

Development of organic rice potentials as drivers of rural economy towards sustainable national agricultural development

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Abstract. The agriculture development is one of the determine factor of Indonesia economic development as an agrarian country. This study aims to increase farmers income and welfare, to support the development of a healthy lifestyle by consuming organic agriculture, and friendly agricultural development environment towards sustainable national agricultural development. Using descriptive study with a qualitative approach. The data will be collected using several methods, which include field observations, interviews, focus group discussions (FGD), Analysis data using interactive analysis, supply-demand analysis, and laboratory analysis. This research has resulted a model of empowerment of organic rice farmers in Klaten District called the "Downstream Upstream Balance Model" underlining the importance of realizing a production sector that is always based on the principles of organic farming and the market sector which is always built through the formation of a consumer mindset about life patterns healthy. The empowerment model of organic rice farmer is focused on mindset change in order to create higher product prices so as to provide more adequate benefits. Besides that, the empowerment model of organic rice farmers in Klaten Regency is also directed to maintain the continuity of supply and quality of products. As the conclusion is an empowerment model of organic rice farmers in Klaten District to maintain the continuity of supply and product quality was conducted, which is strategies for improving the quality of organic rice in Klaten District, and rice marketing strategies effective organic to increase sales of organic rice products in Klaten Regency. Keywords: rural economy, upstream-downstream, organic rice, sustainable agricultural development

1. Introduction

Agricultural development is one of the determinants of Indonesia's economic development as an agricultural country. In the past few decades agricultural products have been a mainstay of both the source of state income and the economy of the community. The agricultural sector has become a provider of employment for the community and at the same time as a main economic driver of rural communities. Therefore, the agricultural sector has a strategic function to advance the economy and improve people's welfare [1]. Agriculture is a major factor in economic development in developing countries and guarantees food security, poverty alleviation, and supports the preservation of the functions of natural resources that become the foundation for present and future generations [2].



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Sustainable agriculture is a production system that sustains environmental health, socio-economic justice of society (social and economic equity), and economic benefits (economic profitability) [3].

Along with increasing public knowledge about health and healthy lifestyle, people need agricultural products that are safe for consumption in the long term. This is an opportunity for farmers to earn better income by growing organic rice. On the other hand, this is followed by increasing public incomes that strengthens people's purchasing power. In addition, there is also an increase in public knowledge about health, especially healthy living based on healthy eating patterns by consuming organic agricultural products to avoid foods contaminated with chemicals. Organic farming is a technique of agricultural cultivation by reducing or avoiding the use of chemical substances such as fertilizers, pesticides, fungicides and synthetic chemical herbicides in order to produce safe and healthy products and create a balance and sustainability of the ecosystem [4].

Problems faced by farmers are a strategic problem in the context of accelerating the national economy because it involves the problems of most Indonesian people who live and have economic activities from the agricultural sector. Thus, research that promotes farmer empowerment and strengthening the rural economy is a strategic research and therefore research on the "Development of Organic Rice Potentials as Drivers of Rural Economy Towards Sustainable National Agricultural Development" has high significance and urgency to be carried out immediately. The aims to increase farmers' income and welfare, support the development of a healthy lifestyle of people by consuming organic agricultural products, and support the development of environmentally friendly agriculture towards agricultural development national sustainability.

2. Material and Methods

2.1. Research site

This research was carried out in the area of Klaten Regency, Central Java Province which is based on the consideration that in Klaten Regency there is agricultural land that can be developed as an organic farming area.

2.2. Data source

This research is a descriptive study using a qualitative approach. The data that will be collected in this study are primary data and secondary data. Primary data derived from informants which were determined purposively by the snowball method, and data collected through field observations. The informants consisted of representatives from various elements of stakeholders from government, private sector, associations and communities. In this case the government element consists of the Regional Development Planning Agency of the Klaten Regency, the Community and Village Empowerment Agency of the Klaten Regency, the Agriculture, Food Crops, Plantation and Forestry Service of the Klaten Regency. Secondary data will be in the form of documents, records and statistics relating to the development of organic rice in rural areas of Klaten Regency.

