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1.	Submission Acknowledgment	March 24, 2019	Attachment 1
2.	Editor Decesion (First Review)	October 26, 2019	Attachment 2
3.	Revision submit	November 18, 2019	Attachment 3
4.	Editor Decesion (Second Review)	February 3, 2020	Attachment 4
5.	Revision submit	Februari 13, 2020	Attachment 5
6.	Editor Decesion (Third Review)	Mei 29, 2020	Attachment 6
7.	Revision submit	Juni 3, 2020	Attachment 7
8.	Editor Decesion (Accepted to submission)	Juni 17, 2020	Attachment 8
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10.	Copyediting Review Acknowledgment	Agustus 12, 2020	Attachment 10
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The Correspondence Process is presented as follows

I. Attachment 1: Submission Acknowledgment, Maret 24, 2019

[AGRARIS] Submission Acknowledgement

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The Stability of Supply and Rice Price in Sukoharjo Regency

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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply stability and market integration. The study uses a survey method. The study was conducted in Tawang Sari and Mojolaban Districts and involving 140 respondents. Simple random sampling method was used to determine the sample number of farmers among 140 respondents. Data were analyzed by integration and Co variance analysis. The study results showed that paddy productivity was 9,743 tons/ha and 8,980 tons/ha for Tawang Sari and Mojolaban Districts, respectively. The stability of prices and supply for grain and rice is occurred in Tawang Sari and Mojolaban Districts. The supply and price of paddy and rice were in stable condition. Market integration of paddy and rice is occurred between Tawang Sari and Mojolaban District for C4 and Bramo varieties and there was no integration for IR64 varieties.

Key words: market integration, rice, price, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan beras dan integrasi pasar. Penelitian menggunakan metode survey. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban dengan jumlah responden 140. *Simple random sampling* dilakukan untuk menentukan sampel petani. Data dianalisis dengan analisis integrasi pasar dan Co variance.

Hasil penelitian menunjukkan bahwa produktivitas padi 9,743 ton/ha dan 8,980 ton/ha untuk Kecamatan Tawang Sari dan Mojolaban. Stabilitas harga padi dan beras dan stabilitas pasokan padi dan beras terjadi di Kecamatan Tawang Sari dan Mojolaban. Pasokan padi dan beras serta harga padi dan beras berada pada kondisi stabil. Integrasi pasar padi dan beras terjadi antara Kecamatan Tawang Sari dan Kecamatan Mojolaban untuk padi dan beras varietas C4 dan Bramo dan tidak ada integrasi untuk padi varietas IR64.

Kata kunci : beras, harga, intergrasi pasar, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Rice is a strategic commodity in Indonesia. This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005 in Widadi & Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the market structure (market integration), supply, demand, and the price stability of both grain and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, so that market integration and supply stability will occur.

Market integration is an attachment or integration between markets. Two products on the market will be said to be integrated if there are trade transactions between these products. Prices in the non-local market are similar to prices in the local market added with transportation costs and other transfer costs as an effort to transfer products between these two markets (Irawan and Roesmayanti, 2007).

Based on the above background, the formulation of the problem is how the conditions of rice supply and the integration of rice market in the study area. While this study aims to analyze the rice supply in the study area and analyze the integration of the rice market in the study area.

RESEARCH METHOD

The analysis of Stability of Rice Supply and Price in Sukoharjo Regency, Central Java, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Survey was conducted to determine farmer's household conditions, especially the rice farming of the sample. The study location was determined based on the potential of rice production i.e. Tawang Sari and Mojolaban Districts. *Simple random*

sampling method was used to determine the number of sample farmers. In this study, the number of sample farmers was determined based on their memberships in the consolidation of rice fields. The number of sample farmers in Dalangan village, Tawangasasi is 80 farmers, while in Dukuh Village, Mojolaban is 60 farmers, thus the total number is 140 farmers.

The analytical methods used are the cointegration test (Kusumaningsih, 2015) and descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is Variance analysis. Fluctuations of food price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 10%.

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rainfed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%).

Respondent's Identity

Respondents in this study are consisted of 140 farmers with an average land area of 0.438 ha. Respondents are farmers in their productive age (77.14%) with average age of 54.14 years and average farming of 22.94 years. A condition that illustrates that agriculture still becomes a sector of main livelihood because 70% of respondents are farmers. 16.43% are farm workers, in other words 86.43% of respondents still depend on the agricultural sector, especially food crops. Of the 140 respondents, it turned out that 49% of them had graduated from high school. It is a good level of education for a farmer.

Rice Farming Results

The production and income generated of rice farming in Dalangan Village of Tawang Sari District turned out to be greater than rice production in Dukuh Village of Mojolaban District. The difference in production in these two regions was due to differences in business management where farmers in Dalangan Village, Tawang Sari District were joined in the land consolidation institutional, while farmers in Dukuh Village, Mojolaban District were not joined in the land consolidation institution.

Table 1. Rice Farming Analysis in Tawang Sari and Mojolaban Districts

No.	Description	Dalangan Village Tawang Sari District		Dukuh Village Mojolaban District	
		Total	IDR/ha/season	Total	IDR/ha/season
I	Fixed costs				
	- Depreciation		143,936.72		135,551.70
	- Irrigation		84,564.49		347,739.29
	- Land rent		1,046,679.00		1,334,272
	- Tax		153,043.80		31,505.53
	Variable costs				
	- Seed	42.82	453,128.01	40.31	402,116.40
	- Urea fertilizer	190.81	362,536.10	170.89	333,872.10
	- SP3 fertilizer	163.74	344,429.70	158.59	322,977.39
	- NPK fertilizer	215.08	510,084.20	218.90	459,398.75
	- Manure	133.42	76,792.59	89.56	54,098.12
	- Herbicide		27,071.46		50,076.96
	- Pesticides		622,405.00		550,452.10
	- Labor	50,09	3,734,805.00	52,98	3,708,261.18
	Total expenditure		7,559,476.66		7,730,321.56
II	Revenue	9,743.90	39,123,122.38	8,980.33	36,134,596.93
	Grain Price per kg :				
	- IDR 4,015.14/kg for TW				
	- IDR 4,023.75/kg for MJ				
III	Income		31,563,645.34		28,404,275.37

Note :

- TW : Tawang Sari
- MJ : Mojolaban

From the production generated by Tawang Sari Village and Dukuh Village, there is a difference in productivity i.e. 9,743.90 kg/ha and 8,980.33 kg/ha, respectively, while paddy productivity in Sukoharjo is 7,208 kg/ha. The satisfactory production of Tawang Sari Village is highly related with the role of consolidated land institution, technology and human resources where on-farm agribusiness activities

have been working well. It is relation to Kasryno (2001) and Suwanto (2012) that increasing paddy production as new technology adopted by farmer, land usage and efficiency.

The difference is not merely found in the aspect of production, but also in price and income i.e. there is difference in operational costs of IDR 170,844.9,-/ha and difference in production of 763.6 kg/ha/season or 2.29 tons/ha/year. While incomes from Dalangan Village and Dukuh Village are IDR 31,563,645.34/ha/season and IDR 28,404,275.37/ha/season, respectively. If it is observed, there is a difference in income of IDR 3,159,369.97/ha/season. The land tenure in Dalangan Village - Tawang Sari is 0,45 ha and 0,416 ha for Dukuh Village - Mojolaban. Thus the income generated based on the land tenure is IDR 9,018,184.38/month/ha or IDR 4,058,182.97/month/0,45ha and IDR 8,115,507.25/season/ha or IDR 3,946.30/month/ha or IDR 33,376,051/month/0,416ha and there is a difference of IDR 33,159,369.97/season/ha. The difference in production costs between the two regions is due to seed extraction, planting, and harvesting activities where groups of farmers who are members of institutions can save operational costs through these activities. This is happened because institutional management has used equipment for planting and harvesting so that in order to save costs as well as hatchery, the tray has been used which does not require seed extraction costs.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

a. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand

of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113,48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by BPS. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 2.

Table 2. Values of Production, Consumption and Stability of Rice Supply in the Study Areas

Description Districts	Rice Production (kg)		Rice Consumption (kg)		Stability (CV)
	2016	2017	2016	2017	
Tawang Sari	19,266,277.41	20,148,000.95	5,403,577.16	5,449,423.08	3.16
Mojolaban	28,073,449.95	29,359,000.18	10,562,264.48	10,649,076.68	3.16
Sukoharjo	234,983,259.00	245,736,000.89	98,070,210.36	98,886,131.56	3.16

Description:

CV = Coefficient Variance

The amount of rice produced at the study area location shows its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of study location the rice supply is stable. This condition is also supported by the small value of the coefficient variance, which is 3.16% for each region, meaning that there is no fluctuations at all. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional demands and it is also possible to have distribution outside the region as presented in the supply chain.

b. Price Stability

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data is approached with prices at each harvest season, while the rice price can be approached every month.

Table 3. Average Paddy Prices and Coefficient Variance in Study Locations

Description Districts	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4

Based on the analysis results, it is known that there is price variation in paddy prices both in Tawang Sari and Mojolaban Districts with the C4 and IR64 varieties.

It can be said that there is no difference in the paddy in price of C4 variety in Tawang Sari District for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawang Sari so that the price declines.

Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018.

Table 4. Average Rice Price and Coefficient Variance in Study Locations

Description	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	10,500	10,692.3	9,507.7	9,500	0	2.3	0.29	0
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	0.55	5.8	4.4	7.05

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.05%. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts can be categorized into minor because they are less than 10%. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 10%. Based on inferent and descriptive analyses, it can be stated that the stability of rice prices in the study area is maintained.

Market Integration

Market integration is an attachment or integration between markets. Two products will be said to be integrated on the market if there are trade transactions

between these products, where prices in the import and export markets are coupled with transportation costs and other transfer costs in order to move products between two markets (Irawan and Roesmayatnti, 2007, Aryani, 2012). The model of market integration in this study uses the correlation between paddy prices and rice prices in the two districts, i.e. Tawang Sari and Mojolaban.

a. Paddy Market Integration

Sukoharjo is a regency with the highest paddy productivity in Central Java, that is 75.26 kw/ha with average productivity of 60.99 kw/ha in Central Java. These results indicated the dynamics of farmers as excellent grain producers. Of course, the paddy production is distributed not only in Sukoharjo area, but also outside Sukoharjo with price movements between markets. This movement can create an integration of prices between markets. In this study, the intended market is paddy-producing areas, i.e. Tawang Sari and Mojolaban Districts. The integration of paddy market in Tawang Sari and Mojolaban Districts can be seen from the result of the regression analysis. In this study, the integration of grain market is divided into several varieties, i.e. C4, IR64, and Bramo.

Table 5. Paddy Market Integration for Several Varieties

Var Dependent	Independent Var	Varieties	Prob	Results
C4MJ	C4TW	C4	0.00	Integration
C4TW	C4MJ	C4	0.000	Integration
IR64MJ	IR64TW	IR64	0.000	Integration
IR64TW	IR64MJ	IR64	0.000	Integration
BRMJ	BRTW	Bramo	0.000	Integration
BRTW	BRMJ	Bramo	0.000	Integration

Description:

C4MJ : C4 in Mojolaban

C4TW : C4 in Tawang Sari

Based on the results of $Y = 718.1710 + 0.819237X$ with p value = 0.0000, it can be concluded that the price of C4 variety in Mojolaban District is influenced by the price of C4 variety in Tawang Sari District. This showed that there is a paddy market integration in the two districts. The market integration means that if the price of C4 variety in Tawang Sari District rises by IDR 1/kg, then the price of C4 variety in Mojolaban District will rise too by Rp 0.819/kg. Conversely, if the price of C4 variety in Tawang Sari becomes a dependent variable, then it is known that $Y = -$

$633.3333 + 1.166667X$ with ($p = 0.0000$). The analysis results showed that the price of C4 variety in Tawangsari District is influenced by the price of C4 variety in Mojolaban District or market integration was created. This means that if the price of C4 variety in Mojolaban District rises by IDR 1/kg, then the price of C4 variety in Tawangsari District will rise too by IDR 1.167/kg. Based on the results of market integration regarding the price of C4 variety, it is known that the price increase in Mojolaban District was responded higher in Tawangsari District. This is happened because the price of C4 variety in Tawangsari District is higher than in Mojolaban.

Similar to C4, the market integration of IR64 variety showed an integration in the two districts of study location with the equation $Y = 377.4755 + 0.904684X$. The probability value $p = 0.000$ indicates that the price of IR64 variety in Mojolaban District is influenced by the price of IR64 variety in Tawangsari District or there was a market integration. This indicated that if the price of IR64 variety in Tawangsari District rises by IDR 1/kg, the price of IR64 variety in Mojolaban District will rise by IDR 0.90/kg. The analysis results showed that the price of IR64 variety in Tawangsari District is influenced by the price of IR64 variety in Mojolaban District at $p = 0.000$ or there was a market integration. This means that if the price of IR64 variety in Mojolaban District rises by IDR 1/kg, then the price of IR64 variety in Tawangsari District will rise by IDR 1.08/kg. As well as C4, the price of IR64 variety was responded higher in Tawangsari District.

Besides C4 and IR64 varieties, farmers also plant Bramo variety. The result of price integration for Bramo variety is $Y = 0.172857 + 0.992112X$ with ($p = 0.0000$). The analysis results showed that the price of Bramo variety in Mojolaban District is influenced by the price of Bramo variety in Tawangsari District or there was a market integration. If the price of Bramo variety in Tawangsari District rises by IDR 1/kg, then the price of Bramo variety in Mojolaban District will rise too by IDR 0.99/kg.

In addition, the changed price of Bramo variety in Tawangsari District is also influenced by the changed price of Bramo variety in Mojolaban District. The analysis results of Bramo variety showed $Y = -0.064307 + 1.007902$ with ($p = 0.0000$), meaning that the price of Bramo variety in Tawangsari District was influenced by the price of Bramo variety in Mojolaban District, resulting in market integration.

This indicated that if the price of Bramo variety in Mojolaban District rises by IDR 1/kg, then the price of Bramo variety in Tawang Sari District will rise by IDR 1.01/kg.

Based on the market integration of C4, IR64, and Bramo varieties, there was market integration in Tawang Sari and Mojolaban Districts with response of slightly higher prices in Tawang Sari District compared to Mojolaban District. This is consistent with the real conditions that the paddy price in Tawang Sari District is slightly higher than Mojolaban District. It corresponding with Agung and Daryanto (2018) that market integration will make price and supply stability.

The analysis results based on such integration showed that there was a price competition at an efficient price and the paddy and rice market is a real source for local market.

Rice Market Integration

Sukoharjo is a regency that has a high paddy productivity, thus it needs specific processing activities to process grain into rice. According to this, there are 288 rice milling units in Sukoharjo and mostly, 65 units, are found in Mojolaban. In addition to rice mills, there are total of 177 rice cleaning units with 42 units found in Tawang Sari District. Activities for processing grain / paddy into rice will also affect the rice price for each variety. Thus, many activities for processing grain into rice in both study locations will allow the price integration.

Table 6. Rice Market Integration for Several Varieties

Var Dependent	Independent Var	Rice	Prob	Results
C4MJ	C4TW	C4	0.013	Integration
C4TW	C4MJ	C4	0.013	Integration
IR64MJ	IR64TW	IR64	0.836	No Integration
IR64TW	IR64MJ	IR64	0.836	No Integration
BRMJ	BRTW	Bramo	0.000	Integration
BRTW	BRMJ	Bramo	0.000	Integration

The analysis results of C4 variety, $ECM Y = -112764.2 + 14.19318 X$ showed a probability of $p = 0.013$ meaning that the price of C4 rice in Mojolaban District had an effect towards the price of C4 rice in Tawang Sari District, which meant that there was a market integration of C4 rice. The existence of market integration

showed that if the price of C4 rice in Mojolaban District rises by IDR 1/kg, then the price of C4 rice in Tawang Sari District will rise by IDR 14.19/kg.

