

# Analysis of Distribution Pattern of Rice Commodity in East Java

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## Abstract

Rice has strategic roles in stabilizing food stability, economic stability, and politic stability of a nation. Food distribution is one of the food stabilities sub-system whose role is very strategic, thus if it cannot be implemented well and smoothly, it will cause inadequate food availability needed by society. This research attempts to find out and to analyze the rice distribution pattern from surplus regions with rice commodity to the deficit regions located in East Java. The data used in this research were the data obtained from Central Bureau of Statistics of East Java in 2010-2014. The analysis method were descriptive statistics, DLQ (Dinamic Location Quotient), and Gravitation Spatial Analysis. The results confirmed that the central regions of rice in East Java were found in some regencies, such as: Banyuwangi, Mojokerto, Pasuruan, Malang, Madiun, Bojonegoro, Ngawi, Lumajang, Lamongan, and Jember. The rice commodity of Malang was city supplied from Malang and Pasuruan. The number of rice surplus in Malang could only fulfill the needs of rice in Malang city. However, the number of the rice still did not cover yet the deficit of rice in Malang city, so it needed more supplies from Pasuruan. The needs of rice in Kediri city and Batu city were supplied from Mojokerto regency and Pasuruan regency. