Organic vegetable production in java – challenge for the chili growers

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Abstract. Indonesia nowadays is in the modernization era, whereas lifestyle in consuming food is changed. The Indonesian want their food in good quality and save to consume. It means that the food should be produced following the rules of organic farming and environmental friendly. Organic vegetable has been known in Java in Indonesia, otherwise the farming practices do not widely apply. The organic vegetable production in Java started in 1984. Since then, the organic vegetable production has been growing and the number of organic growers increase. The growth of organic farming is happened because the farming directly connects to the captive market. Income of such organic growers increase. However, mostly chili growers in Java are still conducting conventional farming. The farmers feel that the organic vegetable production is more complicated, expensive and of high risk. Farmers remain using pesticides even it is dangerous for their health and products. Chili markets in general do not differentiate between organic and non-organic one. Therefore, there are no incentives for the common organic chili farmers. However, the market for „Organic“-chilli is growing faster in urban regions in particular in some supermarkets there. Nevertheless, government supports are needed to accelerate the dissemination of organic technologies, solve the problems faced by farmers as well as supporting the marketing. In that way, the organic vegetable will increase the welfare of consumers and producers.

Key words: organic farming, chili cultivation, vegetable market in Java, vegetable quality

1. Introduction

Food safety, healthier eating, and a more active lifestyle are a growing issue of concern in today’s world. Consumers are becoming highly knowledgeable and interested in who, where, and when their food was produced. The Indonesian consumers are more concerned now about the food they eat than they were five years ago. The growing popularity of store chains such as Hypermart, Giant, Lottemart, and the increases in the amount of natural food line extension products, are indications of the shifting dynamics in consumer preferences in Indonesia. The food industries should take efforts to meet these demands. Food markets are constantly evolving, driven not only by changes in consumer preferences, but also, linkages between members of the food supply chains, prevailing policies, business environments and demographic trends. Changes in these preferences and perceptions may lessen the demand, reduce sales and potentially harm businesses.

To meet the demand and ensure food safety and quality in all of the food production in Indonesia, the organic vegetable production had been applied. To implement the organic vegetable production and good hygienic practice programs required some Standard Operational Procedures (SOP) which have some differences in each region and for each product. These methods are particularly important.
to the high value products of Indonesia such as fresh fruits and vegetables. The implementation of organic vegetable production could improve the production process, on practices and/or outcomes that are environmentally sustainable and socially acceptable. It is particularly to reduce the pesticide use and food borne disease. Since the mid-1980s, organic farming has become the focus of significant attention from policy-makers, consumers, environmentalists and farmers in Europe and state institutions have become increasingly involved in regulating and supporting the organic sector (Matthias, 2009).

The ASEAN Economic Community (AEC) 2015 is also other important reason for the Indonesian farming communities to improve the quality of horticultural products and having competitiveness in the ASEAN free market. In term of improving the quality, farmers should have product certification such as Indo GAP, ASEAN GAP, Global GAP, and ORGANIC. However, there are facts that most of farmers in Indonesia could not follow the SOP for these purposes.

2. Organic farming in Indonesia

There are several definitions of organic farming. One of them states that organic farming is a holistic system related to the biodiversity and life cycle of the soil biology activities. There are certification standards released by the agencies in term of agribusiness of organic farming including cultivation, harvest, post-harvest, processing and marketing (IFOAM, 2016). Organic farming also means such a production system that minimizes use of synthetic fertilizers, pesticides, accelerated growth materials and other additives. In order to maximize the level of production, there are several steps implemented in organic farming such as cropping pattern, yield, manure, waste from organic farming and paying attention to biological aspects of pest control to maintain soil fertility and productivity (National Standardization Agency, 2002). Three main objectives of organic farming include economic, social and ecology purposes. Some aspects in the economic purposes are low investment, high and stable productivity, high income and profit, using of local resources, and increase adding values. Other aspects such as free market, better working condition, food availability, local demand prioritization, local wisdom appreciation, high quality and safety of products are for social purposes. The last objective, ecology, include ecosystem balance, free for chemical pollutants, soil fertility, clean water, diversity of germplasm, and conservation. Based on this agency, organic is a label terminology, which states products have been produced in the organic production procedure and certified by the authority agencies. In practices, organic farming does not guarantee that products produce have been free from pesticides. It is because of the environmental pollution is happened in general. However, several ways to reduce the residues have been implemented to close to the real organic products as defined.

Organic farming in Indonesia had been developed since 1984 by the Non-Government Organization (NGO) called Bina Sarana Bakti (BSB) (Prawoto and Surono 2005). Organic agriculture land in Indonesia increased from 40,000 in 2003 to 74,034 ha in 2011, 113,638 in 2014, the share of organic agriculture land on the whole agricultural is 0.14% and in 2011 were 8,612 organic producers in Indonesia. Two crops started with organic production systems because the importance for export that is organic cocoa bean 1,321 ha and organic coffee 41,652 ha in 2011 81,522 in 2014, furthermore are produced in organic farms also tropical subtropical fruits 164 ha in 2011 and 808 in 2014, organic vegetable 146 ha in 2011 and 443 in 2014 (IOA 2013, IFOAM, 2016).