If C4MJ is a dependent variable, integration will occur in the two districts. The analysis results if C4TW is dependent then $Y = 8677.895 + 0.017313 X$ with ($p = 0.013$) indicating that the price of C4 rice in Tawang Sari District has an effect on the price of C4 rice in Mojolaban District, which means that there was a rice market integration in the two districts. Market integration indicated that if the price of C4 rice in Tawang Sari District rises by IDR 1/kg, the price of C4 rice in Mojolaban District will rise by IDR. 0.017/kg. The integration results showed that if the price of C4 rice in Tawang Sari District rises, it will increase the price of C4 rice in Mojolaban District. Likewise, if there is an increase on the price of C4 rice in Mojolaban District, it will increase the price of C4 rice in Tawang Sari District. Thus, it can be said that there was a price integration of C4 rice in the two districts.

The result of ECM analysis for IR64 rice with IR64MJ as dependent is $Y = 9501.252 + 0.000310 X$ and the probability of $p = 0.83$ showed that the price of IR64 rice in Mojolaban District did not affect the price of IR64 rice in Tawang Sari District, meaning that there was no market integration. This showed that the changed price of IR64 rice in Mojolaban District did not change the price of IR64 rice in Tawang Sari District. However, if IR64TW is dependent, it is known that $Y = -51356.52 + 6.391304 X$ and ($p = 0.83$), means that the price of IR64 rice in Tawang Sari district has no effect on the price of IR64 rice in Mojolaban District, so there was no market integration.

The rice market integration with Bramo varieties in both regions showed that there was market integration. The analysis results showed that the price of Bramo rice in Mojolaban District had an effect towards the rice price in Tawang Sari District, with $Y = 31.07089 + 1.106262 X$ and value ($p = 0.00$). These results indicated a market integration, which means that if the price of Bramo rice in Mojolaban District rises by IDR 1/kg, then the price of Bramo rice in Tawang Sari District will rise too by IDR 1.106/kg. It means also that the price of Bramo rice in Tawang Sari District had an effect towards the price of Bramo rice in Mojolaban District. Whereas the analysis results of $Y = 1.7119030 + 0.897291 X$ and value ($p = 0.00$) indicated that

the price of Bramo rice in Tawangasari District has an effect on the rice price in Mojolaban District, meaning that there was a market integration in the price of Bramo rice. The integration results indicated that the price of Bramo rice in Tawangasari District increases by IDR 1/kg, where the price of Bramo rice in Mojolaban District increases too by IDR 0.897/kg. If there is an increase on the price of Bramo rice in Tawangasari District, it will cause an increase in the price of Bramo rice in Mojolaban District, and vice versa. It can be said that there was a price integration of Bramo rice in the two districts mentioned.

Thus, the rice market in Sukoharjo Regency is independent and interdependent with one another. This condition shows that there are still exogenous influences which can affect rice prices. If the rice market is not fully integrated, the market is in non-perfect competitive structure. In these conditions, to maintain the stability of rice prices, government intervention in the market is still needed in Sukoharjo. This is consistent with what was stated by Makama and Amruthat (2016) that 2 regions or markets have 2 influential directions. This indicated that the price of commodities, whether paddy or rice, is adjusted in two different markets.

CONCLUSION

1. The stability of paddy and rice prices and the stability of paddy and rice supplies occurred in Tawangasari and Mojolaban Districts.
2. There was paddy market integration of between Tawangasari and Mojolaban Districts for C4, IR64 and Bramo paddy varieties. However, the rice market integration only occurs for C4 and Bramo varieties.

ACKNOWLEDGMENTS

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2. Attachment 2: Editor Decesion (First Review), Oktober 26, 2019



Dr. Susanawati Susanawati <journalumy@gmail.com>

Kepada: Dr. Titik Ekowati



Sab, 26 Okt 2019 jam 10.30 ☆

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency".

Our decision is to: REVISIONS REQUIRED

If you decide to continue publishing your work to this journal, please return back the revised manuscript to the editor within 7 days via OJS. We would be glad if you submit your revised manuscript as soon as possible.

Dr. Susanawati Susanawati
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Dr. Susanawati Susanawati <journalumy@gmail.com>

Kepada: Dr. Titik Ekowati

Sab, 26 Okt 2019 jam 10.30

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency" after reviewing the review process :

- this paper should only explain the supply side. The market integration section can be excluded from this paper.
- revise the abstract

Thank You

Paper Review 1

Correction	Revision
this paper should only explain the supply side. The market integration section can be excluded from this paper.	Have been revised
abstract should be revised	Have been revised

The Stability of Supply and Rice Price in Sukoharjo Regency

Titik Ekowati, Edy Prasetyo and Mukson
Agribusiness Study Program, Diponegoro University, Semarang, Indonesia
Correspondence email : tiekowati@yahoo.co.id

Commented [L1]: After reviewing the review process, this paper should only explain the supply side. The market integration section can be excluded from this paper.
Abstract should be revised
Thank You

ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply stability and market integration. The study uses a survey method. The study was conducted in Tawang Sari and Mojolaban Districts and involving 140 respondents. Simple random sampling method was used to determine the sample number of farmers among 140 respondents. Data were analyzed by integration and Co variance analysis. The study results showed that paddy productivity was 9,743 tons/ha and 8,980 tons/ha for Tawang Sari and Mojolaban Districts, respectively. The stability of prices and supply for grain and rice is occurred in Tawang Sari and Mojolaban Districts. The supply and price of paddy and rice were in stable condition. Market integration of paddy and rice is occurred between Tawang Sari and Mojolaban District for C4 and Brama varieties and there was no integration for IR64 varieties.

Key words: market integration, rice, price, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan beras dan integrasi pasar. Penelitian menggunakan metode survey. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban dengan jumlah responden 140. *Simple random sampling* dilakukan untuk menentukan sampel petani. Data dianalisis dengan analisis integrasi pasar dan Co variance.

Hasil penelitian menunjukkan bahwa produktivitas padi 9,743 ton/ha dan 8,980 ton/ha untuk Kecamatan Tawang Sari dan Mojolaban. Stabilitas harga padi dan beras dan stabilitas pasokan padi dan beras terjadi di Kecamatan Tawang Sari dan Mojolaban. Pasokan padi dan beras serta harga padi dan beras berada pada kondisi stabil. Integrasi pasar padi dan beras terjadi antara Kecamatan Tawang Sari dan Kecamatan Mojolaban untuk padi dan beras varietas C4 dan Bramo dan tidak ada integrasi untuk padi varietas IR64.

Kata kunci : beras, harga, integrasi pasar, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Rice is a strategic commodity in Indonesia. This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005 in Widadi & Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important

role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the market structure (market integration), supply, demand, and the price stability of both grain and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, so that market integration and supply stability will occur.

Market integration is an attachment or integration between markets. Two products on the market will be said to be integrated if there are trade transactions between these products. Prices in the non-local market are similar to prices in the local market added with transportation costs and other transfer costs as an effort to transfer products between these two markets (Irawan and Roesmayanti, 2007).

Based on the above background, the formulation of the problem is how the conditions of rice supply and the integration of rice market in the study area. While this study aims to analyze the rice supply in the study area and analyze the integration of the rice market in the study area.

RESEARCH METHOD

The analysis of Stability of Rice Supply and Price in Sukoharjo Regency, Central Java, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Survey was conducted to determine farmer's household conditions, especially the rice farming of the sample. The study location was determined based on the potential of rice production i.e. Tawangarsi and Mojolaban Districts. *Simple random sampling method* was used to determine the number of sample farmers. In this study, the number of sample farmers was determined based on their memberships in the consolidation of rice fields. The number of sample farmers in Dalangan village, Tawangarsi is 80 farmers, while in Dukuh Village, Mojolaban is 60 farmers, thus the total number is 140 farmers.

The analytical methods used are the cointegration test (Kusumaningsih, 2015) and descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is Variance analysis. Fluctuations of food price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 10%.

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rainfed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%).

Respondent's Identity

Respondents in this study are consisted of 140 farmers with an average land area of 0.438 ha. Respondents are farmers in their productive age (77.14%) with average age of 54.14 years and average farming of 22.94 years. A condition that illustrates that agriculture still becomes a sector of main livelihood because 70% of respondents are farmers. 16.43% are farm workers, in other words 86.43% of respondents still depend on the agricultural sector, especially food crops. Of the 140 respondents, it turned out that 49% of them had graduated from high school. It is a good level of education for a farmer.

Rice Farming Results

The production and income generated of rice farming in Dalangan Village of Tawangsari District turned out to be greater than rice production in Dukuh Village of Mojolaban District. The difference in production in these two regions was due to differences in business management where farmers in Dalangan Village, Tawangsari District were joined in the land consolidation institutional, while farmers in Dukuh Village, Mojolaban District were not joined in the land consolidation institution.

Table 1. Rice Farming Analysis in Tawangsari and Mojolaban Districts

No.	Description	Dalangan Village Tawangsari District		Dukuh Village Mojolaban District	
		Total	IDR/ha/season	Total	IDR/ha/season
I	Fixed costs				
-	Depreciation		143,936.72		135,551.70
-	Irrigation		84,564.49		347,739.29
-	Land rent		1,046,679.00		1,334,272
-	Tax		153,043.80		31,505.53
	Variable costs				
-	Seed	42.82	453,128.01	40.31	402,116.40
-	Urea fertilizer	190.81	362,536.10	170.89	333,872.10
-	SP3 fertilizer	163.74	344,429.70	158.59	322,977.39
-	NPK fertilizer	215.08	510,084.20	218.90	459,398.75
-	Manure	133.42	76,792.59	89.56	54,098.12
-	Herbicide		27,071.46		50,076.96
-	Pesticides		622,405.00		550,452.10
-	Labor	50.09	3,734,805.00	52.98	3,708,261.18
	Total expenditure		7,559,476.66		7,730,321.56
II	Revenue	9,743.90	39,123,122.38	8,980.33	36,134,596.93
	Grain Price per kg :				

	- IDR 4,015.14/kg for TW		
	- IDR 4,023.75/kg for MJ		
III	Income	31,563,645.34	28,404,275.37

Note :

- TW : Tawang Sari
- MJ : Mojolaban

From the production generated by Tawang Sari Village and Dukuh Village, there is a difference in productivity i.e. 9,743.90 kg/ha and 8,980.33 kg/ha, respectively, while paddy productivity in Sukoharjo is 7,208 kg/ha. The satisfactory production of Tawang Sari Village is highly related with the role of consolidated land institution, technology and human resources where on-farm agribusiness activities have been working well. It is relation to Kasryno (2001) and Suwanto (2012) that increasing paddy production as new technology adopted by farmer, land usage and efficiency.

The difference is not merely found in the aspect of production, but also in price and income i.e. there is difference in operational costs of IDR 170,844.9,-/ha and difference in production of 763.6 kg/ha/season or 2.29 tons/ha/year. While incomes from Dalangan Village and Dukuh Village are IDR 31,563,645.34/ha/season and IDR 28,404,275.37/ha/season, respectively. If it is observed, there is a difference in income of IDR 3,159,369.97/ha/season. The land tenure in Dalangan Village - Tawang Sari is 0,45 ha and 0,416 ha for Dukuh Village - Mojolaban. Thus the income generated based on the land tenure is IDR 9,018,184.38/month/ha or IDR 4,058,182.97/month/0,45ha and IDR 8,115,507.25/season/ha or IDR 3,946.30/month/ha or IDR 33,376,051/month/0,416ha and there is a difference of IDR 33,159,369.97/season/ha. The difference in production costs between the two regions is due to seed extraction, planting, and harvesting activities where groups of farmers who are members of institutions can save operational costs through these activities. This is happened because institutional management has used equipment for planting and harvesting so that in order to save costs as well as hatchery, the tray has been used which does not require seed extraction costs.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

a. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113,48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by BPS. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the

rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 2.

Table 2. Values of Production, Consumption and Stability of Rice Supply in the Study Areas

Description Districts	Rice Production (kg)		Rice Consumption (kg)		Stability (CV)
	2016	2017	2016	2017	
Tawang Sari	19,266,277.41	20,148,000.95	5,403,577.16	5,449,423.08	3.16
Mojolaban	28,073,449.95	29,359,000.18	10,562,264.48	10,649,076.68	3.16
Sukoharjo	234,983,259.00	245,736,000.89	98,070,210.36	98,886,131.56	3.16

Description:

CV = Coefficient Variance

The amount of rice produced at the study area location shows its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of study location the rice supply is stable. This condition is also supported by the small value of the coefficient variance, which is 3.16% for each region, meaning that there is no fluctuations at all. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional demands and it is also possible to have distribution outside the region as presented in the supply chain.

b. Price Stability

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data is approached with prices at each harvest season, while the rice price can be approached every month.

Table 3. Average Paddy Prices and Coefficient Variance in Study Locations

Description	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
Districts	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4

Based on the analysis results, it is known that there is price variation in paddy prices both in Tawang Sari and Mojolaban Districts with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in Tawang Sari District for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawang Sari so that the price declines.

Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018.

Table 4. Average Rice Price and Coefficient Variance in Study Locations

Description	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
Districts	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	10,500	10,692.3	9,507.7	9,500	0	2.3	0.29	0
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	0.55	5.8	4.4	7.05

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price

variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.05%. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts can be categorized into minor because they are less than 10%. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 10%. Based on inferent and descriptive analyses, it can be stated that the stability of rice prices in the study area is maintained.

Market Integration

Market integration is an attachment or integration between markets. Two products will be said to be integrated on the market if there are trade transactions between these products, where prices in the import and export markets are coupled with transportation costs and other transfer costs in order to move products between two markets (Irawan and Roesmayatnti, 2007, Aryani, 2012). The model of market integration in this study uses the correlation between paddy prices and rice prices in the two districts, i.e. Tawang Sari and Mojolaban.

c. Paddy Market Integration

Sukoharjo is a regency with the highest paddy productivity in Central Java, that is 75.26 kw/ha with average productivity of 60.99 kw/ha in Central Java. These results indicated the dynamics of farmers as excellent grain producers. Of course, the paddy production is distributed not only in Sukoharjo area, but also outside Sukoharjo with price movements between markets. This movement can create an integration of prices between markets. In this study, the intended market is paddy-producing areas, i.e. Tawang Sari and Mojolaban Districts. The integration of paddy market in Tawang Sari and Mojolaban Districts can be seen from the result of the regression analysis. In this study, the integration of grain market is divided into several varieties, i.e. C4, IR64, and Bramo.

Table 5. Paddy Market Integration for Several Varieties

Var Dependent	Independent Var	Varieties	Prob	Results
C4MJ	C4TW	C4	0.00	Integration
C4TW	C4MJ	C4	0.000	Integration
IR64MJ	IR64TW	IR64	0.000	Integration
IR64TW	IR64MJ	IR64	0.000	Integration
BRMJ	BRTW	Bramo	0.000	Integration
BRTW	BRMJ	Bramo	0.000	Integration

Description:

C4MJ : C4 in Mojolaban

C4TW : C4 in Tawang Sari

Based on the results of $Y = 718.1710 + 0.819237X$ with p value = 0.0000, it can be concluded that the price of C4 variety in Mojolaban District is influenced by the price of C4 variety in Tawang Sari District. This showed that there is a paddy market integration in the two districts. The market integration means that if the price of C4 variety in Tawang Sari District rises by IDR 1/kg, then the price of C4 variety in Mojolaban District will rise too by Rp 0.819/kg. Conversely, if the price of C4 variety in Tawang Sari becomes a dependent variable, then it is known that $Y = -633.3333 + 1.166667X$ with ($p = 0.0000$). The analysis results showed that the price of C4 variety in Tawang Sari District is influenced by the price of C4 variety in Mojolaban District or market integration was created. This means that if the price of C4 variety in Mojolaban District rises by IDR 1/kg, then the price of C4 variety in Tawang Sari District will rise too by IDR 1.167/kg. Based on the results of market integration regarding the price of C4 variety, it is known that the price increase in Mojolaban District was responded higher in Tawang Sari District. This is happened because the price of C4 variety in Tawang Sari District is higher than in Mojolaban.

Similar to C4, the market integration of IR64 variety showed an integration in the two districts of study location with the equation $Y = 377.4755 + 0.904684X$. The probability value $p = 0.000$ indicates that the price of IR64 variety in Mojolaban - District is influenced by the price of IR64 variety in Tawang Sari District or there was

a market integration. This indicated that if the price of IR64 variety in Tawang Sari District rises by IDR 1/kg, the price of IR64 variety in Mojolaban District will rise by IDR 0.90/kg. The analysis results showed that the price of IR64 variety in Tawang Sari District is influenced by the price of IR64 variety in Mojolaban District at $p = 0.000$ or there was a market integration. This means that if the price of IR64 variety in Mojolaban District rises by IDR 1/kg, then the price of IR64 variety in Tawang Sari District will rise by IDR 1.08/kg. As well as C4, the price of IR64 variety was responded higher in Tawang Sari District.

Besides C4 and IR64 varieties, farmers also plant Bramo variety. The result of price integration for Bramo variety is $Y = 0.172857 + 0.992112X$ with ($p = 0.0000$). The analysis results showed that the price of Bramo variety in Mojolaban District is influenced by the price of Bramo variety in Tawang Sari District or there was a market integration. If the price of Bramo variety in Tawang Sari District rises by IDR 1/kg, then the price of Bramo variety in Mojolaban District will rise too by IDR 0.99/kg.

In addition, the changed price of Bramo variety in Tawang Sari District is also influenced by the changed price of Bramo variety in Mojolaban District. The analysis results of Bramo variety showed $Y = -0.064307 + 1.007902$ with ($p = 0.0000$), meaning that the price of Bramo variety in Tawang Sari District was influenced by the price of Bramo variety in Mojolaban District, resulting in market integration. This indicated that if the price of Bramo variety in Mojolaban District rises by IDR 1/kg, then the price of Bramo variety in Tawang Sari District will rise by IDR 1.01/kg.

Based on the market integration of C4, IR64, and Bramo varieties, there was market integration in Tawang Sari and Mojolaban Districts with response of slightly higher prices in Tawang Sari District compared to Mojolaban District. This is consistent with the real conditions that the paddy price in Tawang Sari District is slightly higher than Mojolaban District. It corresponding with Agung and Daryanto (2018) that market integration will make price and supply stability.

The analysis results based on such integration showed that there was a price competition at an efficient price and the paddy and rice market is a real source for local market.

Rice Market Integration

Sukoharjo is a regency that has a high paddy productivity, thus it needs specific processing activities to process grain into rice. According to this, there are 288 rice milling units in Sukoharjo and mostly, 65 units, are found in Mojolaban. In addition to rice mills, there are total of 177 rice cleaning units with 42 units found in Tawang Sari District. Activities for processing grain / paddy into rice will also affect the rice price for each variety. Thus, many activities for processing grain into rice in both study locations will allow the price integration.

Table 6. Rice Market Integration for Several Varieties

Var Dependent	Independent Var	Rice	Prob	Results
C4MJ	C4TW	C4	0.013	Integration
C4TW	C4MJ	C4	0.013	Integration
IR64MJ	IR64TW	IR64	0.836	No Integration
IR64TW	IR64MJ	IR64	0.836	No Integration
BRMJ	BRTW	Bramo	0.000	Integration
BRTW	BRMJ	Bramo	0.000	Integration

The analysis results of C4 variety, $ECM Y = -112764.2 + 14.19318 X$ showed a probability of $p = 0.013$ meaning that the price of C4 rice in Mojolaban District had an effect towards the price of C4 rice in Tawang Sari District, which meant that there was a market integration of C4 rice. The existence of market integration showed that if the price of C4 rice in Mojolaban District rises by IDR 1/kg, then the price of C4 rice in Tawang Sari District will rise by IDR 14.19/kg.

If C4MJ is a dependent variable, integration will occur in the two districts. The analysis results if C4TW is dependent then $Y = 8677.895 + 0.017313 X$ with ($p = 0.013$) indicating that the price of C4 rice in Tawang Sari District has an effect on the price of C4 rice in Mojolaban District, which means that there was a rice market integration in the two districts. Market integration indicated that if the price of C4 rice in Tawang Sari District rises by IDR 1/kg, the price of C4 rice in Mojolaban District will rise by IDR. 0.017/kg. The integration results showed that if the price

of C4 rice in Tawang Sari District rises, it will increase the price of C4 rice in Mojolaban District. Likewise, if there is an increase on the price of C4 rice in Mojolaban District, it will increase the price of C4 rice in Tawang Sari District. Thus, it can be said that there was a price integration of C4 rice in the two districts.

The result of ECM analysis for IR64 rice with IR64MJ as dependent is $Y = 9501.252 + 0.000310 X$ and the probability of $p = 0.83$ showed that the price of IR64 rice in Mojolaban District did not affect the price of IR64 rice in Tawang Sari District, meaning that there was no market integration. This showed that the changed price of IR64 rice in Mojolaban District did not change the price of IR64 rice in Tawang Sari District. However, if IR64TW is dependent, it is known that $Y = -51356.52 + 6.391304 X$ and ($p = 0.83$), means that the price of IR64 rice in Tawang Sari district has no effect on the price of IR64 rice in Mojolaban District, so there was no market integration.

The rice market integration with Bramo varieties in both regions showed that there was market integration. The analysis results showed that the price of Bramo rice in Mojolaban District had an effect towards the rice price in Tawang Sari District, with $Y = 31.07089 + 1.106262 X$ and value ($p = 0.00$). These results indicated a market integration, which means that if the price of Bramo rice in Mojolaban District rises by IDR 1/kg, then the price of Bramo rice in Tawang Sari District will rise too by IDR 1.106/kg. It means also that the price of Bramo rice in Tawang Sari District had an effect towards the price of Bramo rice in Mojolaban District. Whereas the analysis results of $Y = 1.7119030 + 0.897291 X$ and value ($p = 0.00$) indicated that the price of Bramo rice in Tawang Sari District has an effect on the rice price in Mojolaban District, meaning that there was a market integration in the price of Bramo rice. The integration results indicated that the price of Bramo rice in Tawang Sari District increases by IDR 1/kg, where the price of Bramo rice in Mojolaban District increases too by IDR 0.897/kg. If there is an increase on the price of Bramo rice in Tawang Sari District, it will cause an increase in the price of Bramo rice in Mojolaban District, and vice versa. It can be said that there was a price integration of Bramo rice in the two districts mentioned.

Thus, the rice market in Sukoharjo Regency is independent and interdependent with one another. This condition shows that there are still exogenous influences which can affect rice prices. If the rice market is not fully integrated, the market is in non-perfect competitive structure. In these conditions, to maintain the stability of rice prices, government intervention in the market is still needed in Sukoharjo. This is consistent with what was stated by Makama and Amruthat (2016) that 2 regions or markets have 2 influential directions. This indicated that the price of commodities, whether paddy or rice, is adjusted in two different markets.

CONCLUSION

1. The stability of paddy and rice prices and the stability of paddy and rice supplies occurred in Tawang Sari and Mojolaban Districts.
2. There was paddy market integration of between Tawang Sari and Mojolaban Districts for C4, IR64 and Bramo paddy varieties. However, the rice market integration only occurs for C4 and Bramo varieties.

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3. Attachment 3: Revision 1. submit, November 18, 2019



Titik Ekowati Ekowati <tielowati@yahoo.co.id>
Kepada: Dr. Susanawati Susanawati

Sen, 18 Nov 2019 jam 20:55 ☆

Dr. Susanawati
Agraris Journal Editor

Here, I am inform You that the revision of my article with the title : Tha Stability of Supply and Rice Price in Sukoharjo Regency have revised and resubmitted to Agraris Journal via OJS.

I will be glad to hear the time of publication.

Thank you very much

Titik Ekowati
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> Tampilkan pesan asli

Revision Manuscript

1

The Stability of Supply and Rice Price in Sukoharjo Regency

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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply and price stability of rice. The study used a secondary data method. The study was conducted in Tawang Sari and Mojolaban Districts of Sukoharjo Regency. Data were analyzed by Co variance analysis. The study results showed that supply and demand of rice was surplus and stable. The stability of prices and supply for paddy and rice is occurred in Tawang Sari and Mojolaban Districts and Sukoharjo regency as well.

Key words: paddy, price, rice, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan dan harga beras. Penelitian menggunakan metode data sekunder. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban Kabupaten Sukoharjo. Data dianalisis dengan analisis Co variance.

Hasil penelitian menunjukkan bahwa pasokan beras pada kondisi surplus dan stabil. Harga padi dan beras berada pada kondisi stabil.

Kata kunci : beras, harga, padi, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Development of agricultural commodities requires an understanding of market prospects, resource capabilities and technological potential. The imbalance between supply and demand will affect the price and profitability, so that it requires an intervention policy and planning to deal with the situation. Projection of supply or demand is very important for production planning which will have an impact on what level of supply to maintain price stability. Food supply and price stabilization is a problem faced by almost every region in Indonesia. Some factors that affect the

stability of supply and food prices are the amount of production, population increase, demand, climate change, trade barriers.

Rice is a strategic commodity that can affect economic, social and even political stability. Rice commodity is still one of the key commodities in influencing the stability of general prices. The increase in rice prices can trigger an increase in the prices of other goods (Sari 2010). This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005 in Widadi and Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the supply, demand, and the price stability of both paddy and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from

surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, supply stability and price stability will occur.

Based on the background, the formulation of the problem is how the conditions of paddy and rice supply in the study area. While this study aims to analyze the paddy and rice stability of supply and price in the study area

RESEARCH METHOD

The analysis of stability of paddy and rice supply and price in Sukoharjo Regency, especially in Tawang Sari and Mojolaban Districts, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Sukoharjo Regency is determined as the location of the study because it has the highest rice productivity in Central Java, which is 7,466 tons/ha while the average rice productivity in Central Java is 5.74 tons/ha. Whereas the determination of Tawang Sari and Mojolaban Districts is based on activities related to efforts to increase production and land productivity, namely the existence of a land consolidation program.

The research method used is a secondary data method. The data used in this study are paddy production and prices of paddy and rice.

The analytical method used is descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is coefficient of variance analysis. Fluctuations of paddy and rice price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 9 (The Indonesian Ministry of Trade, 2019).

The coefficient of variation (CV) is the ratio between the standard deviation and the average value, expressed as a percentage, which is useful for looking at the distribution of data from the calculated average (Walpole, 2000).

Where:

$$CV = \frac{\sigma}{\bar{X}}$$

Cv = coefficient of variation

σ = standard deviation

\bar{X} = mean variable

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rain fed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%).

Central Java Province is one of the main food producers for national stock lead to promote paddy productivity. In 2018, the level of wetland paddy productivity is about 6.099 tons per hectare, with the harvested area 1.80 million hectare and production of wetland paddy 11.00 million tons. Meanwhile, Sukoharjo Regency is one of regencies that support food in Central Java, so the productivity food crops, especially paddy, is continually increased. In 2018 productivity of paddy reached 7.208tons/ha, while production of paddy reached 391,675 tons and 54,339 hectares of harvested area. Productivity of paddy in Sukoharjo is higher among the paddy productivity in other regency/municipality, while the lowest productivity was recorded in the Pekalongan Regency in the amount of 4.312 tons per hectare. The high productivity of paddy in Sokoharjo shows that the ability of farmers in paddy farming has been going well.

The research approach taken is paddy and rice stability. So there is a conversion from paddy to rice. The Central Statistics Agency said that the conversion rate of milled unhusked rice (GKG) to rice that is now used is 64.02%. This figure is up from the previous calculation at 62% which is often used as a reference for farmers and rice mills before. The change in number was caused by an improvement in the paddy production sector, "The processing technique has improved.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

Demand is very important for production planning to be have an impact on how big the rate is supply to keep price stability. Total commodity demand is useful for food as one input in determining food commodity production targets, how much is needed as well overview of future price developments. Meanwhile the number of supply is useful for food commodities as description of the level of commodity production concerned agriculture that can achieved based on assumptions that are used. By comparing the results of demand and can be known the condition of the demand balance and supply of the relevant commodity whether in a state of surplus or deficit. In the short term and medium condition will be related to current distribution of food commodities which impact on supply and price stability.

The main actors in development agriculture is a farmer that cultivate the certain agricultural commodities. Farmers have an important position as one of the subject actor's economy in the local, regional order even nationally. Important thing farmers are expected to be sustainable farm is price certainty. So that agricultural business that it runs able to provide an income feasible and sustainable, then commodities which should be cultivated properly is a prospective commodity on the market

b. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

The amount of food available must meet the interests of all people, whether sourced from domestic or imported production. Second, accessibility both physically and economically. Physical affordability requires that food is easily accessible to individuals or households. Whereas economic affordability means the ability to obtain or buy food or is related to the people's purchasing power for food. Third, the aspect of stability (stability), refers to the ability to minimize the possibility of food consumption below the level of standard needs in difficult seasons (famine or natural disasters) (M Fuad, 2009).

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113.48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by BPS. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 1.

Table 1. Analysis of Coefficient of Variance of Availability and Consumption of Rice in Tawang Sari, Mojolaban District and Sukoharjo Regency

District	Paddy Production (ton)	Rice Supply (ton)	Population (person)	Rice Consumption (ton)	Surplus (ton)	CV
Tawang Sari						
- 2016	32,12	21,003.21	47,94	5,439.78	15,563.43	6.35
- 2017	35,17	22,999.87	47,99	5,446.13	17,553.74	
- 2018	32,39	21,181.10	47,95	5,441.14	15,739.96	
Mojolaban						
2016	46,79	30,603.93	93,845	10,641.57	19,962.36	7.88
2017	45,64	29,846.60	95,06	10,779.69	19,066.91	
2018	40,53	26,503.35	96,27	10,916.79	15,586.56	
Sukoharjo						
2016	391,68	256,155.45	871,39	98,886.13	157,269.32	7.78
2017	387,98	253,738.92	878,37	99,677.88	154,061.04	
2018	341,59	223,403.13	880,35	99,902.23	123,500.90	

Source : Jawa Tengah Dalam Angka 2018
Tawang Sari Dalam Angka 2019
Mojolaban Dalam Angka 2019

The results of rice production in the Districts of Tawanghari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawanghari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply.

Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can be achieved.

An area said to be stable in supply can be seen from the coefficient of variance value smaller than 9. The results of the CV analysis in the study area showed a value smaller than 9, namely 6.35; 7.88 and 7.87 respectively. This shows that the availability of rice in the study area is stable. The surplus and stability of a region's rice supply illustrates that rice is a potential commodity in the area. Furthermore, with the existence of a surplus and stability the distribution of these commodities is possible to other regions.

The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of study location the rice supply is stable. This condition is also supported by the small value of the coefficient variance, which is 6.35; 7.88 and 7.87 for each region, meaning that there is no fluctuations at all. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional demands and it is also possible to have distribution outside the region as presented in the supply chain.

Based on the results of one sample t test analysis, it is known that rice in the study area is in a stable condition. This is indicated by the significance value of each CV namely 0.036; 0.041 and 0.046 respectively that less than 0.05. This showed

that paddy and rice commodities are potential commodities for Tawang Sari and Mojolaban Districts and Sukoharjo Regency.

