Implementation of organic farming system and consumer satisfaction

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Abstract. The research objectives are: (1) to analyse the implementation of organic farming of Boyolali farmers. (2) to find out consumer satisfaction level of organic rice in Surakarta and Boyolali. The research location was determined purposively in Dlingo Village, Boyolali and Surakarta. This research used qualitative method with interactive data analysis model of Miles and Huberman and descriptive analysis. The research resulted in the application of organic farming systems by the farmers in the following ways: (a) the selection of locations not contaminated with chemicals, (b) appropriate local types of rice plant, (c) programming of appropriate crop rotation, (d) processing soil with tools not contaminated with chemicals, (e) intermittent irrigation, (f) use of fermented compost, (g) control of pests with natural enemies and vegetable pesticides, (h) appropriate post-harvest handling, and (i) organic rice marketed with the packaging that attaches the SNI organik logo. The results of research on the level of consumer satisfaction with organic rice are: (a) the quality of the organic rice is 90.41% meaning that the consumers are satisfied; (b) the availability of the organic rice is 73% meaning that the consumers are satisfied; and (c) the price of the organic rice is 60% meaning that the consumers are dissatisfied.

1. Introduction
Food is an important and strategic commodity because it is an essential human need that must be fulfilled at all times. Food needs need to be made available in sufficient quantities, adequate quality, safe for consumption and easily obtainable at affordable prices for all levels of society. The awareness of hazards caused by the use of synthetic chemicals in agriculture makes organic farming attract the attention of both the producer and consumer levels. The Organic Standard Operational Procedure (SPO) in Indonesia refers to the best operational methods that can be carried out by the actors of organic rice production in accordance with the Indonesian National Standard (SNI) 01-6729-2016 concerning Organic Food System [1]. This standard is a revision of Indonesian National Standard 6729: 2013. This Indonesian National Standard adapts all material in the CAC / GL 32 - 1999 standard document, Guidelines for the production, processing, labelling and marketing of modified organically produced foods in accordance with Indonesian conditions [2]. For the application of good organic rice cultivation and in accordance with the provisions of the Indonesian National Standard in order to produce quality, safe, and consumable organic food, provisions concerning Good Agriculture Practices (GAP-organic) are provided which explain how to cultivate organic crops, Good Handling Practices
(GHP - organic) guidelines for good post-harvest handling methods of organic farming and Good Manufacturing Practices (GMP-organic), a good guideline for processing organic agricultural products. The organic market is growing rapidly in both international and domestic markets. The world market for organic products increases by 20% per year. Based on 2015 Statistics and Organic Trends published by the Research Institute of Organic Agriculture (FIBL) and the International Federation of Organic Agriculture Movements (IFOAM) [3], Boyolali Regency is one of the regencies in Central Java which has the second largest organic land which is 318.45 ha. One of them is APPOLI (Boyolali Organic Rice Farmers Alliance) with 15 organic farmer groups that have developed certified organic farming. The sustainability of organic groups must be supported by good practices of organic farming, so that the rice production of farmer groups is able to satisfy consumers. The optimization of the application of organic farming systems by the farmers can be seen from the level of consumer satisfaction of organic agricultural products, whether consumers feel satisfied or vice versa. Even, this assessment cannot be separated from consumer perceptions. Perception also makes consumers know about what are the advantages, weaknesses, opportunities or threats to the product. It shows that Consumer Perception has a significant influence on the purchase decision of a product / service [4]. Perception not only is important in the information processing stage but also plays a role in post-product consumption that is when consumers evaluate their purchasing decisions. Consumer perceptions about organic products vary greatly. Therefore, organic farmers must pay attention to consumers’ needs and tastes for the sustainability of marketing of organic rice because currently market forces are in the hands of buyers. Inevitably, organic farmers must guarantee the quality of their products so that they can meet the demand and needs of the consumers and customer satisfaction. Demands for various attributes such as product quality, product design, and product benefits for consumers must be fulfilled by organic rice producers. The problem of developing organic farming in Boyolali Regency is due to the absence of information between producers and consumers. The information on consumer behaviour and organic farming practices is important to ensure the sustainability of organic farming development. Therefore, this research aimed to: (1) analyse the application of organic farming systems, (2) find out the level of perception of consumers of organic rice.