2.3. Data validation

In this study triangulation of sources have used [7]. [7] states that source triangulation is a method to obtain a higher degree of trust by comparing and checking back the degree of trust of an information obtained from one source through different information sources and checking data collected with a technique through different techniques. The method for obtaining data validity includes comparing what people say in public with what is done personally about the development of the potential of insightful organic rice

2.4. Data analysis

Data analysis in the study of the development of the potential of organic rice as a driver of the rural economy towards sustainable national agricultural development will use interactive analysis [10], supply-demand analysis, and laboratory analysis.

3. Results and Discussions

3.1. Identification of the Contribution of Organic Rice Production to the Economy of Farmer Communities and Regional Economic Development.

Agriculture in a broad sense includes all activities that involve the use of living things (including plants, animals, and microbes) for the benefit of humans. In a narrow sense, agriculture is also defined as the activity of utilizing a plot of land to cultivate certain types of plants, especially those that are seasonal. Agricultural businesses are named specifically for certain farming subjects.

Agriculture is the primary sector in the Indonesian economy. This means that agriculture is the main sector that accounts for almost half of the economy. Agricultural development that was quite successful was achieved by Indonesia in the 1970s to the 1980s which was marked by an increase in the growth of the GDP (Gross Domestic Product) of the agricultural sector by 3.2% per year. Then in 1984 rice self-sufficiency was achieved and succeeded in triggering economic growth in the countryside. However, rice self-sufficiency can only be maintained until 1993. The level of rice productivity in Indonesia is the highest from other countries in Southeast Asia and South Asia. Therefore, Indonesia has the advantage that rice is a substitute for imports.