3. The development of organic vegetable production in java

The organic vegetable production in Java started in 1984 mainly initiated by the NGO’s. Since the markets of organic farming was developed, the organic vegetables were developed rapidly. The growth of organic vegetable production is happened because the farming directly connects to the captive market. Income of such organic farmers increase. However, mostly chili farmers in Java are still conducting conventional farming. The farmers feel that the organic vegetable production are more complicated, expensive and of high risk. Farmers remain using pesticides even it is dangerous for their health and products. Chili markets in general do not differentiate between organic and non-organic one. Therefore, there are no incentives for the common organic chili farmers. However, the market for „Organic”-chilli is growing faster in urban regions in particular in some supermarkets there. Based on that reason, it is necessary to study the history of organic vegetable production in Indonesia, particularly in Java, current condition of organic vegetable production in Java and how the chili growers nowadays face these challenges? Thus, the recommendation on the government supports will
be concluded to accelerate the dissemination of organic technologies, solve the problems faced by chili growers as well as support the market.

The important products that should be produced in organic ways are vegetables. Vegetables are consumed with and without cooking. It is important to produce the free pesticide vegetable products particularly that are consumed in raw materials. The organic farming for vegetables is necessary. Basically, all of vegetables could be produced in the organic ways. The leafy vegetables such as broccoli, spinach, water spinach, cabbage, and lettuce, and also some fruity vegetables such as chili, tomatoes, cucumber, chayote, cabbage, paprika, as well as tubers such as potato, carrot, shallot, onion, and bit are the example of products that can be produced as organic vegetables. Chili in Indonesia is very important, because of the high domestic demand. These vegetables are frequently related to the inflation rate in this country. Cultivate chili is a high-risk investment. To avoid the risk, farmers use chemical pesticides and fertilizers in the over dosages that in their opinions could improve productivity and attach pests and diseases. In that way, organic farming for chili production need to be implemented widely in Indonesia.

The development of organic vegetables mainly because of the change of Indonesian consumer lifestyle and increase awareness of the important of organic vegetables as healthy and safety food (Arsanti, 2016). Inawati(2011), also states that business of organic vegetables is developed fast and the areas of organic vegetables farming are also growing. The key actors of the organic vegetables in Indonesia are organic farmers and private sectors who managed the farming system and organized in the International Control System (ICS). Other key actors are processors, traders, exporters, training agencies, and certification agencies. There are eight certification agencies in Indonesia, namely Institute for Market Ecology (IMO), Control Union, National Association of Sustainable Agriculture of Australia (NASSA), Naturland, Ecocert, Guaranteed Organic Certification Agency (GOCA), Australian Certified Organic (ACO), and Certification of Environmental Standards (CERES). Meanwhile the national agencies that have been certified are Komita Akreditasi Nasional (KAN), Otoritas Kompeten Pangan Organik (OKPO) yang mengakui BIOCet, INOFICE, Sucofindo, LeSOS, Mutu Agung, PT. Persada dan LSO West Sumatra. In this direction, the awareness of consumers on healthy and safety food increase, organic farming particularly organic vegetables is very important and growing, and related stakeholders involved.

4. Current condition of chili growers in java

Based on above explanation, organic farming and organic vegetables are growing in Indonesia, however, there is a fact that the vegetable farmers particularly chiligrowers using chemical pesticides and fertilizers in high dosage to avoid the risk. On the other hand looking the whole vegetable production in Indonesia it is visible the high importance of chili in comparison to other vegetables produced (Fig 1). This is the reason why a transition to organic production should be discussed in particular for chili.

Java is one of the chili production centre in Indonesia, particularly West Java, East Java and Central Java.

![Figure 1. Harvested area of vegetable production in Indonesia (FAOSTAT 2016)](image-url)
The chili production areas in Java is more than 55% (about 174,003ha) from total chili production areas in Indonesia (DGH 2017). The total production of both red and small chili increases continuously in the period of 2005-2014 (Fig. 2 and 3).