2. Methods
The research location was determined purposively that is the organic farming implementation system was applied to the farmers of the Boyolali Organic Rice Farmers Alliance (APPOLI) in Boyolali Regency, Central Java. This research used qualitative approach. The data were collected using observation, interviews and documentation. The data were then analysed using "Miles and Huberman Interactive Analysis Models" and descriptive analyses. The interactive analysis model includes: Data collection, data reduction, data display and verification/conclusion drawing [5]. The objectivity test of the research data was carried out using the source triangulation and informant review techniques. The research on the consumer satisfaction in consuming organic rice was carried out on the organic rice consumers in Surakarta and Boyolali with 30 respondents selected purposively. The data were then analysed using descriptive analysis method.

3. Results and Discussion

3.1. Application of organic farming systems.
3.1.1. Selection of land
The location of organic agricultural land according to the provisions of SNI 6729 of 2016 is the land with a slope of less than 45%. The suitability of the land chosen for the development of organic rice from APPOLI farmers has been in accordance with the rules of SNI so that it has good potential for the development of organic rice. The location of the land was in Wates Village, SimoSubdistrict of 9.35 ha with a slope of <10%, in the Catur Village, Sambi District, covering an area of 17.77 ha, a slope of less than 15% and Glonggong Village, NogosariSubdistrict with a slope of <10%.
3.1.2. Land preparation.
To prevent the contamination of chemicals according to the direction of BSN (2016), the farmer group must create a buffer zone with a width of about 2 meters to limit the land of non-organic farmers [1]. From this provision in the three villages, APPOLI's development of organic farming has not met the requirements. The buffer zone that has been made by the farmers is 0.6 meters wide with grass planted. To clear agricultural land from the contamination of chemicals derived from chemical fertilizers and pesticides, all 122 farmers in the research location had converted the land for 2 years before certification in accordance with the rules in BSN in 2016. For land processing in accordance with SOP, the farmers must use special tools used only for organic farming. However, all the farmers have not been able to do it according to SOP. They used cleaned tools with clean water before used.

3.1.3. Watering.
The application of SOP for organic rice irrigation systems is very important to be implemented by APPOLI farmers as a form of their compliance with the rules established by the SOP of APPOLI organic rice irrigation system when the plant is at the age of 8 days and 9 to 10 days after the plant is inundated for 24 hours before the water is discharged. At the age 18, 19 to 20 days, the rice is re-inundated. After that, drying is done until the flowering plants. When the flowering plants are re-inundated and after the rice plants are ripe, they are re-dried until before harvest. In fact, only 36 farmers (29.5%) had followed the rules of SOP. Others always inundated their agricultural land until the rice plants were flowering before they were drained. According to BSN policy, the Irrigation for organic rice plants must be economical. The irrigation system of rice plants showed that with dry wet irrigation method there was a saving of 55.03% [6].

3.1.4. Production Process.
(a) In using organic rice according to the provisions of BSN, farmers may not use the seeds derived from genetically modified products (GMOs). As many as 122 farmers (100%) in the research area did not use GMO seeds. They used the seeds from the selected farmers' own land crops. The selected types of rice were the local species i.e. "Pandan Wangi", "MerahSlegreng" and "HitamCempo". (b) The SOP for planting is that the age of the seeds used is 18-20 days after planting, with a spacing of 25x25 cm. However, only 36 farmers (29.5%) followed the SOP. Others used the seeds at the age of >20 days with planting spacing of <25 cm. (c) The SOP for fertilization on organic farming using manure and fermented agricultural waste is at a dose of 5 tons per hectare, but only 36 farmers (29.5%) followed it. Others used unfermented manure. The application of cow manure bokashi fertilizer with doses ranging from 5-7.5 tons ha gives a better influence on the growth and production of rice plants [7]. (d) The SOP for controlling plant disturbing organisms (OPT) prioritize preventive measures by rotating crops to cut the cycle of pests and diseases and using plant-based pesticides. (e) The SOP for weed cleaning and soil loosening was carried out using a traditional tool "gosrok". A total of 122 farmers (100%) farmers have followed the SOP of fertilization and weed control methods.