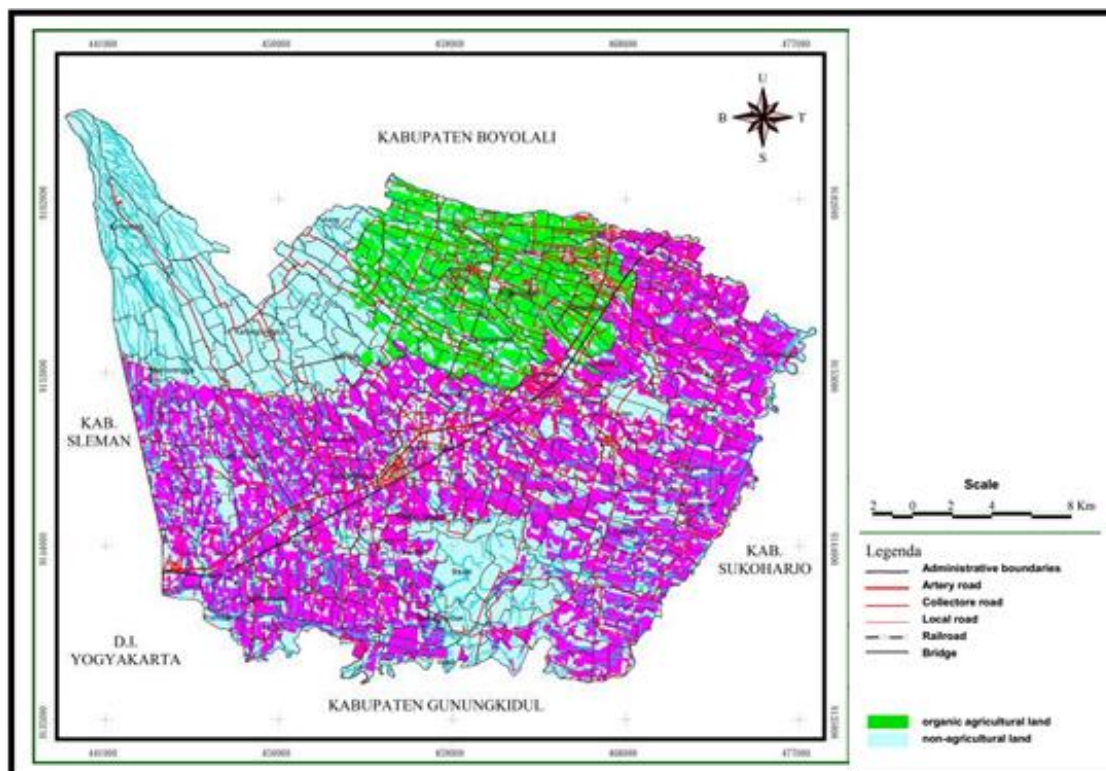


Figure 1 The Comparison between Organic Agriculture and Inorganic Agriculture

Klaten Regency has the condition of rice farming which is quite dominant and one of the centers of rice production in the Central Java region. In the last 5 years, from 2009 to 2013, Klaten always had a surplus of rice stock, with an average surplus of 60,833 tons per year. In 2012 the highest surplus reached 95,538 tons. And in 2014 to November, data while the surplus reached 100,000 tons. Thus, Klaten Regency is one of the rice barns in Central Java Province. Klaten Regency has launched Rojolele type of organic rice, black glutinous rice, and IR-64 in Glagahwangi Village, Polanharjo District. Organic rice planting in the 2014/2015 planting season in Polanharjo Subdistrict was carried out in Glagahwangi Village covering 25 hectares, Karanglo Village 25 hectares, and Sidowayah Village 25 hectares. This is a follow-up trial activity in Huma which produces 7 tons per hectare

3.2. Organic Rice Agricultural Distribution in Klaten Regency

Agricultural development is one of the determinants of Indonesia's economic development as an agrarian country. In the past few decades agricultural products have been a mainstay of both the source of state income and the economy of the community. The agricultural sector has become a provider of employment for the community and as the main economic driver of rural communities. Meanwhile, most Indonesians live in rural areas. Therefore, the agricultural sector has a strategic function to advance the economy and improve people's welfare [1]. The availability of rice products is a benchmark for food safety and security in Indonesia.

Ref. [8] demonstrated that organic farming has been growing rapidly in China since the 1990s, driven by increasing domestic and international demand for organic products. Quantification of environmental benefits and performance of organic agricultural production on a national scale helps develop agricultural production systems with sustainable results with minimal impact on the environment. Organic production data for 2013 were obtained from a national survey organized by the Chinese Certification and Accreditation Administration. Agricultural performance indicators and environmental impacts, economic (monetary) values of agricultural inputs, crop production, and environmental benefits are then measured and integrated to compare the performance of organic agriculture to conventional agriculture. In 2013, organically managed agricultural land accounted for around 0.97% of the nation's fertile land, covering 1,158 million ha [8].

While Ref. [9] stated that on organic production in Belgian Flanders has shown little growth since the late 1990s. For decades, competition between organic farming that was considered exclusive has hampered collaborative efforts for the growth of the organic agriculture and inorganic agriculture sectors. Various aspects that can facilitate collaboration are competitive discourses among agricultural stakeholders, and food market politics are very important to support the development of organic agriculture [9]. This was confirmed by Ref. [11] that consumer demand for organic products will continue grow up and support by food safety issues and increasing prosperity. Because of low yields, however, natural ecosystems may increasingly shift to agroecosystems to meet demand with consequences that are less well-known to the environment [11]. The same is expressed by [12] that agriculture stands as the foundation of modern society. Every change in social function must seriously consider how to guarantee people get proper food, both in terms of quantity and quality. The growth is a movement that aims to achieve radical changes in the metabolism of society, towards a more efficient, sustainable and friendly lifestyle [12].

3.3. Quality of organic rice produced by farmers in Klaten Regency

Various policies to increase rice production, such as: the construction of irrigation facilities, seed subsidies, fertilizers, and pesticides, subsidized farming credit, and farming institutional development have been pursued. Likewise, in the marketing of results, the government issued a policy on basic grain prices or the basic price of government purchases to protect farmers from falling prices below production costs. Meanwhile, import policy is carried out to meet domestic demand which continues to increase, and so that rice prices are affordable by most consumers. A very large and protective intervention has produced results, namely the achievement of rice self-sufficiency in 1984. However, self-sufficiency achieved is only a moment. In general, for more than three decades domestic rice production has not been able to cope the needs. In other words, Indonesia is almost always in deficit, so it still depends on imports.

From the socio-economic aspect, external opportunities that support efforts to increase rice production include: (i) increasing demand for rice is a market guarantee for rice farmers, (ii) a rice marketing system that is stable and efficient so that the percentage of marketing margins is quite small, and (iii) subsidizing production facilities (fertilizer and seeds) so as to reduce production costs. The three factors above are opportunities that can be utilized to increase the profits of rice farming and improve the competitiveness of rice farming. All of these opportunities can increase the motivation of farmers in growing rice.

3.4. Mechanisms and marketing networks of organic rice produced by farmers in Klaten Regency.

Organic rice farmers in Klaten Regency have tried to develop simple technology to realize the effectiveness and efficiency of work in agriculture. One farmer group member has attempted to make a weeding device. The tool is not only used for weeding rice fields, but also land planted by crops other than rice. Farmer groups in the region have had a comparative study visit from Bojonegoro city. Not only weeding machines, according to the plan will also be attempted the innovation of tractors that can move / walk quickly from house to field.

The general public response to organic rice is still lacking so far. Socialization from the Ministry of Agriculture regarding organic rice has been carried out since 2010. Although the initial socialization has been calculated since 2010, the socialization of the community is still lacking. As a result, the poor knowledge about organic rice of the society as the main factor.

Until now organic rice production is still low less than ideal production (6 tons / ha). The conditions that can produce high organic rice production are during normal conditions like rainfall condition is not too high. In addition, during the rainy season mushrooms are strongly attack rice plant.

Farmers usually make liquid smoke which liquid smoke is made from the burning of coconut shells and rice husks, the combustion is made without burning the fire. Liquid smoke is developed for mushrooms by spraying. The fungus is processed and developed and to facilitate development it is better to use a liquid instead of a solid one. Mushroom seeds from the solar.

Their goal of socializing organic rice is to campaign for farmers to live healthy. Today's society, when buying rice, tends to prefer rice free from lice. This is actually wrong, because rice with lice actually it proves that the rice has no chemistry. On the contrary, rice with no lices indicates that the rice has been using chemicals. However, farmers in the region use natural pesticides in order to expel rice pests, such as the planthopper pest control efforts. Natural pesticides are made from "empon-empon" (traditional pesticide). "Empon-empon" is made from gadung (*Dioscorea hispida* Dennst), turmeric (*Curcuma domestica*), temulawak (*Curcuma zanthorrhiza*) and ginger (*Zingiber officinale*). Natural pesticides will get better quality if added to cow urine, but will smell slightly.

3.5. Barriers to the upstream sector (improving product quality and empowering organic rice farmers) and the downstream sector (marketing of organic rice).

There are potential and opportunities in increasing rice production, there are also obstacles both from within the system (internal weaknesses) and from outside the system (external threats). Internally, existing biophysical weaknesses in increasing rice production include: (i) ongoing land conversion, (ii) rice productivity tends to stagnate, and (iii) increasingly limited production facilities. In addition to the decrease in planting area due to conversion, efforts to increase rice production in Indonesia were also faced with external threats in the form of (i) biotic and abiotic environmental stresses, (ii) high rice selling value for non-agriculture, and (iii) a shift from rice farming to other business.

Attack of pests and diseases of rice is a biotic stress which if not handled properly can cause crop failure. Likewise, the threat of flooding or drought can cause crop failure. The high sale value of land for non-agriculture is a temptation for farmers to sell their land, so that it is no longer used for rice production. Other businesses that are considered more promising, such as brick and tile manufacturing businesses in paddy fields, or other business and industrial businesses, make land use for rice crops narrower. Efforts to increase rice production are faced with socio-economic constraints, both internally (weaknesses) and externally (threats). Internal weaknesses include limited farmers' capital and a narrow scale of land tenure and increasingly expensive production facilities. Both of these factors cause them to be unable to apply advanced technology, so that productivity still has not reached its potential.

Narrow land tenure causes farming to be less efficient, and the income earned is still low, only able to meet basic needs, without being able to invest in productive businesses. External threats include the bargaining position of farmers in the trade of agricultural products is still weak, so that the price of grain at the farm level is volatile, cheap during the harvest season and expensive during the dry season; import policies that are not timely are often detrimental to farmers; and land conversion is not easily replaced by the opening of new rice fields, because the opening of new fields requires high costs.

In difficult state financial conditions, the more limited land that can be used as rice fields, and the increasingly limited water resources, it is almost impossible to open new fields with irrigation

infrastructure. All internal weaknesses and external threats mentioned above are serious obstacles to efforts to increase rice production in a sustainable manner.