The stability of rice supply is a potential for the region to distribute to other regions. Because the amount of availability is greater than population consumption and is an area that has food security, especially rice.

c. Price Stability

Annual production pattern of paddy and rice in the production center shows that paddy and rice production during the main harvest is always abundant while monthly demand for paddy and rice is relatively stable. This matter causing the price of paddy and rice to fall. Conversely when it does not occur harvest, less paddy and rice production so it is lower than paddy and rice needs. As a result, prices will increase and not affordable, which occurs when farmers actually do not have inventory. This shows that the price of paddy and rice fluctuates according to season.

Fluctuations in commodity prices basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers. If there is an oversupply, the commodity prices will go down, on the other hand the commodity prices will rise if there is a lack of supply. For agricultural commodities that depend on the season, price fluctuations during the harvest season and non harvest season will occur.

Prices play an important role in the market economy. Price is one of the factors that determine every decision of producers and consumers in allocating limited resources in order to go to the optimal Pareto condition or balance condition (Brummer *et al.*, 2009). According to Nicholson (2004), market prices have two main functions, namely: (i) as information about the quantity of commodities that producers should offer to obtain maximum profits; and (ii) as a determinant of the level of demand for consumers who want maximum satisfaction.

There are at least two reasons why an analysis of rice prices is important to do, in this case related to the purpose of conducting a price analysis namely (1) to estimate certain economic coefficients (parameters) such as the elasticity of demand for rice prices, and (2) to forecast (price) in the future and the factors that influence the price level of rice.

Price fluctuations are actually a normal thing and are needed to keep the market functioning, ie creating a competitive market. Changes in prices will become a problem if prices soar very high and unpredictable, which in turn will create uncertainty that can increase risks for producers, traders, consumers, and of course also the government.

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data were approached with prices at each harvest season, while the rice price can be approached every month.

Table 2 Average Paddy Prices and Coefficient Variance in Study Locations

Description Districts	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4
Sukoharjo	4,261.4	4,608.6	4,265.0	4,558.6	5.7	5.6	5.0	5.1

Based on the analysis results, it is known that there is price variation in paddy prices in Tawanghari and Mojolaban Districts and Sukoharjo Regency with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in research location for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawanghari so that the price declines. This is in accordance with the opinion of Brummer *et al.* (2013) concluded that price fluctuations are basically strongly influenced by supply and demand in the market. For agricultural commodities, input markets and fossil fuels greatly affect price fluctuations. Stock can also affect prices, low stock will cause prices to increase in the market. Price fluctuations in the study area did not cause price volatility. This is indicated by the CV value lower than 9, which means that the price of paddy is in a stable condition.

Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018.

Table 3. Average Rice Price and Coefficient Variance in Study Locations

Description Location	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	10,500	10,692.3	9,507.7	9,500	0	2.3	0.29	0
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	5.6	5.8	4.4	7.1
Sukoharjo	10,615.4	12,150.0	9,534.6	11,600.0	5.8	6.1	4.9	7.5

In 2017, the average price of C4 variety in Tawanghari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawanghari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawanghari with the largest CV from IR64 of 7.0. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts and Sukoharjo Regency can be categorized into minor because the values are less than 9. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 9%. Based on inferent and descriptive analysis, it can be stated that the stability of rice prices in the study area is maintained.

Prices and CV in Sukoharjo Regency are greater than Tawanghari and Mojolaban Districts. This happens because Sukoharjo is an area that encompasses several districts where each district varies greatly in the price of rice. Moreover, not all districts are paddy granaries and rice.

The smaller the coefficient of variation can be interpreted that the price is relatively stable or has a low level of fluctuation. Price stability is one indicator that

can be used to give a signal to producers of price risk factors that may be faced by a producer and the government in order to protect producers and consumers.

Actually, food price stability can be achieved if it can built sufficient government food reserves for respond to food insecurity due to natural disasters and social and reduce the sharp rise in food prices. (Suryana *et al.*, 2014)

CONCLUSION

The stability of paddy and rice prices and the stability of paddy and rice supplies occurred in Tawang Sari District, Mojolaban District and Sukoharjo Regency.

ACKNOWLEDGMENTS

I would like to thank to the Directorate of Research and Community Service, Directorate General of Strengthening Research and Development at the Ministry of Research, Technology and Higher Education regarding the Research and Community Service Funding Agreement for Fund Year of 2018 through the National Strategic Research Scheme.

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4. Attachment 4: Editor Decesion (Second Review), February 3, 2020

[AGRARIS] Editor Decision 3

Yahoo/Email M... ☆



Dr. Susanawati Susanawati <journalumy@gmail.com>
Kepada: Dr. Titik Ekowati

Sen, 3 Feb 2020 jam 10.40 ☆

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency".

Our decision is to: REVISIONS REQUIRED

If you decide to continue publishing your work to this journal, please return back the revised manuscript to the editor within 7 days via OJS. We would be glad if you submit your revised manuscript as soon as possible.

Dr. Susanawati Susanawati
Program Studi Agribisnis, Fakultas Pertanian, Universitas Muhammadiyah
Yogyakarta
Phone 081568471582
nagribis@yahoo.co.id

AGRARIS
<http://jurnal.umy.ac.id/index.php/ag>

[AGRARIS] Editor Decision3

Yahoo/Email Masuk

Dr. Susanawati Susanawati <journalumy@gmail.com>

Kepada: Dr. Titik Ekowati

Sen, 3 Feb 2020 jam 10.40

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency", please revise "

- Abstract, give justification relation to the location
- On the research method : In this section, it is necessary to add any secondary data used, in what year. In addition, a variety of rice is used
- Give the reason Why come there is sukoharjo in Table 1?
- On the result and discussion Rice production, rice supply, and others can also be displayed in graphical form (trend) to enrich the results and discussions.
This section has not been enriched with the results of other similar studies.
- Conclusion too short



Titik Ekowati Ekowati <tielowati@yahoo.co.id>
Kepada: Dr. Susanawati Susanawati

Sen, 3 Feb 2020 jam 15:35 ☆

Dear : Dr. Susanawati
The Editor in chief of Agraris

I am glad to hear the news of my manuscript and thank you very much for correction of it. I will revise it soon and send back to Editor of Agraris.

Your sincerely
Titik Ekowati

> Tampilkan pesan asli

Paper Review 2

Correction	Revision
Abstract, give justification relation to the location	Have been revised
On the research method : In this section, it is necessary to add any secondary data used, in what year. In addition, a variety of rice is used	Have been revised
Give the reason Why come there is sukoharjo in Table 1?	Have been revised
On the result and discussion Rice production, rice supply, and others can also be displayed in graphical form (trend) to enrich the results and discussions. This section has not been enriched with the results of other similar studies.	Have been revised
Conclusion too short	Have been revised

Paper review 2

The Stability of Supply and Rice Price in Sukoharjo Regency

Titik Ekowati, Edy Prasetyo and Mukson
Agribusiness Study Program, Diponegoro University, Semarang, Indonesia
Correspondence email : tielowati@yahoo.co.id

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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply and price stability of rice. The study used a secondary data method. The study was conducted in Tawang Sari and Mojolaban

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Districts of Sukoharjo Regency. Data were analyzed by Co variance analysis. The study results showed that supply and demand of rice was surplus and stable. The stability of prices and supply for paddy and rice is occurred in Tawang Sari and Mojolaban Districts and Sukoharjo regency as well.

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Key words: paddy, price, rice, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan dan harga beras. Penelitian menggunakan metode data sekunder. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban Kabupaten Sukoharjo. Data dianalisis dengan analisis Co variance.

Hasil penelitian menunjukkan bahwa pasokan beras pada kondisi surplus dan stabil. Harga padi dan beras berada pada kondisi stabil.

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Kata kunci : beras, harga, padi, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Development of agricultural commodities requires an understanding of market prospects, resource capabilities and technological potential. The imbalance between supply and demand will affect the price and profitability, so that it requires

an intervention policy and planning to deal with the situation. Projection of supply or demand is very important for production planning which will have an impact on what level of supply to maintain price stability. Food supply and price stabilization is a problem faced by almost every region in Indonesia. Some factors that affect the stability of supply and food prices are the amount of production, population increase, demand, climate change, trade barriers.

Rice is a strategic commodity that can affect economic, social and even political stability. Rice commodity is still one of the key commodities in influencing the stability of general prices. The increase in rice prices can trigger an increase in the prices of other goods (Sari 2010). This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005 in Widadi and Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the supply, demand, and the price stability of both paddy and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in

farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, supply stability and price stability will occur.

Based on the background, the formulation of the problem is how the conditions of paddy and rice supply in the study area. While this study aims to analyze the paddy and rice stability of supply and price in the study area

RESEARCH METHOD

The analysis of stability of paddy and rice supply and price in Sukoharjo Regency, especially in Tawang Sari and Mojolaban Districts, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Sukoharjo Regency is determined as the location of the study because it has the highest rice productivity in Central Java, which is 7,466 tons/ha while the average rice productivity in Central Java is 5.74 tons/ha. Whereas the determination of Tawang Sari and Mojolaban Districts is based on activities related to efforts to increase production and land productivity, namely the existence of a land consolidation program.

The research method used is a secondary data method. The data used in this study are paddy production and prices of paddy and rice.

The analytical method used is descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is coefficient of variance analysis. Fluctuations of paddy and rice price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018)

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where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 9 (The Indonesian Ministry of Trade, 2019).

The coefficient of variation (CV) is the ratio between the standard deviation and the average value, expressed as a percentage, which is useful for looking at the distribution of data from the calculated average (Walpole, 2000).

Where:

$$CV = \frac{\sigma}{\bar{X}}$$

Cv = coefficient of variation

σ = standard deviation

\bar{X} = mean variable

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rain fed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%).

Central Java Province is one of the main food producers for national stock lead to promote paddy productivity. In 2018, the level of wetland paddy productivity is about 6.099 tons per hectare, with the harvested area 1.80 million hectare and production of wetland paddy 11.00 million tons. Meanwhile, Sukoharjo Regency is one of regencies that support food in Central Java, so the productivity food crops, especially paddy, is continually increased. In 2018 productivity of paddy reached 7.208tons/ha, while production of paddy reached 391,675 tons and 54,339 hectares of harvested area. Productivity of paddy in Sukoharjo is higher among the paddy productivity in other regency/municipality, while the lowest productivity was recorded in the Pekalongan Regency in the amount of 4.312 tons per hectare. The

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high productivity of paddy in Sokoharjo shows that the ability of farmers in paddy farming has been going well.

The research approach taken is paddy and rice stability. So there is a conversion from paddy to rice. The Central Statistics Agency said that the conversion rate of milled unhusked rice (GKG) to rice that is now used is 64.02%. This figure is up from the previous calculation at 62% which is often used as a reference for farmers and rice mills before. The change in number was caused by an improvement in the paddy production sector, "The processing technique has improved.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

Demand is very important for production planning to be have an impact on how big the rate is supply to keep price stability. Total commodity demand is useful for food as one input in determining food commodity production targets, how much is needed as well overview of future price developments. Meanwhile the number of supply is useful for food commodities as description of the level of commodity production concerned agriculture that can achieved based on assumptions that are used. By comparing the results of demand and can be known the condition of the demand balance and supply of the relevant commodity whether in a state of surplus or deficit. In the short term and medium condition will be related to current distribution of food commodities which impact on supply and price stability.

The main actors in development agriculture is a farmer that cultivate the certain agricultural commodities. Farmers have an important position as one of the subject actor's economy in the local, regional order even nationally. Important thing farmers are expected to be sustainable farm is price certainty. So that agricultural business that it runs able to provide an income feasible and sustainable, then commodities which should be cultivated properly is a prospective commodity on the market

a. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

The amount of food available must meet the interests of all people, whether sourced from domestic or imported production. Second, accessibility both physically and economically. Physical affordability requires that food is easily accessible to individuals or households. Whereas economic affordability means the ability to obtain or buy food or is related to the people's purchasing power for food. Third, the aspect of stability (stability), refers to the ability to minimize the possibility of food consumption below the level of standard needs in difficult seasons (famine or natural disasters) (M Fuad, 2009).

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113.48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by BPS. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 1.

Table 1. Analysis of Coefficient of Variance of Availability and Consumption of Rice in Tawang Sari, Mojolaban District and Sukoharjo Regency

District Year	Paddy Production (ton)	Rice Supply (ton)	Population (person)	Rice Consumption (ton)	Surplus (ton)	CV
Tawang Sari						
- 2016	32,12	21,003.21	47,94	5,439.78	15,563.43	6.35
- 2017	35,17	22,999.87	47,99	5,446.13	17,553.74	
- 2018	32,39	21,181.10	47,95	5,441.14	15,739.96	
Mojolaban						
2016	46,79	30,603.93	93,845	10,641.57	19,962.36	7.88
2017	45,64	29,846.60	95,06	10,779.69	19,066.91	
2018	40,53	26,503.35	96,27	10,916.79	15,586.56	
Sukoharjo						
2016	391,68	256,155.45	871,39	98,886.13	157,269.32	7.78
2017	387,98	253,738.92	878,37	99,677.88	154,061.04	
2018	341,59	223,403.13	880,35	99,902.23	123,500.90	

Source : Jawa Tengah Dalam Angka 2018, Tawang Sari Dalam Angka 2019, Mojolaban Dalam Angka 2019

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public

consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply.

Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can achieved.

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An area said to be stable in supply can be seen from the coefficient of variance value smaller than 9. The results of the CV analysis in the study area showed a value smaller than 9, namely 6.35; 7.88 and 7.87 respectively. This shows that the availability of rice in the study area is stable. The surplus and stability of a region's rice supply illustrates that rice is a potential commodity in the area. Furthermore, with the existence of a surplus and stability the distribution of these commodities is possible to other regions.

The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of study location the rice supply is stable. This condition is also supported by the small value of the coefficient variance, which is 6.35; 7.88 and 7.87 for each region, meaning that there is no fluctuations at all. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional demands and it is also possible to have distribution outside the region as presented in the supply chain.

Based on the results of one sample t test analysis, it is known that rice in the study area is in a stable condition. This is indicated by the significance value of each CV namely 0.036; 0.041 and 0.046 respectively that less than 0.05. This showed that paddy and rice commodities are potential commodities for Tawang Sari and Mojolaban Districts and Sukoharjo Regency.

The stability of rice supply is a potential for the region to distribute to other regions. Because the amount of availability is greater than population consumption and is an area that has food security, especially rice.

b. Price Stability

Annual production pattern of paddy and rice in the production center shows that paddy and rice production during the main harvest is always abundant while monthly demand for paddy and rice is relatively stable. This matter causing the price of paddy and rice to fall. Conversely when it does not occur harvest, less paddy and rice production so it is lower than paddy and rice needs. As a result, prices will increase and not affordable, which occurs when farmers actually do not have inventory. This shows that the price of paddy and rice fluctuates according to season.

Fluctuations in commodity prices basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers. If there is an oversupply, the commodity prices will go down, on the other hand the commodity prices will rise if there is a lack of supply. For agricultural commodities that depend on the season, price fluctuations during the harvest season and non harvest season will occur.

Prices play an important role in the market economy. Price is one of the factors that determine every decision of producers and consumers in allocating limited resources in order to go to the optimal Pareto condition or balance condition (Brummer *et al.*, 2009). According to Nicholson (2004), market prices have two main functions, namely: (i) as information about the quantity of commodities that producers should offer to obtain maximum profits; and (ii) as a determinant of the level of demand for consumers who want maximum satisfaction.

There are at least two reasons why an analysis of rice prices is important to do, in this case related to the purpose of conducting a price analysis namely (1) to estimate certain economic coefficients (parameters) such as the elasticity of demand for rice prices, and (2) to forecast (price) in the future and the factors that influence the price level of rice.