3.1.5. Post-harvest
The SOPs in the post-harvest are as follows: (a) Harvesting or collection of agricultural products is carried out based on visual appearance if 90% to 95% of the rice grain is yellow or golden yellow. This is in accordance with the research of [8] that the determination of harvest as a critical moment in the harvest process is determined visually. Cutting the rice plants with sickles is done by down cutting because the farmers do the threshing with "thresher pedal". (b) Rice drying by drying method is the process of drying wet grain by utilizing the sun heat until the grain reaches the moisture content of 12-14%. (c) Storage moisture content to obtain premium quality of rice in the milling process grain moisture content ranges from 12% to 14%.

The temperature in the paddy grain storage can be used to improve the quality of milled rice and the yield of milled rice and the percentage of head rice [9]. The storage of organic products using group warehouses is always cleaned to be free of pests and not contaminated with chemicals. In storing organic products, the farmer must do good recording and separate between organic and non-organic rice. (d) Organic paddy grain milling was carried out on a special milling machine which is
not used for milling non-organic grain. Milling workers have been trained and worked by prioritizing work safety. 122 organic farmers (100%) have implemented the SOP for post-harvest.

3.1.6. Packaging and labelling.
Packaging is a product container that includes the physical appearance of the container including design, colour, labelling, shape, and materials used [10]. Packaging and labelling were not carried out by each farmer, but were carried out by the trained personnel in special places managed by APPOLI. The SOPs of packaging and labelling are as follows: (a). Prior to packaging, the rice must be sorted first to separate it into various quality fractions based on the characteristics: physical (water content, shape, size, specific gravity, texture, colour and foreign matter / dirt), chemical (material composition, odour and rancidity) and biological (type and amount of damage by insects). (b). Packaging rice used plastic with a thickness of 0.8 mm. (g) Organic rice marketed by farmer groups was packaged and had Organik Indonesia logo on it, which is a circular symbol that reads Organik Indonesia. Packaging with good quality material tends to be the choice of consumers [11].

3.2. Level of consumer satisfaction with organic rice.
The level of consumer satisfaction research shows high or low consumer satisfaction with organic rice. This consumer satisfaction research is reviewed from three aspects, namely (1) quality of rice, (2) availability of rice, and (3) price of rice. To be clearer, the average score achieved can be seen in table 1.

| No. | Parameters        | Scores | Categories   |
|-----|-------------------|--------|--------------|
| 1.  | Quality of rice   |        |              |
|     | a. Taste          | 100%   | Satisfied    |
|     | b. Colours        | 100%   | Satisfied    |
|     | c. Aroma          | 100%   | Satisfied    |
|     | d. Composition    | 66.6%  | Satisfied    |
|     | e. Efficacy       | 93.3%  | Satisfied    |
|     | f. Hygiene        | 80%    | Satisfied    |
|     | g. Legality       | 93%    | Very satisfied |
|     |                   | Sub Total | 90.41%       |
| 2.  | Availability of rice |        | Satisfied    |
|     |                   | Sub Total | 73%          |
| 3.  | Price             | 60%    | Less satisfied |
|     |                   | Sub Total | 60%          |

The results of the research are as follows: (1) Quality of rice, the consumers interviewed were satisfied with an average score of 90.41%. The aspects assessed include: (a) Taste, 100% of the consumers consider organic rice to be more tasteful and fluffier and not easily spoilt. (b) Colour, 100% of the consumers considered organic rice to be more typical white and bright. (c) Aroma, the consumers considered organic rice to be more fragrant. (d) Nutrient composition contained, 66.6% of the consumers was satisfied while 33.4% of them was not. They considered rice from organic rice plant to be easily digested by the body and relatively safe for consumption. (e) Efficacy, 93.3% of the consumers was satisfied and 6.7% was dissatisfied. They considered organic rice to be beneficial to the body. (f) Hygiene, 80% of the consumers was satisfied and 20% was dissatisfied. They considered that the hygiene was still lacking because sometimes there was still residual rice husk. (g) Legality, 93% of the consumers was satisfied and 7% was dissatisfied. They considered that the existence of the SNI organik logo attached to the packaging shows the guaranteed quality of the organic rice. The
image of the product has a positive and significant effect on perceived quality and performance expectation at the evaluation stage. In addition, the purchase satisfaction is influenced by the image of the product [12].