3.6. Formulation of the Model of Empowerment of Organic Rice Farmers in Klaten Regency

Based on the exploration of the potential of organic rice and the identification of problems in the field, a draft model for the empowerment of organic rice farmers can be formulated by underlining the importance of maintaining the balance of upstream downstream. Therefore, the draft model that was tentatively compiled by the research team was named the upstream downstream balancing model. Upstream is the production sector, while downstream is the market sector. The production sector includes some of the main components of rice fields for organic rice, irrigation systems for organic rice farming, fertilizer applications or organic rice fertilizers, application of pest control (pesticides and insecticides), and farmer human resources. In the downstream sector there is a market (consumer) and marketing which includes techniques for promotion and sale of organic rice farming.

In terms of the facts about downstream upstream, currently with promotional conditions regarding the health of organic rice consumption is still limited but it turns out that consumer demand for organic rice production is quite large, even suppliers (farmers) cannot meet market demand quota. Therefore, a strategy is needed to empower farmers so that organic rice production can meet increasing market demand. In this case, it is necessary to increase the motivation and willingness of farmers to change the agricultural system applied from conventional farming systems to organic farming systems. In addition, efforts are needed to change the mindset, change the motivation, initiate an incentive system, strengthen networks from upstream to downstream in a formal form, including the need for support from all relevant parties (stakeholders), protection against fraudulent parties who are not responsible for claiming organic whereas actually not organic.

In addition, there is also a need for protection of rights or trademarks, testing the quality of organic rice products with licenses from authorized institutions, support for environmentally friendly and organic-based technology, as well as detection indicators of key indicators such as water, soil, fertilizer and pest control, seeds which are pest resistant, environmentally friendly equipment, seed planting systems methods, diversification of varieties to break pest chains, rice processing that do not use bleach and fragrance, and packaging that resists lice.

4. Conclusions

In this research we know that the lack of knowledge of organic rice of the society is need to socialize. Moreover, an empowerment model of organic rice farmers in Klaten District to maintain the continuity of supply and product quality was conducted which is strategies for improving the quality of organic rice in Klaten District, and rice marketing strategies effective organic to increase sales of organic rice products in Klaten Regency

References

- [1] Priyono K D 2010 Pembangunan pertanian berkelanjutan di daerah rawan longsor lahan: Studi kasus di Pegunungan Menoreh Kabupaten Kulonprogo DIY, <http://geo.fis.unesa.ac.id/berkas/naskah/kuswaji.pdf>
- [2] Ghimire A 2002 A Review on organic farming for sustainable agriculture <http://www.forestrynepal.org/images/Organic/Farming/for/Sustainable/Agriculture.pdf>
- [3] ASI (Agricultural Sustainability Institute) 2013 What is sustainable agriculture? (UC Davis: Sustainable Agriculture Research and Programs)
- [4] Sudirja R. 2008 Pembangunan pertanian berkelanjutan berbasis system pertanian organik <http://pustaka.unpad.ac.id>
- [5] Hermansah T 2007 Ekonomi pedesaan, dinamika sumber daya alam dalam pandangan reforma agrarian di Indonesia Konpernas PERHEPI Solo 3-5 Agustus 2007
- [6] Jarnanto A 2010 Pertanian berkelanjutan <http://tanimulya.blog.com/2010/06/13/pertanian-berkelanjutan/>
- [7] Moleong L J 2000 Metodologi Penelitian Kualitatif (Bandung: Remadja Karya)

- [8] Meng F, Qiao Y, Wu W, Smith P and Scott S 2016 Environmental impacts and production performances of organic agriculture in China: A monetary valuation *Journal of Environmental Management* 188 49-57
- [9] De Cock L, Dessein J and de Krom M P 2016 Understanding the development of organic agriculture in Flanders (Belgium): A discourse analytical approach *Wageningen Journal of Life Sciences* 79 1-10
- [10] Miles M B and Huberman A M 1984 *Qualitative Data Analysis: A Sourcebook of New Methods*. (London: Sage Publications)
- [11] Lorenz K R L 2016 Chapter Three - Environmental Impact of Organic Agriculture *Journal Advances in Agronomy* 139 99-152
- [12] Tiziano G 2017 Agriculture and degrowth: State of the art and assessment of organic and biotech-based agriculture from a degrowth perspective *Journal of Cleaner Production* 197 1823-1839

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