Price fluctuations are actually a normal thing and are needed to keep the market functioning, ie creating a competitive market. Changes in prices will become

a problem if prices soar very high and unpredictable, which in turn will create uncertainty that can increase risks for producers, traders, consumers, and of course also the government.

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data were approached with prices at each harvest season, while the rice price can be approached every month.

Table 2 Average Paddy Prices and Coefficient Variance in Study Locations

Description Districts	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4
Sukoharjo	4,261,4	4,608.6	4,265.0	4,558.6	5.7	5,6	5.0	5.1

Based on the analysis results, it is known that there is price variation in paddy prices in Tawanghari and Mojolaban Districts and Sukoharjo Regency with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in research location for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawanghari so that the price declines. This is in accordance with the opinion of Brummer *et al.* (2013) concluded that price fluctuations are basically strongly influenced by supply and demand in the market. For agricultural commodities, input markets and fossil fuels greatly affect price fluctuations. Stock can also affect prices, low stock will cause prices to increase in the market. Price fluctuations in the study area did not cause price volatility. This is indicated by the CV value lower than 9, which means that the price of paddy is in a stable condition.

Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018.

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Table 3. Average Rice Price and Coefficient Variance in Study Locations

Description Location	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	10,500	10,692.3	9,507.7	9,500	0	2.3	0.29	0
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	5.6	5.8	4.4	7.1
Sukoharjo	10,615.4	12,150.0	9,534.6	11,600.0	5.8	6.1	4.9	7.5

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.0. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts and Sukoharjo Regency can be categorized into minor because the values are less than 9. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 9%. Based on inferent and descriptive analysis, it can be stated that the stability of rice prices in the study area is maintained.

Prices and CV in Sukoharjo Regency are greater than Tawang Sari and Mojolaban Districts. This happens because Sukoharjo is an area that encompasses several districts where each district varies greatly in the price of rice. Moreover, not all districts are paddy granaries and rice.

The smaller the coefficient of variation can be interpreted that the price is relatively stable or has a low level of fluctuation. Price stability is one indicator that can be used to give a signal to producers of price risk factors that may be faced by a producer and the government in order to protect producers and consumers.

Actually, food price stability can be achieved if it can built sufficient government food reserves for respond to food insecurity due to natural disasters and social and reduce the sharp rise in food prices. (Suryana *et al.*, 2014)

CONCLUSION

The stability of paddy and rice prices and the stability of paddy and rice supplies occurred in Tawangasari District, Mojolaban District and Sukoharjo Regency.

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ACKNOWLEDGMENTS

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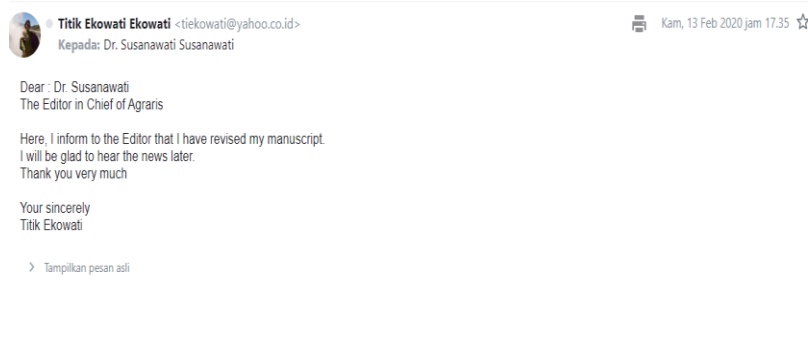
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5. Attachment 5: Revision submit, Februari 13, 2020



Revision Manuscript 2

The Stability of Supply and Rice Price in Sukoharjo Regency
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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply and price stability of rice. The study used a secondary data method. The study was conducted in Tawang Sari and Mojolaban Districts of Sukoharjo Regency. Data were analyzed by Co variance analysis. The study results showed that supply and rice consumption were surplus and stable. The stability of prices and supply for paddy and rice is occurred in Tawang Sari and Mojolaban Districts and Sukoharjo regency as well.

Key words: paddy, price, rice, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji

fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan dan harga beras. Penelitian menggunakan metode data sekunder. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban Kabupaten Sukoharjo. Data dianalisis dengan analisis Co variance. Hasil penelitian menunjukkan bahwa pasokan beras pada kondisi surplus dan stabil. Harga padi dan beras berada pada kondisi stabil.

Kata kunci : beras, harga, padi, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity (Kasyrino *et al.*, 2001, Nur *et al.*, 2012)

Development of agricultural commodities requires an understanding of market prospects, resource capabilities and technological potential. The imbalance between supply and demand will affect the price and profitability, so that it requires an intervention policy and planning to deal with the situation. Projection of supply or demand is very important for production planning which will have an impact on what level of supply to maintain price stability. Food supply and price stabilization is a problem faced by almost every region in Indonesia. Some factors that affect the stability of supply and food prices are the amount of production, population increase, demand, climate change, trade barriers.

Rice is a strategic commodity that can affect economic, social and even political stability. Rice commodity is still one of the key commodities in influencing the stability of general prices. The increase in rice prices can trigger an increase in the prices of other goods (Sari 2010). This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005, Widadi and Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the supply, demand, and the price stability of both paddy and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow

of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, supply stability and price stability will occur.

Based on the background, the formulation of the problem is how the conditions of paddy and rice supply in the study area. While this study aims to analyze the paddy and rice stability of supply and price in the study area

RESEARCH METHOD

The analysis of stability of paddy and rice supply and price in Sukoharjo Regency, especially in Tawang Sari and Mojolaban Districts, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Sukoharjo Regency is determined as the location of the study because it has the highest rice productivity in Central Java, which is 7,466 tons/ha while the average rice productivity in Central Java is 5.74 tons/ha. Whereas the determination of Tawang Sari and Mojolaban Districts is based on activities related to efforts to increase production and land productivity, namely the existence of a land consolidation program.

Secondary data method was used in this research with the kind of data are paddy production, rice supply, population, rice consumption, paddy prices and rice prices in the year of 2016, 2017 and 2018. Meanwhile the variety of paddy was IR64 and C4. The analytical method used is descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is coefficient of variance analysis. Fluctuations of paddy and rice price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 9 (The Indonesian Ministry of Trade, 2019).

The coefficient of variation (CV) is the ratio between the standard deviation and the average value, expressed as a percentage, which is useful for looking at the distribution of data from the calculated average (Walpole, 2000).

Where:

$$CV = \frac{\sigma}{\bar{X}}$$

Cv = coefficient of variation

σ = standard deviation

\bar{X} = mean variable

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rain fed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%) (BPS, 2018). An overview of the regional potential is presented in Table 1.

Table 1. The Area Wide by Utilizing in Grobogan Regency, 2018

Component	Rice Fields --- ha ---	Non Rice Fields --- ha ---
Wide area	20,617	26,049
Technical irrigated	14,655	
Semi-technical irrigated	2,161	
Simple irrigated	1,967	
Rain fed area	1,834	

Central Java Province is one of the main food producers for national stock lead to promote paddy productivity. In 2018, the level of wetland paddy productivity is about 6.099 tons/ha, with the harvested area 1.80 million ha and production of wetland paddy 11.00 million tons. Meanwhile, Sukoharjo Regency is one of regencies that support food in Central Java, so the productivity food crops, especially paddy, is continually increased. In 2018 productivity of paddy reached 7.208tons/ha,

while production of paddy reached 391,675 tons and 54,339 ha of harvested area. Productivity of paddy in Sukoharjo is higher among the paddy productivity in other regency/municipality, while the lowest productivity was recorded in the Pekalongan Regency in the amount of 4.312 tons/ha. The high productivity of paddy in Sokoharjo showed that the ability of farmers in paddy farming has been going well.

The research approach taken is paddy and rice stability. So there is a conversion from paddy to rice. The Central Statistics Agency said that the conversion rate of milled unhusked rice (GKG) to rice that is now used is 64.02%. This figure is up from the previous calculation at 62% which is often used as a reference for farmers and rice mills before. The change in number was caused by an improvement in the paddy production sector, "The processing technique has improved.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

Demand is very important for production planning to be have an impact on how big the rate is supply to keep price stability. Total commodity demand is useful for food as one input in determining food commodity production targets, how much is needed as well overview of future price developments. Meanwhile the number of supply is useful for food commodities as description of the level of commodity production concerned agriculture that can achieved based on assumptions that are used. By comparing the results of demand and can be known the condition of the demand balance and supply of the relevant commodity whether in a state of surplus or deficit. In the short term and medium condition will be related to current distribution of food commodities which impact on supply and price stability.

The main actors in development agriculture is a farmer that cultivate the certain agricultural commodities. Farmers have an important position as one of the subject actor's economy in the local, regional order even nationally. Important thing farmers are expected to be sustainable farm is price certainty. So that agricultural

business that it runs able to provide an income feasible and sustainable, then commodities which should be cultivated properly is a prospective commodity on the market

a. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

The amount of food available must meet the interests of all people, whether sourced from domestic or imported production. Second, accessibility both physically and economically. Physical affordability requires that food is easily accessible to individuals or households. Whereas economic affordability means the ability to obtain or buy food or is related to the people's purchasing power for food. Third, the aspect of stability (stability), refers to the ability to minimize the possibility of food consumption below the level of standard needs in difficult seasons (famine or natural disasters) (Fuad, 2009).

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the

study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113.48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by Central Bureau of Statistic. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 2.

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply. Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can be achieved.

Table 2. Analysis of Coefficient of Variance of Availability and Consumption of Rice in Tawang Sari, Mojolaban District and Sukoharjo Regency

District	Paddy Production (ton)	Rice Supply (ton)	Population (person)	Rice Consumption (ton)	Surplus (ton)	CV
Tawang Sari						
- 2016	32,12	21,003.21	47,94	5,439.78	15,563.43	6.35
- 2017	35,17	22,999.87	47,99	5,446.13	17,553.74	
- 2018	32,39	21,181.10	47,95	5,441.14	15,739.96	
Mojolaban						
2016	46,79	30,603.93	93,845	10,641.57	19,962.36	7.88
2017	45,64	29,846.60	95,06	10,779.69	19,066.91	
2018	40,53	26,503.35	96,27	10,916.79	15,586.56	
Sukoharjo						
2016	391,68	256,155.45	871,39	98,886.13	157,269.32	7.78
2017	387,98	253,738.92	878,37	99,677.88	154,061.04	
2018	341,59	223,403.13	880,35	99,902.23	123,500.90	

Source : Jawa Tengah Dalam Angka 2018
Tawang Sari Dalam Angka 2019
Mojolaban Dalam Angka 2019

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Rice Supply and consumption(ton)

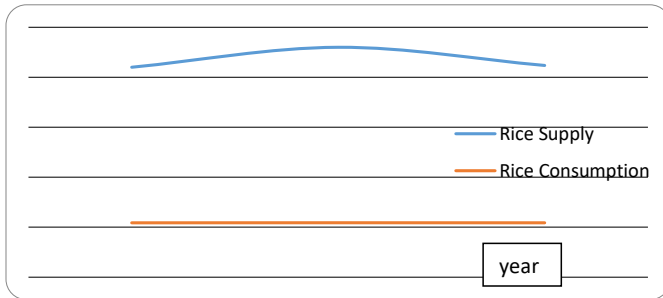


Illustration 1 : Rice Supply and Rice Consumption in Tawang Sari District

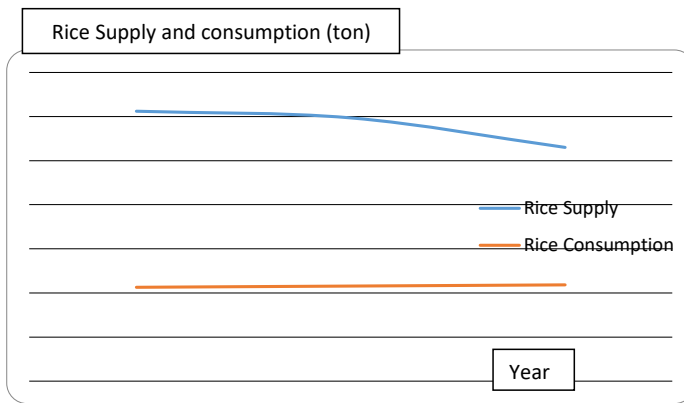


Illustration 2 : Rice Supply and Rice Consumption in Mojolaban District

The amount of rice supply and consumption in the Tawang Sari District and Mojolaban District showed that both regions have been able to meet the consumption even in the third year the supply of rice is decrease. It is mean that the amount of rice supply is higher than rice consumption resulting in a surplus of rice supply. The occurrence of a rice surplus is one of the factors of stability. The amount of rice supply is stable if the co variance value is smaller than 9.

The results of the CV analysis in the study area showed a value smaller than 9, namely 6.35; 7.88 and 7.87 respectively. This shows that the availability of rice in the study area is stable. The surplus and stability of a region's rice supply illustrates that rice is a potential commodity in the area. Furthermore, with the

existence of a surplus and stability the distribution of these commodities is possible to other regions.

The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of the rice supply is stable. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional consumption and it is also possible to have distribution outside the region as presented in the supply chain.

Based on the results of one sample t test analysis, it is known that rice in the study area is in a stable condition. This is indicated by the significance value of each CV namely 0.036; 0.041 and 0.046 respectively that less than 0.05. This showed that paddy and rice commodities are potential commodities for Tawang Sari and Mojolaban Districts and Sukoharjo Regency.

The stability of rice supply is a potential for the region to distribute to other regions. Because the amount of availability is greater than population consumption and is an area that has food security, especially rice.

b. Price Stability

Annual production pattern of paddy and rice in the production center shows that paddy and rice production during the main harvest is always abundant while monthly demand for paddy and rice is relatively stable. This matter causing the price of paddy and rice to fall. Conversely when it does not occur harvest, less paddy and rice production so it is lower than paddy and rice needs. As a result, prices will increase and not affordable, which occurs when farmers actually do not have inventory. This shows that the price of paddy and rice fluctuates according to season.

Fluctuations in commodity prices basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers. If there is an oversupply, the commodity prices will go down, on the other hand the commodity prices will rise if there is a lack of supply. For agricultural commodities

that depend on the season, price fluctuations during the harvest season and non harvest season will occur.

Prices play an important role in the market economy. Price is one of the factors that determine every decision of producers and consumers in allocating limited resources in order to go to the optimal Pareto condition or balance condition (Brummer *et al.*, 2009). According to Nicholson (2004), market prices have two main functions, namely: (i) as information about the quantity of commodities that producers should offer to obtain maximum profits; and (ii) as a determinant of the level of demand for consumers who want maximum satisfaction. There are at least two reasons why an analysis of rice prices is important to do, in this case related to the purpose of conducting a price analysis namely (1) to estimate certain economic coefficients (parameters) such as the elasticity of demand for rice prices, and (2) to forecast (price) in the future and the factors that influence the price level of rice.

Price fluctuations are actually a normal thing and are needed to keep the market functioning, ie creating a competitive market. Changes in prices will become a problem if prices soar very high and unpredictable, which in turn will create uncertainty that can increase risks for producers, traders, consumers, and of course also the government. That is corresponding to Widadi and Sutanto, 2012 that prices can be influenced by factors of production, risk of product and government policy.

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The data of paddy were approached with prices at each harvest season, while the rice price can be approached every month. It is presented at Table 3.

Table 3 Average Paddy Prices and Coefficient Variance in Study Locations

Description Districts	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4
Sukoharjo	4,261.4	4,608.6	4,265.0	4,558.6	5.7	5.6	5.0	5.1

Based on the analysis results, it is known that there is price variation in paddy prices in Tawang Sari and Mojolaban Districts and Sukoharjo Regency with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in research location for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawang Sari so that the price declines. This is in accordance with the opinion of Brummer *et al.* (2013) concluded that price fluctuations are basically strongly influenced by supply and demand in the market. For agricultural commodities, input markets and fossil fuels greatly affect price fluctuations. Stock can also affect prices, low stock will cause prices to increase in the market. Price fluctuations in the study area did not cause price volatility. This is indicated by the CV value lower than 9, which means that the price of paddy is in a stable condition. This is in accordance with the Proborini that the stable condition is indicated by a CV of less than 9. Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018. It is presented at Table 4.

Table 4. Average Rice Price and Coefficient Variance in Study Locations

Description Location	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	10,438.4	10,692.3	9,507.7	9,580.7	2.12	2.3	0.29	1.69
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	5.6	5.8	4.4	7.1
Sukoharjo	10,615.4	12,150.0	9,534.6	11,600.0	5.8	6.1	4.9	7.5

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression

for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.0. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts and Sukoharjo Regency can be categorized into minor because the values are less than 9. This is consistent with Proborini (2018) and The Indonesian Ministry of Trade (2019) that the minimum standard of CV value for price stability set is less than 9%. Based on inferent and descriptive analysis, it can be stated that the stability of rice prices in the study area is maintained.

Prices and CV in Sukoharjo Regency are greater than Tawang Sari and Mojolaban Districts. This happens because Sukoharjo is an area that encompasses several districts where each district varies greatly in the price of rice. Moreover, not all districts are paddy granaries and rice.

The smaller the coefficient of variation can be interpreted that the price is relatively stable or has a low level of fluctuation. Price stability is one indicator that can be used to give a signal to producers of price risk factors that may be faced by a producer and the government in order to protect producers and consumers.

Actually, food price stability can be achieved if it can build sufficient government food reserves for respond to food insecurity due to natural disasters and social and reduce the sharp rise in food prices. (Suryana *et al.*, 2014)

CONCLUSION

Based on the research result, it can be concluded that :

1. The rice consumption is smaller than rice supply, so Sukoharjo is a rice supply area
2. Paddy and rice supply and also price of rice were in stable condition

ACKNOWLEDGMENTS

I would like to thank to the Directorate of Research and Community Service, Directorate General of Strengthening Research and Development at the Ministry of Research, Technology and Higher Education regarding the Research and

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6. Attachment 6: Editor Decesion (Third Review), Mei, 29 2020

[AGRARIS] Editor Decision 2

Yahoo/Email M... ☆



Dr. Susanawati Susanawati <journalmy@gmail.com>
Kepada: Dr. Titik Ekowati

Jum, 29 Mei 2020 jam 21.00 ☆

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency".

Our decision is to: REVISIONS REQUIRED

If you decide to continue publishing your work to this journal, please return back the revised manuscript to the editor within 7 days via OJS. We would be glad if you submit your revised manuscript as soon as possible.

Dr. Susanawati Susanawati
Program Studi Agribisnis, Fakultas Pertanian, Universitas Muhammadiyah Yogyakarta
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AGRARIS
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Dr. Susanawati Susanawati <journalumy@gmail.com>

Kepada: Dr. Titik Ekowati

Jum, 29 Mei 2020 jam 21.00

Dr. Titik Ekowati:

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please revise Is there any non-annual data ? So that the trend display is better. The writing on the graph is annoying

Review 3

The Stability of Supply and Rice Price in Sukoharjo Regency

Titik Ekowati, Edy Prasetyo and Mukson

Agribusiness Study Program, Diponegoro University, Semarang, Indonesia

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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply and price stability of rice. The study used a secondary data method. The study was conducted in Tawang Sari and Mojolaban Districts of Sukoharjo Regency. Data were analyzed by Co variance analysis. The study results showed that supply and rice consumption were surplus and stable. The stability of prices and supply for paddy and rice is occurred in Tawang Sari and Mojolaban Districts and Sukoharjo regency as well.

Key words: paddy, price, rice, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan dan harga beras. Penelitian menggunakan metode data sekunder. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban Kabupaten Sukoharjo. Data dianalisis dengan analisis Co variance. Hasil penelitian menunjukkan bahwa pasokan beras pada kondisi surplus dan stabil. Harga padi dan beras berada pada kondisi stabil.

Kata kunci : beras, harga, padi, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Development of agricultural commodities requires an understanding of market prospects, resource capabilities and technological potential. The imbalance between supply and demand will affect the price and profitability, so that it requires an intervention policy and planning to deal with the situation. Projection of supply or demand is very important for production planning which will have an impact on what level of supply to maintain price stability. Food supply and price stabilization is a problem faced by almost every region in Indonesia. Some factors that affect the stability of supply and food prices are the amount of production, population increase, demand, climate change, trade barriers.

Rice is a strategic commodity that can affect economic, social and even political stability. Rice commodity is still one of the key commodities in influencing the stability of general prices. The increase in rice prices can trigger an increase in the prices of other goods (Sari 2010). This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein

requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005, Widadi and Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the supply, demand, and the price stability of both paddy and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, supply stability and price stability will occur.

Based on the background, the formulation of the problem is how the conditions of paddy and rice supply in the study area. While this study aims to analyze the paddy and rice stability of supply and price in the study area

RESEARCH METHOD

The analysis of stability of paddy and rice supply and price in Sukoharjo Regency, especially in Tawang Sari and Mojolaban Districts, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Sukoharjo Regency is determined as the location of the study because it has the highest rice productivity in Central Java, which is 7,466 tons/ha while the average rice productivity in Central Java is 5.74 tons/ha. Whereas the determination of Tawang Sari and Mojolaban Districts is based on activities related to efforts to increase production and land productivity, namely the existence of a land consolidation program.

Secondary data method was used in this research with the kind of data are paddy production, rice supply, population, rice consumption, paddy prices and rice prices in the year of 2016, 2017 and 2018. Meanwhile the variety of paddy was IR64 and C4. The analytical method used is descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is coefficient of variance analysis. Fluctuations of paddy and rice price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 9 (The Indonesian Ministry of Trade, 2019).

The coefficient of variation (CV) is the ratio between the standard deviation and the average value, expressed as a percentage, which is useful for looking at the distribution of data from the calculated average (Walpole, 2000).

Where:

$$CV = \frac{\sigma}{\bar{X}}$$

Cv = coefficient of variation

σ = standard deviation

\bar{X} = mean variable

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rain fed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017 was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%). An overview of the regional potential is presented in Table 1.

Table 1. The Area Wide by Utilizing in Grobogan Regency, 2018

Component	Rice Fields --- ha ---	Non Rice Fields --- ha ---
Wide area	20,617	26,049
Technical irrigated	14,655	
Semi-technical irrigated	2,161	
Simple irrigated	1,967	
Rain fed area	1,834	

Central Java Province is one of the main food producers for national stock lead to promote paddy productivity. In 2018, the level of wetland paddy productivity is about 6.099 tons/ha, with the harvested area 1.80 million ha and production of wetland paddy 11.00 million tons. Meanwhile, Sukoharjo Regency is one of regencies that support food in Central Java, so the productivity food crops, especially paddy, is continually increased. In 2018 productivity of paddy reached 7.208tons/ha, while production of paddy reached 391,675 tons and 54,339 ha of harvested area. Productivity of paddy in Sukoharjo is higher among the paddy productivity in other regency/municipality, while the lowest productivity was recorded in the Pekalongan Regency in the amount of 4.312 tons/ha. The high productivity of paddy in Sokoharjo showed that the ability of farmers in paddy farming has been going well.

The research approach taken is paddy and rice stability. So there is a conversion from paddy to rice. The Central Statistics Agency said that the conversion rate of milled unhusked rice (GKG) to rice that is now used is 64.02%. This figure

is up from the previous calculation at 62% which is often used as a reference for farmers and rice mills before. The change in number was caused by an improvement in the paddy production sector, "The processing technique has improved.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period, the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

Demand is very important for production planning to be have an impact on how big the rate is supply to keep price stability. Total commodity demand is useful for food as one input in determining food commodity production targets, how much is needed as well overview of future price developments. Meanwhile the number of supply is useful for food commodities as description of the level of commodity production concerned agriculture that can achieved based on assumptions that are used. By comparing the results of demand and can be known the condition of the demand balance and supply of the relevant commodity whether in a state of surplus or deficit. In the short term and medium condition will be related to current distribution of food commodities which impact on supply and price stability.

The main actors in development agriculture is a farmer that cultivate the certain agricultural commodities. Farmers have an important position as one of the subject actor's economy in the local, regional order even nationally. Important thing farmers are expected to be sustainable farm is price certainty. So that agricultural business that it runs able to provide an income feasible and sustainable, then commodities which should be cultivated properly is a prospective commodity on the market

a. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand

of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

The amount of food available must meet the interests of all people, whether sourced from domestic or imported production. Second, accessibility both physically and economically. Physical affordability requires that food is easily accessible to individuals or households. Whereas economic affordability means the ability to obtain or buy food or is related to the people's purchasing power for food. Third, the aspect of stability (stability), refers to the ability to minimize the possibility of food consumption below the level of standard needs in difficult seasons (famine or natural disasters) (Fuad, 2009).

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113.48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by Central Bureau of Statistic. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs

of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 2.

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply. Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can be achieved.

Table 2. Analysis of Coefficient of Variance of Availability and Consumption of Rice in Tawang Sari, Mojolaban District and Sukoharjo Regency

District	Paddy Production (ton)	Rice Supply (ton)	Population (person)	Rice Consumption (ton)	Surplus (ton)	CV
Tawang Sari						
- 2016	32,12	21,003.21	47,94	5,439.78	15,563.43	6.35
- 2017	35,17	22,999.87	47,99	5,446.13	17,553.74	
- 2018	32,39	21,181.10	47,95	5,441.14	15,739.96	
Mojolaban						
2016	46,79	30,603.93	93,845	10,641.57	19,962.36	7.88
2017	45,64	29,846.60	95,06	10,779.69	19,066.91	
2018	40,53	26,503.35	96,27	10,916.79	15,586.56	

Sukoharjo						
2016	391,68	256,155.45	871,39	98,886.13	157,269.32	
2017	387,98	253,738.92	878,37	99,677.88	154,061.04	7.78
2018	341,59	223,403.13	880,35	99,902.23	123,500.90	

Source : Jawa Tengah Dalam Angka 2018, Tawang Sari Dalam Angka 2019
Mojolaban Dalam Angka 2019

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply. Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can be achieved. Changes in the amount and supply of rice are presented in Illustration 1 and 2.

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The writing on the graph is annoying

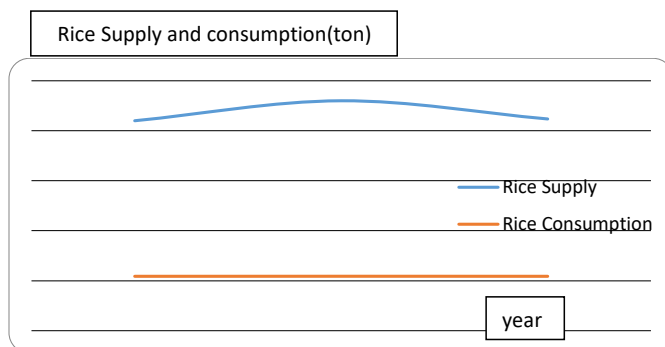


Illustration 1 : Rice Supply and Rice Consumption in Tawang Sari District

Rice Supply and consumption (ton)

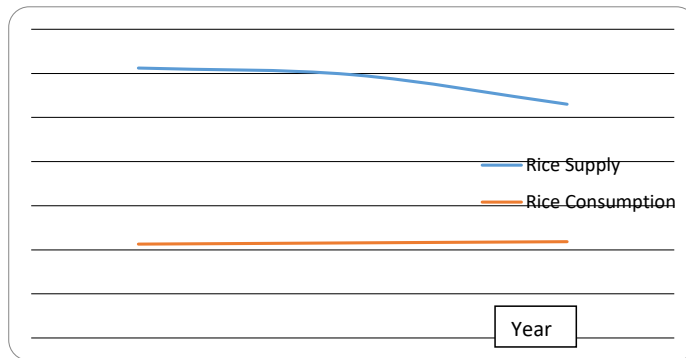


Illustration 2 : Rice Supply and Rice Consumption in Mojolaban District

The amount of rice supply and consumption in the Tawang Sari District and Mojolaban District showed that both regions have been able to meet the consumption even in the third year the supply of rice is decrease. It is mean that the amount of rice supply is higher than rice consumption resulting in a surplus of rice supply. The occurrence of a rice surplus is one of the factors of stability. The amount of rice supply is stable if the co variance value is smaller than 9.

The results of the CV analysis in the study area showed a value smaller than 9, namely 6.35; 7.88 and 7.87 respectively. This shows that the availability of rice in the study area is stable. The surplus and stability of a region's rice supply illustrates that rice is a potential commodity in the area. Furthermore, with the existence of a surplus and stability the distribution of these commodities is possible to other regions.

The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of the rice supply is stable. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional consumption and it is also possible to have distribution outside the region as presented in the supply chain.

Based on the results of one sample t test analysis, it is known that rice in the study area is in a stable condition. This is indicated by the significance value of

each CV namely 0.036; 0.041 and 0.046 respectively that less than 0.05. This showed that paddy and rice commodities are potential commodities for Tawang Sari and Mojolaban Districts and Sukoharjo Regency.

The stability of rice supply is a potential for the region to distribute to other regions. Because the amount of availability is greater than population consumption and is an area that has food security, especially rice.

b. Price Stability

Annual production pattern of paddy and rice in the production center shows that paddy and rice production during the main harvest is always abundant while monthly demand for paddy and rice is relatively stable. This matter causing the price of paddy and rice to fall. Conversely when it does not occur harvest, less paddy and rice production so it is lower than paddy and rice needs. As a result, prices will increase and not affordable, which occurs when farmers actually do not have inventory. This shows that the price of paddy and rice fluctuates according to season.

Fluctuations in commodity prices basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers. If there is an oversupply, the commodity prices will go down, on the other hand the commodity prices will rise if there is a lack of supply. For agricultural commodities that depend on the season, price fluctuations during the harvest season and non harvest season will occur.

Prices play an important role in the market economy. Price is one of the factors that determine every decision of producers and consumers in allocating limited resources in order to go to the optimal Pareto condition or balance condition (Brummer *et al.*, 2009). According to Nicholson (2004), market prices have two main functions, namely: (i) as information about the quantity of commodities that producers should offer to obtain maximum profits; and (ii) as a determinant of the level of demand for consumers who want maximum satisfaction.

There are at least two reasons why an analysis of rice prices is important to do, in this case related to the purpose of conducting a price analysis namely (1) to

estimate certain economic coefficients (parameters) such as the elasticity of demand for rice prices, and (2) to forecast (price) in the future and the factors that influence the price level of rice.

Price fluctuations are actually a normal thing and are needed to keep the market functioning, ie creating a competitive market. Changes in prices will become a problem if prices soar very high and unpredictable, which in turn will create uncertainty that can increase risks for producers, traders, consumers, and of course also the government.

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data were approached with prices at each harvest season, while the rice price can be approached every month.

Table 3 Average Paddy Prices and Coefficient Variance in Study Locations

Description	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4
Sukoharjo	4,261.4	4,608.6	4,265.0	4,558.6	5.7	5.6	5.0	5.1

Based on the analysis results, it is known that there is price variation in paddy prices in Tawanghari and Mojolaban Districts and Sukoharjo Regency with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in research location for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawanghari so that the price declines. This is in accordance with the opinion of Brummer *et al.* (2013) concluded that price fluctuations are basically strongly influenced by supply and demand in the market. For agricultural commodities, input markets and fossil fuels greatly affect price fluctuations. Stock can also affect prices, low stock will cause prices to increase in the market. Price fluctuations in the study

area did not cause price volatility. This is indicated by the CV value lower than 9, which means that the price of paddy is in a stable condition. Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018. It is presented at Table 4.