(2). Availability of rice, 73% of consumers were satisfied and 27% were dissatisfied. They considered that the availability of rice was still not satisfactory because sometimes it is not available when consumers need it. (3) Price, 60% of consumers thought that the price of organic rice was still high even though they did not mind it. The consumers perceived that there is a positive relationship between price and quality of a product. Therefore, they will compare one product with another. After that, they make the decision to buy a particular product [13].

4. Conclusion
The results of this research indicate the application of organic farming systems by the farmers in the following ways: (a) the selection of locations not contaminated with chemicals, (b) appropriate local types of rice plant, (c) programming of appropriate crop rotation, (d) processing soil with tools not contaminated with chemicals, (e) intermitten irrigation, (f) use of fermented compost, (g) control of pests with natural enemies and vegetable pesticides, (h) appropriate post-harvest handling, and (i) organic rice marketed with the packaging that attaches the SNI organic logo. The results of research on the level of consumer satisfaction with organic rice are: (a) the quality of the organic rice is 90.41% meaning that the consumers are satisfied; (b) the availability of the organic rice is 73% meaning that the consumers are satisfied; and (c) the price of the organic rice is 60% meaning that the consumers are dissatisfied.

References
[1] National Standardization Agency (BSN). 2016. Indonesian National Standard (SNI) 01-6729-2016 about Organic Food System. Jakarta
[2] National Standardization Agency (BSN). 2010. Indonesian National Standard (SNI) 01-67292010. Organic Food System. Jakarta.
[3] AOI. 2015. Indonesian Organic Farming Statistic (SPOI). Bogor: Indonesian Organization Alliance (AOI).
[4] Taroreh, O., R.J. Jorie., R. Wenas. 2015. Pengaruh Persepsi Konsumen Dan Kepercayaan Terhadap Penggunaan Jasa Asuransi Pada Asuransi Jasindo Manado (The Effect of Consumer Perception and Trust in the Use of Insurance Services at Jasindo Manado Insurance). Jurnal Emba. Vol. 3 No. 3 Sept. 2015, Pg. 312-321
[5] Milles, M.B. and Huberman, M.A. 1984. Qualitative Data Analysis. London: Sage Publication
[6] Adriati Y. 2008. Kajian beberapa metode system pemberian air irigasi padi sawah (A study of several methods of providing irrigation systems for paddy rice.). Pekan Baru. Universitas Islam Riau
[7] Tufaila M., Yusrina, Alam S. 2014. Pengaruh Pupuk Bokashi Kotoran SapiTerhadap Pertumbuhan Padi Sawah pada Ultisol Pausu Jaya Kecamatan Konda, Konawe Selatan (The Effect of Cow Manure Bokashi Fertilizer on Paddy Rice Growth and Production in UltisolPusu Jaya Konda District, South Konawe). Jurnal Agroteknos, March 2014. Vol. 4 No. 1. pg 18-25
[8] Kobarsih, M. and N.Siswanto. 2015. Penanganan Susut Panen dan Pasca Panen Padi Kaitannya dengan Anomali Iklim di Wilayah Daerah Istimewa Yogyakarta (Coping with Harvest and Post-Harvest Rice Shrinkage Related to Climate Anomalies in the Special Region of Yogyakarta). PlantaTropika Journal of Agro Science Vol. 3 No. 2. pg. 101-106
[9] Millati, T., Y. Pranoto, N. Bintoro, T. Utami. 2017. Pengaruh Suhu Penyimpanan pada Gabah Basah yang Baru Dipanen terhadap Perubahan Mutu Fisik Beras Giling (The Effect of Storage
Temperature on Newly Harvested Wet Paddy Grain to Changes in Physical Quality of Milled Rice), *AGRITECH*, Vol. 37, No. 4, November 2017, pg. 477-485

[10] Arens. 1996. Contemporary advertising. United States of America: Irwin.
[11] Danger, E.P. 1987. Selecting colour for packaging. England: Gower Technical Press.
[12] Yu, H. J. & Kincade, D. H. 2001. Effects of product image at three stages of the consumer decision process for apparel products: alternative evaluation, purchase and post-purchase. *Journal of Fashion Marketing and Management*, Vol. 5 Iss: 1 pg. 29 – 43.
[13] Akshay, R.K. 1989. The Effect of Price, Brand Name, and Store Name on Buyers Perception of Product Quality: An Integrative Review. *Journal of Marketing Research*. Vol. 26, pg. 351-357.