![Figure 2. Production of Red Chilli, Java and Indonesia, 2005-2014]

Source: Central Statistic of MoA, 2017

![Figure 3. Production of Small Chilli, Java and Indonesia, 2005-2014]

Source: Central Statistic of MoA 2017

5. Constraints of quality chili production
Chili growers use pesticide since in the nursery. They use e.g. Furadan (50 kg/ha for seedling media and 15 kg/ha for tillage), Curacron (200 ml) and Antracol (400 gr/l) for 1 ha, two weeks after planting. Farmers also use manure (20 ton/ha), NPK Phonska (700 kg/ha) and ZA (300 kg/Ha) for the first fertilizing three weeks before planting. For the second fertilizing two weeks after planting, Subur Ijo (1 ton/ha), NPK Phonska (400 kg/ha) usually are applied. Farmers spray their plants intensively. Starting one week after planting with frequency once in four days, farmers use e.g. the mix liquid of Profenofos, Mankozeb, Leaf fertilizer and adhesive liquid. The dosage increases time by time from 200 l to 1000 l per ha from beginning to the end of planting time. These practices of chili cultivation are common and widely applied by farmers in Java. It does not consider effective in term of productivity, efficient in term of input use and environmental friendly.

Farmers use fertilizers and pesticides over dosage compare to the organic farming and even the recommended one. High use of fertilizers and pesticides is dangerous to the products produces as well as farmers who applied the chemical things. Farmers do not wear the appropriate clothes during spraying and even feel headache or stomached after spraying. Profenofos is one of brand of the
pesticides which contain organophosphate. As we know that organophosphate is the dangerous ingredients of pesticide that harmful the human.

6. Challenges of chili growers on organic vegetable production
In order to change the vegetable farming system und to start with producing of chili in a sustainable way and following the rules of organic farming should be considered:

- Improving of the soil quality by using of organic fertilizer
- Preparation of organic fertilizer by collection of biowaste and composting (Böhme and Le H. Anh 2016)
- Introducing an advanced crop rotation system also to reduce the development of soil born pest and diseases and to reduce dangerous erosions (Arsanti and Böhme 2011)
- To search for organic pesticides and growth stimulators

The challenges in transforming chemically-based to pesticide-free chili production in Java horticultural production areas have highlighted the value of integrative approaches through the participation of various stakeholders. Something that have to be faced and solves by chili growers in the organic era are: (1) How to diverse the plants not only planting chili but also other plants in multi-cropping system at the economic scale to avoid the risk and interfere the lifecycle of pest and disease? (2) How chili growers could deal with the market driven organic products and its key actors? (3) How the government policies could support the chilli grower in Java to develop the organic farming? (4) How are the consumer preferences on organic vegetable? (5) How is the certification schemes for organic vegetables production? Is that chili grower could deal with the organic certification scheme? (5) How far is the implementation of farmers field school on organic farming? (6) How far is the development of multi-stakeholders process on organic farming, market channel and value chains? (7) How could chili growers to expand the market opportunities? And, how could the chili growers continue learning and update new knowledge? If the chili growers could deal with all of those challenges, they could start to cultivate chili in organic way. And then they could penetrate the organic markets and run the business on organic.

In several cases, organic farming is relatively easy to adopt. For example in China, the willingness of farmers to adopt organic farming was about 36%. It is quite good, because farmers realized that organic farming is more benefiting to them and government support on that (Wanglin 2017). Organic farming has positive impact such as have higher positive matter, lower nutrient losses and lower energy requirements (Tuomisto 2012). The decisions of Irish farmers to convert to organic farming is by applying the theory of planned behavior to control for social influence and technical constraints (Doris 2013). In Africa, although economic concerns play a strong role, a significant number of farmers give high importance to moral and social factors in organic farming adoption (Naoufel 2011). The adoption of organic farming depends on the adopter groups. The factors that affect adoption play a different role for early, medium and late adopters, particularly with regard to farming intensity, age, information gathering as well as attitudes of the farmer. More specifically, early adopters were the youngest to adopt organic farming and their decisions were found to be less profit related compared to other groups. Late adoption is constrained by risk considerations, while environmental attitudes and social learning were identified to be important determinants for all adopter groups. In the European Union, organic farming is considered one of the most important rural development tools often connected to the socio-economic objectives of small-farm support and employment generation. The share of a region’s agricultural area under organic methods is positively associated with average farm size (Konstantinidis 2016). Farmers’ technical efficiency (TE) under conventional practices is a significant driver of the conversion to organic farming. In France, the probability of conversion depends on the technical efficiency on the farm size and type of production (Latruffe 2014). And, in Andalusia, there are several motives to adopt the organic farming, such as political issues and cultural roots of an innovative farming co-operative of both ex-labourers and small farmers (Luetchford 2011).

7. Conclusions
The changes of preferences of consumers nowadays into the organic food which are healthy and safety are the challenges of chili growers in Java. At the moment chili farmers in Java have not
enough motivation to change their conception and are still using the higher dosage of chemical fertilizers and pesticides to get high yield. The governances of the organic farming have been developed and grown faster in the last decade in Indonesia. But the lobby of organic standardisation and marketing organisations is still too low. By the supports from the government and willingness to learn and to apply of the chili growers on the organic farming practices and its value chains, they can manage and run their agribusiness in organic chili farming successfully (Doris 2011).

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