Table 4. Average Rice Price and Coefficient Variance in Study Locations

Description	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
Location	2017	2018	2017	2018	2017	2018	2017	2018
Tawang Sari	10,438.4	10,692.3	9,507.7	9,580.7	2.12	2.3	0.29	1.69
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	5.6	5.8	4.4	7.1
Sukoharjo	10,615.4	12,150.0	9,534.6	11,600.0	5.8	6.1	4.9	7.5

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.0. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts and Sukoharjo Regency can be categorized into minor because the values are less than 9. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 9%. Based on inferent and descriptive analysis, it can be stated that the stability of rice prices in the study area is maintained.

Prices and CV in Sukoharjo Regency are greater than Tawang Sari and Mojolaban Districts. This happens because Sukoharjo is an area that encompasses several districts where each district varies greatly in the price of rice. Moreover, not all districts are paddy granaries and rice.

The smaller the coefficient of variation can be interpreted that the price is relatively stable or has a low level of fluctuation. Price stability is one indicator that can be used to give a signal to producers of price risk factors that may be faced by a producer and the government in order to protect producers and consumers.

Actually, food price stability can be achieved if it can built sufficient government food reserves for respond to food insecurity due to natural disasters and social and reduce the sharp rise in food prices. (Suryana *et al.*, 2014)

CONCLUSION

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Based on the research result, it can be concluded that :

1. The rice consumption is smaller than rice supply, so Sukoharjo is a rice supply area
2. Paddy and rice suplly and also price of rice were in stable condition

ACKNOWLEDGMENTS

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7. **Attachment 7: Revision Submit (Third Revision), June, 3 2020**



Titik Ekowati Ekowati <ti.ekowati@yahoo.co.id>
Kepada: Dr. Susanawati Susanawati

Rab, 3 Jun 2020 jam 20.05

Dr. Susanawati
Editor of Agraris Journal

Here I inform You that I have emailed the revised of manuscript by OJS.
I would like to say thank for your attention.

Titik Ekowati
PS Agribisnis FPP Undip

> Tampilkan pesan asli

Paper Review 3

Correction	Revision
Is there any non-annual data ? So that the trend display is better. The writing on the graph is annoying	Have been revised
Conclusion should be elaborate	Have been revised

The Stability of Supply and Rice Price in Sukoharjo Regency

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ABSTRACT

The economic conditions of rice, whether aspect of supply, demand, or rice price is continue to fluctuate due to changes of the phenomena. Therefore, this commodity needs to be examined in regarding its supply, demand and price aspects. This study aims to analyze the supply and price stability of rice. The study used a secondary data method. The study was conducted in Tawang Sari and Mojolaban Districts of Sukoharjo Regency. Data were analyzed by Co variance analysis. The study results showed that supply and rice consumption were surplus and stable. The stability of prices and supply for paddy and rice is occurred in Tawang Sari and Mojolaban Districts and Sukoharjo regency as well.

Key words: paddy, price, rice, stability, supply

INTISARI

Kondisi ekonomi perberasan baik itu yang menyangkut aspek penawaran, permintaan maupun harga beras terus mengalami gejolak fluktuasi akibat adanya perubahan fenomena yang terjadi. Oleh karena itu, komoditi beras perlu dikaji fenomena aspek penawaran, permintaan maupun harga beras kedalam sebuah model ekonomi. Penelitian bertujuan menganalisis pasokan dan harga beras. Penelitian menggunakan metode data sekunder. Penelitian dilakukan di Kecamatan Tawang Sari dan Kecamatan Mojolaban Kabupaten Sukoharjo. Data dianalisis dengan analisis Co variance. Hasil penelitian menunjukkan bahwa pasokan beras pada kondisi surplus dan stabil. Harga padi dan beras berada pada kondisi stabil.

Kata kunci : beras, harga, padi, pasokan, stabilitas

INTRODUCTION

Background

Food has become a serious concern of the government and the public in early 2013. This is highly related to Indonesia's population of more than 250 million people who need a huge production and consumption of food commodities. Merely food availability is not enough to bring food security into realization but food access and food absorption are also important factors. If these three indicators i.e. food security, food access, and food absorption cannot be fulfilled, food insecurity as a condition where it is unable to obtain sufficient food will occur. If there is food insecurity, then economic, political, and social stabilities of a country will be threatened. Food insecurity is one of the causes of inefficient land use due to the limited land tenure of farmers. This in turn will result in low productivity.

Development of agricultural commodities requires an understanding of market prospects, resource capabilities and technological potential. The imbalance between supply and demand will affect the price and profitability, so that it requires an intervention policy and planning to deal with the situation. Projection of supply or demand is very important for production planning which will have an impact on what level of supply to maintain price stability. Food supply and price stabilization is a problem faced by almost every region in Indonesia. Some factors that affect the stability of supply and food prices are the amount of production, population increase, demand, climate change, trade barriers.

Rice is a strategic commodity that can affect economic, social and even political stability. Rice commodity is still one of the key commodities in influencing the stability of general prices. The increase in rice prices can trigger an increase in the prices of other goods (Sari 2010). This can be seen from the significant role of rice in people's lives, among others: (i) a staple food of most of Indonesia's population; (ii) from perspective of household expenses, 63% is spent for food and 17% is allocated for rice consumption; (iii) contributors to calorie and protein requirements and; (iv) the rice industry involves total of 18 million farmers, most of whom are small farmers, as well as workers involved in the supply of production inputs and factors, processing, and marketing (Saifullah, 2005, Widadi and Sutanto, 2012). Thus, it is not surprising if the rice situation has a strong correlation with the development of economic and non-economic situations. History has proven that the instability

of food supplies, especially rice, has triggered riots and criminal acts at the beginning of reformation era. This indicates the important role of the government in maintaining rice availability throughout the year, as well as its even distribution and stable prices.

The economic conditions of rice, whether related to the aspect of supply, demand, and price are continue to fluctuate. Thus there are many quantitative economic relations found between the economic models of rice, whether concerned to the supply, demand, and the price stability of both paddy and rice.

One of agricultural characteristics is scattered production in several areas. The price per unit volume or per unit for the similar commodity is different from one area to other areas. According to Chen and Shagaian (2016), variations in the price of one particular commodity between two regions are caused by: 1) different ability in commodity production and transfer costs between regions, 2) differences in farming operational costs, 3) differences in demand condition and local supply, 4) market imperfections.

Agricultural commodities will move from surplus areas with relatively cheap prices to deficit areas with relatively high prices, thus there is movement from surplus to deficit areas. In fact, transfer costs are required for trading purposes between two areas, which include terminal area and transportation costs. The flow of agricultural commodities from surplus area Y to deficit area X will be stopped if the transfer costs are equal to the difference in prices between the deficit area and the surplus area, supply stability and price stability will occur.

Based on the background, the formulation of the problem is how the conditions of paddy and rice supply in the study area. While this study aims to analyze the paddy and rice stability of supply and price in the study area

RESEARCH METHOD

The analysis of stability of paddy and rice supply and price in Sukoharjo Regency, especially in Tawang Sari and Mojolaban Districts, was conducted by using the analytical descriptive method to get a systematic, factual, and accurate description of the situation of study area concerning the facts, nature and relationship between the phenomena studied (Nasir, 1988).

Sukoharjo Regency is determined as the location of the study because it has the highest rice productivity in Central Java, which is 7,466 tons/ha while the average rice productivity in Central Java is 5.74 tons/ha. Whereas the determination of Tawang Sari and Mojolaban Districts is based on activities related to efforts to increase production and land productivity, namely the existence of a land consolidation program.

Secondary data method was used in this research with the kind of data are paddy production, rice supply, population, rice consumption, paddy prices and rice prices in the year of 2016, 2017 and 2018. Meanwhile the variety of paddy was IR64 and C4. The analytical method used is descriptive analysis by observing the rice supply and demand so that its supply stability is known, while the other method is coefficient of variance analysis. Fluctuations of paddy and rice price / supply are measured by the coefficient of variation (CV) (Setiawan, 2012 and Proborini, 2018) where the supply is said to be stable if the price variation (coefficient of variation) of rice on the market is less than 9 (The Indonesian Ministry of Trade, 2019).

The coefficient of variation (CV) is the ratio between the standard deviation and the average value, expressed as a percentage, which is useful for looking at the distribution of data from the calculated average (Walpole, 2000).

Where:

$$CV = \frac{\sigma}{\bar{X}}$$

Cv = coefficient of variation

σ = standard deviation

\bar{X} = mean variable

RESULTS AND DISCUSSION

General Description of Study Location

The area of Sukoharjo Regency is 46,666ha wide or 1.43% of the total area of Central Java. The land in Sukoharjo Regency is allocated for rice fields of 20,617ha (44.18%) and non-rice fields of 26,049ha (55.82%). Rice fields are classified into technical irrigated of 14,655ha (71.08%), semi-technical irrigated of 2,161ha (10.47%), simple irrigated of 1,967ha (9.54%), and rain fed area of 1,834ha (8.89%). The population of Sukoharjo Regency in 2017

was 871,397 people consisting of 431,686 male (49.54%) and 439,711 female (50.46%). An overview of the regional potential is presented in Table 1.

Table 1. The Area Wide by Utilizing in Grobogan Regency, 2018

Component	Rice Fields --- ha ---	Non Rice Fields --- ha ---
Wide area	20,617	26,049
Technical irrigated	14,655	
Semi-technical irrigated	2,161	
Simple irrigated	1,967	
Rain fed area	1,834	

Central Java Province is one of the main food producers for national stock lead to promote paddy productivity. In 2018, the level of wetland paddy productivity is about 6.099 tons/ha, with the harvested area 1.80 million ha and production of wetland paddy 11.00 million tons. Meanwhile, Sukoharjo Regency is one of regencies that support food in Central Java, so the productivity food crops, especially paddy, is continually increased. In 2018 productivity of paddy reached 7.208tons/ha, while production of paddy reached 391,675 tons and 54,339 ha of harvested area. Productivity of paddy in Sukoharjo is higher among the paddy productivity in other regency/municipality, while the lowest productivity was recorded in the Pekalongan Regency in the amount of 4.312 tons/ha. The high productivity of paddy in Sokoharjo showed that the ability of farmers in paddy farming has been going well.

The research approach taken is paddy and rice stability. So there is a conversion from paddy to rice. The Central Statistics Agency said that the conversion rate of milled unhusked rice (GKG) to rice that is now used is 64.02%. This figure is up from the previous calculation at 62% which is often used as a reference for farmers and rice mills before. The change in number was caused by an improvement in the paddy production sector, "The processing technique has improved.

Supply Stability

Stability of price/supply represents fluctuations (increase or decrease) in price / supply over a certain period of time. The smaller the price/supply fluctuations during certain period,

the price/supply conditions are said to be stable, and vice versa. Fluctuations of food price/supply are measured by variation coefficient values (CV).

Demand is very important for production planning to have an impact on how big the rate is supply to keep price stability. Total commodity demand is useful for food as one input in determining food commodity production targets, how much is needed as well overview of future price developments. Meanwhile the number of supply is useful for food commodities as description of the level of commodity production concerned agriculture that can be achieved based on assumptions that are used. By comparing the results of demand and supply, it can be known the condition of the demand balance and supply of the relevant commodity whether in a state of surplus or deficit. In the short term and medium condition will be related to current distribution of food commodities which impact on supply and price stability.

The main actors in development agriculture is a farmer that cultivate the certain agricultural commodities. Farmers have an important position as one of the subject actor's economy in the local, regional order even nationally. Important thing farmers are expected to be sustainable farm is price certainty. So that agricultural business that it runs able to provide an income feasible and sustainable, then commodities which should be cultivated properly is a prospective commodity on the market

c. Stability of Rice Supply

Distribution of rice availability and demand for consumption needs to be known, so that regions with potential rice production can be better developed and areas with no potential of rice production can develop their appropriate food potential. The aim is to increase the rice availability. The balance between supply and demand of rice consumption is strongly influenced by the population. If the rice availability is greater than the consumption, then the area is said to be a rice surplus area, otherwise the area is said to be a rice deficit if the rice availability is smaller than its consumption. This is consistent with Nuryanti (2005), that the fluctuating dynamics of bidding are highly vulnerable because the population increases so consumption also increases.

The amount of food available must meet the interests of all people, whether sourced from domestic or imported production. Second, accessibility both physically and economically. Physical affordability requires that food is easily accessible to individuals or

households. Whereas economic affordability means the ability to obtain or buy food or is related to the people's purchasing power for food. Third, the aspect of stability (stability), refers to the ability to minimize the possibility of food consumption below the level of standard needs in difficult seasons (famine or natural disasters) (Fuad, 2009).

One aspect of food, namely food availability, has a correlation with rice field area (Tambunan, 2008), harvested area, planting area (Suwarno, 2010), rice productivity (Mulyo and Sugiarto, 2014), and rice production. The increase of rice field area, harvested area, planting area, rice productivity, and rice production can increase the rice availability. The net production of rice is assumed to be the condition of rice availability. In this case, the operational limit used is rice availability from the perspective of domestic production generated to meet the demand of community consumption without considering the rice produced from the study area. The rice demand for consumption can be calculated through the following formula:

$$\text{Rice Consumption Demanded} = \text{Population} \times 113.48 \text{ kg/capita/year.}$$

The figure of 113.48 kg/capita/year is the standard value of rice consumption demand per-capita determined by Central Bureau of Statistic. This figure means that each population needs 113.48 kg of rice per year. This study assumes that each population has the same amount of rice consumption needs. In this case, the assumption used is that all the rice available in an area is entirely used to meet rice consumption needs in the area. If the stock of rice available is greater than the needs of rice consumption, then the area is said to be a rice surplus area, whereas if the stock of rice available is smaller than the needs of rice consumption, then the area is said to be a rice deficit.

It was found that the results of rice production in Tawang Sari, Mojolaban and Sukoharjo Regency each is 32,115 tons, 46,795 tons and 391,675 tons respectively, with total population of 48,021 people for Tawang Sari, 93,841 people for Mojolaban, and 871,397 people for Sukoharjo Regency. The amount of rice supply can be seen from the conversion of paddy to rice by 62.74%. The values of production, consumption, and supply stability are summarized in Table 2.

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results

illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply. Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can achieved.

Table 2. Analysis of Coefficient of Variance of Availability and Consumption of Rice in Tawang Sari, Mojolaban District and Sukoharjo Regency

District	Paddy Production (ton)	Rice Supply (ton)	Population (person)	Rice Consumption (ton)	Surplus (ton)	CV
Tawang Sari						
- 2016	32,12	21,003.21	47,94	5,439.78	15,563.43	6.35
- 2017	35,17	22,999.87	47,99	5,446.13	17,553.74	
- 2018	32,39	21,181.10	47,95	5,441.14	15,739.96	
Mojolaban						
2016	46,79	30,603.93	93,845	10,641.57	19,962.36	7.88
2017	45,64	29,846.60	95,06	10,779.69	19,066.91	
2018	40,53	26,503.35	96,27	10,916.79	15,586.56	
Sukoharjo						
2016	391,68	256,155.45	871,39	98,886.13	157,269.32	7.78
2017	387,98	253,738.92	878,37	99,677.88	154,061.04	
2018	341,59	223,403.13	880,35	99,902.23	123,500.90	

Source : Jawa Tengah Dalam Angka 2018
Tawang Sari Dalam Angka 2019
Mojolaban Dalam Angka 2019

The results of rice production in the Districts of Tawang Sari, Mojolaban and Sukoharjo Regency were converted to rice using a reference rate of 65.4%. The conversion results illustrate the availability of rice which is a source of public consumption. The need or consumption of rice is the result of the population with a reference to rice consumption, which is 113.48 kg / per capita / year. Of the availability and need of rice in the Districts of Tawang Sari and Mojolaban and Sukoharjo Regency are in a surplus condition. The existence

of a rice surplus shows that the consumption needs of the population have been met. However, the surplus condition needs to be studied further to find out the stability of supply. Meanwhile the projected supply useful for food commodities as description of the level of commodity production concerned agriculture that can achieved. Changes in the amount and supply of rice are presented in Illustration 1 and 2.

