and diseases or heavy metals from the inorganic fertilizers used. Soil fertility will be maintained and biodiversity will also

Table 4. Ingredients for Preparing Organic Pesticides (Hamka et al., 2018)

Item	Material	Procedur Preparation
Farmers		
Organic Pesticide	• Bontoari (castor leaves) 100 g • Srikaya leaves • 100 sheets • Gadung 2 kg	Gadung, serikaya leaves and bontoari are grated. The grated results are then mixed evenly. Then soaked in 15 liters of water and fermented for 24 hours. The fermentation results are then filtered and stored in a closed jerry can. For use on plants, dilution is carried out by adding 1 liter of fermented solution with 2 liters of water
Pesticides for borer pests stem	• Maja fruit • (matang) Mature • Lime stones	Maja fruit shell is split into two parts, then the contents are removed and kneaded until it becomes smooth. Then the contents of the maja fruit that have been mashed are put back into the maja fruit shell and filled with water until it is full. Next, the fermentation process is carried out by soaking for 4 days (until the contents of the maja fruit are black). Camphor is finely ground and mixed evenly into the fermented maja fruit mixture. Then the fragmentation process was carried out again for 1 night. For application, use a ratio of 240 ml of solution for every 12 liters of water (spray tank)

be maintained. (3) Water quality is also maintained. The use of agrochemical materials will cause residues to enter water bodies which will pollute aquatic habitats. (4) the air will also be maintained. The use of chemical fertilizers, for example urea, will cause nitrogen dioxide emissions which can pollute the air environment. (5) Recyclable. Organic farming products can be recycled naturally. According to Yuriansyah et al. (2020) excessive use of inorganic chemicals has negative impacts on land and plants.

In the midst of society There is concern about the high content of pesticide residues in agricultural products. It is necessary to develop alternative agricultural systems that are capable of producing quantity and quality of healthy products in a sustainable manner. One agricultural system that supports this concept is the organic farming system. The basic principles of organic farming are: (1) Keeping the ecosystem healthy, (2) Applying the principle of efficiency to the cultivation system, (3) Carrying out production activities with the concept of sustainable agriculture, (4) Producing pesticide-free products, and (6) Maintaining environmental sustainability.

5. Barriers to Implementing Organic Agriculture

Even though organic farming has various advantages by producing healthy food and being able to maintain a good environment and land sustainabiity, in its implementation there are still various obstacles to implementing organic farming, especially in Indonesia. The first obstacle is that there are still many farmers who do not understand organic farming. Farmers do not have adequate knowledge about organic farming and its prospects (Eneizan, 2017). In general, farmers in Indonesia are still traditional farmers

who have been passed down from generation to generation, and there are still few who develop themselves regarding plant cultivation, especially organic farming. Especially regarding organic farming, what is considered everyday farming is how to grow crops that can produce crops, without considering health and food safety, what is still the focus is cultivating crops that can produce crops and meet their daily needs. According to Ashari et al. (2017), there are several things that influence the success of adopting organic farming, namely (1) availability of information and knowledge, (2) economic and financial motives, (3) technical and management skills, (4) social considerations, (5) environmental concerns, (6) institutional environment, and (7) socio-economic and demographic background of farmers.

The second obstacle is that it is still difficult to sell organic products because consumers buy products that are relatively cheaper, while organic products are relatively more expensive (Kubrevi and Lasket., 2017) For this reason, government intervention is still needed, especially protecting the prices of organic products and selling organic products or providing organic outlets. In Indonesia, organic product outlets are still rarely found. As a result, the organic products produced experience marketing difficulties so that organic products do not sell, making farmers reluctant to develop organic cultivation. The results of a study by Mayrowani (2012) suggest that macro constraints in the development of organic agriculture are the market and climate conditions. From a marketing perspective, the consumer segment is still limited to the upper middle class, although demand from global markets such as America, Japan and European countries is increasing. However, to

be able to penetrate the global market, very strict certification is required in accordance with the standards set by each consumer country. The biggest obstacles faced by farmers in pursuing organic farming according to Kilcher (2007) are lack of knowledge, access to markets, the need for certification, agricultural inputs, and lack of organization. It was further stated that to overcome these obstacles, an accessible local certification scheme and harmonized standards, development of organic markets, trade relations which are also related to organic product certification are needed. Thus, it is hoped that the sustainability of organic farming businesses will continue to develop. One of the successes of developing organic farming businesses in Taiwan is farmers grouping and working together well, the use of mechanization, and the government's role in regulations that benefit farmers.

6. Conclusion

With increasing human awareness and welfare regarding healthy food, organic farming has good prospects and can be developed in the future, supported by the availability of land and easy provision of production inputs for organic farming and the richness of organic waste in Indonesia. National organic regulations and standards in Indonesia are also available. Implementation of organic farming should follow the regulation. For this reason, socialization about organic farming is needed at all levels of society, both for organic farming practitioners and for consumers of organic products. To make the implementation of organic farming a success in Indonesia, the role of the Government is highly expected, especially in protecting the prices of organic products and providing marketing networks. To convince the Indonesian and global people that the agricultural products produced are organic, it is necessary to have organic certification, both independent certification and group certification. The basis for certification is SNI 6729-2016. Institutionally, the development of organic agriculture in Indonesia is almost the same as existing conventional agriculture as it is today. Farmer institutions such as farmer groups, cooperatives, associations, or corporations are still very relevant for use in developing organic agriculture, both as a forum for learning and technological information, providing input, and marketing results. To motivate farmers to take up provision of organic farming, farmers should be made profitable by providing minimum price support for organic products by the Government.

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