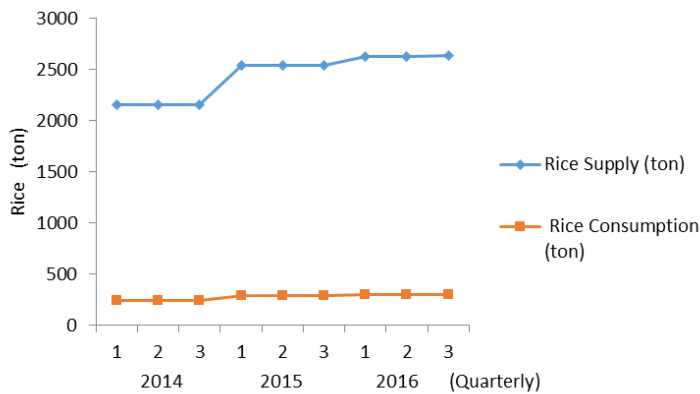


Illustration 1 : Rice Supply and Rice Consumption in Tawang Sari District

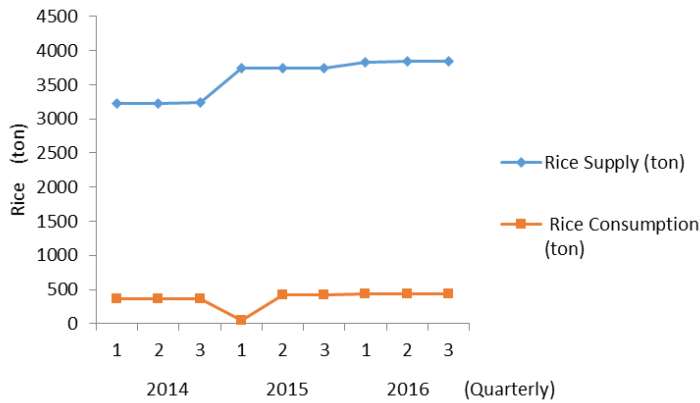


Illustration 2 : Rice Supply and Rice Consumption in Mojolaban District

The amount of rice supply and consumption in the Tawang Sari District and Mojolaban District showed that both regions have been able to meet the consumption even in the third year the supply of rice is decrease. It is mean that the amount of rice supply is higher than rice consumption resulting in a surplus of rice supply. The occurrence of a rice surplus is one of the factors of stability. The amount of rice supply is stable if the co variance value is smaller than 9.

The results of the CV analysis in the study area showed a value smaller than 9, namely 6.35; 7.88 and 7.87 respectively. This shows that the availability of rice in the study area is stable. The surplus and stability of a region's rice supply illustrates that rice is a potential commodity in the area. Furthermore, with the existence of a surplus and stability the distribution of these commodities is possible to other regions.

The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. This can be seen from the amount of production or supply and consumption where the amount of supply is greater than the value demand, so it can be said that in the three areas of the rice supply is stable. Therefore, Sukoharjo Regency and the two study locations are areas with supply stability that can meet their regional consumption and it is also possible to have distribution outside the region as presented in the supply chain.

Based on the results of one sample t test analysis, it is known that rice in the study area is in a stable condition. This is indicated by the significance value of each CV namely 0.036; 0.041 and 0.046 respectively that less than 0.05. This showed that paddy and rice commodities are potential commodities for Tawang Sari and Mojolaban Districts and Sukoharjo Regency.

The stability of rice supply is a potential for the region to distribute to other regions. Because the amount of availability is greater than population consumption and is an area that has food security, especially rice.

a. Price Stability

Annual production pattern of paddy and rice in the production center shows that paddy and rice production during the main harvest is always abundant while monthly demand for paddy and rice is relatively stable. This matter causing the price of paddy and rice to fall. Conversely when it does not occur harvest, less paddy and rice production so it is lower than

paddy and rice needs. As a result, prices will increase and not affordable, which occurs when farmers actually do not have inventory. This shows that the price of paddy and rice fluctuates according to season.

Fluctuations in commodity prices basically occur due to an imbalance between the quantity of supply and the quantity of demand needed by consumers. If there is an oversupply, the commodity prices will go down, on the other hand the commodity prices will rise if there is a lack of supply. For agricultural commodities that depend on the season, price fluctuations during the harvest season and non harvest season will occur.

Prices play an important role in the market economy. Price is one of the factors that determine every decision of producers and consumers in allocating limited resources in order to go to the optimal Pareto condition or balance condition (Brummer *et al.*, 2009). According to Nicholson (2004), market prices have two main functions, namely: (i) as information about the quantity of commodities that producers should offer to obtain maximum profits; and (ii) as a determinant of the level of demand for consumers who want maximum satisfaction.

There are at least two reasons why an analysis of rice prices is important to do, in this case related to the purpose of conducting a price analysis namely (1) to estimate certain economic coefficients (parameters) such as the elasticity of demand for rice prices, and (2) to forecast (price) in the future and the factors that influence the price level of rice.

Price fluctuations are actually a normal thing and are needed to keep the market functioning, ie creating a competitive market. Changes in prices will become a problem if prices soar very high and unpredictable, which in turn will create uncertainty that can increase risks for producers, traders, consumers, and of course also the government.

Supply stability is illustrated by the price, so it can be examined to the stability of paddy and rice prices. The paddy data were approached with prices at each harvest season, while the rice price can be approached every month.

Table 3 Average Paddy Prices and Coefficient Variance in Study Locations

Description Districts	Average Paddy Price (IDR/kg)				Coefficient Variance			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	4,607.1	4,642.8	4,478.5	4,528.5	5.3	5.4	5.1	4.6
Mojolaban	4,528.5	4,485.7	4,432.1	4,485.7	4.8	4.3	4.8	4.4
Sukoharjo	4,261.4	4,608.6	4,265.0	4,558.6	5.7	5.6	5.0	5.1

Based on the analysis results, it is known that there is price variation in paddy prices in Tawanghari and Mojolaban Districts and Sukoharjo Regency with the C4 and IR64 varieties. It can be said that there is no difference in the paddy in price of C4 variety in research location for 2017-2018 period, however there has been a flat price reduction of IDR 42.8/kg in Mojolaban District. This is because the supply or harvest during the planting season 1 of 2018 in Mojolaban is greater than Tawanghari so that the price declines. This is in accordance with the opinion of Brummer *et al.* (2013) concluded that price fluctuations are basically strongly influenced by supply and demand in the market. For agricultural commodities, input markets and fossil fuels greatly affect price fluctuations. Stock can also affect prices, low stock will cause prices to increase in the market. Price fluctuations in the study area did not cause price volatility. This is indicated by the CV value lower than 9, which means that the price of paddy is in a stable condition. Price variations also occur in rice prices. Variations in rice prices in the study area were approached with C4 and IR64 varieties in 2017 and 2018. It is presented at Table 4.

Table 4. Average Rice Price and Coefficient Variance in Study Locations

Description Location	Average Rice Price (IDR/kg)				Coefficient Variance (%)			
	C4		IR64		C4		IR64	
	2017	2018	2017	2018	2017	2018	2017	2018
Tawanghari	10,438.4	10,692.3	9,507.7	9,580.7	2.12	2.3	0.29	1.69
Mojolaban	9,984.6	10,615.4	8,769.2	9,076.9	5.6	5.8	4.4	7.1
Sukoharjo	10,615.4	12,150.0	9,534.6	11,600.0	5.8	6.1	4.9	7.5

In 2017, the average price of C4 variety in Tawang Sari District was IDR 10,500/kg with Coefficient Variance of 0. This is happened because throughout 2017 period the price of C4 variety is stagnant so that it could be said to be very stable. Likewise, the price of IR64 variety in 2018 is also stagnant. Unlike the price variations of C4 and IR64 varieties in Mojolaban District, the average price of rice in Mojolaban is lower than Tawang Sari, but there are variations in price progression for the two rice varieties above. The value of Coefficient Variance for the two rice varieties in Mojolaban is greater than Tawang Sari with the largest CV from IR64 of 7.0. If it is carefully examined, the CV values of both C4 and IR64 varieties for the two Districts and Sukoharjo Regency can be categorized into minor because the values are less than 9. This is consistent with Proborini (2018) that the minimum standard of CV value for price stability set is less than 9%. Based on inferent and descriptive analysis, it can be stated that the stability of rice prices in the study area is maintained.

Prices and CV in Sukoharjo Regency are greater than Tawang Sari and Mojolaban Districts. This happens because Sukoharjo is an area that encompasses several districts where each district varies greatly in the price of rice. Moreover, not all districts are paddy granaries and rice.

The smaller the coefficient of variation can be interpreted that the price is relatively stable or has a low level of fluctuation. Price stability is one indicator that can be used to give a signal to producers of price risk factors that may be faced by a producer and the government in order to protect producers and consumers.

Actually, food price stability can be achieved if it can built sufficient government food reserves for respond to food insecurity due to natural disasters and social and reduce the sharp rise in food prices. (Suryana *et al.*, 2014)

CONCLUSION

Based on the research result, it can be concluded that : The amount of rice produced at the study area showed its ability to meet the demand or consumption of the population. The rice consumption is smaller than rice supply, so Sukoharjo Regency is a rice supply area.

Paddy and rice supply and price fluctuations in the study area did not cause volatility. This is indicated by the CV value lower than 9, which means that the supply and price of paddy and rice is in a stable condition.

ACKNOWLEDGMENTS

I would like to thank to the Directorate of Research and Community Service, Directorate General of Strengthening Research and Development at the Ministry of Research, Technology and Higher Education regarding the Research and Community Service Funding Agreement for Fund Year of 2018 through the National Strategic Research Scheme.

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8. **Attachment 8: Editor Decision(Accepted to submissionRevision), June, 17 2020**

[AGRARIS] Editor Decision 2 Yahoo/Email M... ☆

 **Dr. Susanawati Susanawati** <journalumy@gmail.com> Rab, 17 Jun 2020 jam 21.33 ☆
Kepada: Dr. Titik Ekowati

Dr. Titik Ekowati:

We have reached a decision regarding your submission to AGRARIS: Journal of Agribusiness and Rural Development Research, "The Stability of Supply and Rice Price in Sukoharjo Regency".

It is my pleasure to inform you that our decision is to: ACCEPTED THE SUBMISSION.
Thank you for your contribution to this journal.

Dr. Susanawati Susanawati
Program Studi Agribisnis, Fakultas Pertanian, Universitas Muhammadiyah
Yogyakarta
Phone 081568471582
nagribis@yahoo.co.id

AGRARIS
<http://journal.umy.ac.id/index.php/ag>

 **Titik Ekowati Ekowati** <तिकुवति@yahoo.co.id> Jun, 19 Jun 2020 jam 19.03 ☆
Kepada: Dr. Susanawati Susanawati

To : Dr. Susanawati

Hereby, We would like to sya thank you for the LoA and also notice about the publication of our article with the title :

"The Stability of Supply and Rice Price in Sukoharjo Regency" in the journal of Agraris.

In connection with everything concerning the completeness of our publishing requirements, We are waiting for further information.

Thank you for your attention

Titik Ekowati
Prodi Agribisnis, FPP Undip



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Email: agraris@umy.ac.id

Yogyakarta, June 17th, 2020

Number : 008/JA-UMY/VI/2020
Attachment :-
Subject : Letter of Acceptance

Dear Titik Ekowati,

Department of Agribusiness, Diponegoro University, Semarang, Indonesia

Based on the result of the blind review process, we have reached a decision regarding your submission to AGRARIS: *Journal of Agribusiness and Rural Development Research*.

Title : The Stability of Supply and Rice Price in Sukoharjo Regency

Authors : Titik Ekowati, Edy Prasetyo, Mukson Mukson

We are pleased to inform you that your submission is: **Accept the Submission.**

We will inform you through electronic mail of everything that concerns completing the publishing requirement.

Thank you for your interest in AGRARIS: *Journal of Agribusiness and Rural Development Research*.


Sincerely,
Editor in Chief



Dr. Ir. Widodo, M.P.

9. Attachment 9: Copyediting Review Request, August 11, 2020

[AGRARIS] Copyediting Review Request Yahoo/Email M... ☆

 **Widodo Widodo** <journalumy@gmail.com>
Kepada: Dr. Titik Ekowati Sel, 11 Agu 2020 jam 11.12 ☆

Dr. Titik Ekowati:

Your submission "The Stability of Supply and Rice Price in Sukoharjo Regency" for AGRARIS: Journal of Agribusiness and Rural Development Research has been through the first step of copyediting, and is available for you to review by following these steps.

1. Click on the Submission URL below.
2. Log into the journal and click on the File that appears in Step 1.
3. Open the downloaded submission.
4. Review the text, including copyediting proposals and Author Queries.
5. Make any copyediting changes that would further improve the text.
6. When completed, upload the file in Step 2.
7. Click on METADATA to check indexing information for completeness and accuracy.
8. Send the COMPLETE email to the editor and copyeditor.


Submission URL:
<https://journal.umy.ac.id/index.php/ag/author/submissionEditing/5048>
Username: titekowati

This is the last opportunity to make substantial copyediting changes to the submission. The proofreading stage, that follows the preparation of the galleys, is restricted to correcting typographical and layout errors.

If you are unable to undertake this work at this time or have any questions, please contact me. Thank you for your contribution to this journal.

Widodo Widodo
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10. Attachment 10: Copyediting Review Acknowledgment, August 12, 2020

[AGRARIS] Copyediting Review Acknowledgement

Yahoo/Email M... ☆



Widodo Widodo <journalumy@gmail.com>
Kepada: Dr. Titik Ekowati

Rab, 12 Agu 2020 jam 08.30 ☆

Dr. Titik Ekowati:

Thank you for reviewing the copyediting of your manuscript, "The Stability of Supply and Rice Price in Sukoharjo Regency," for AGRARIS: Journal of Agribusiness and Rural Development Research. We look forward to publishing this work.

Widodo Widodo
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<http://journal.umy.ac.id/index.php/ag>

11. Attachment 11: Notification of AGRARIS online Version, August 27, 2020

Notification of AGRARIS Online Version 2

Yahoo/Email M... ☆



Jurnal Agraris UMY <agraris@umy.ac.id>
Kepada: Titik Ekowati Ekowati

Kam, 27 Agu 2020 jam 08.45 ☆

Dear Titik Ekowati,

With full gratitude to Allah, we announce that Journal AGRARIS: Journal of Agribusiness and Rural Development Research Vol. 6 No.1 has been published on Online Version. All the articles can be accessed on the Open Journal System (OJS) of AGRARIS. On the other hand, we still process for the Offline Version, please wait patiently.

Thank you for all your interest to submit your article to our journal and we are sorry if there are too many weaknesses during the process, we hope AGRARIS will be better in the future.

Thank you.

Best Regards,
Secretariat of AGRARIS

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Titik Ekowati Ekowati <tiekowati@yahoo.co.id>
Kepada: Jurnal Agraris UMY

Jum, 28 Agu 2020 jam 14.42 ☆

To: Editor of the Agraris Journal

Assalamualaikum wa rahmatullahi wa barakatuh

Alhamdulillah, We pray to Allah Swt for the publication of our article in the journal Agraris.

Our thanks go to the editorial team who reviewed and decided that our article was worthy of publication.

Iam waiting for the information of hard copy of the journal ..

Thank You

Titik Ekowati
Agribisnis
FPP UNDIP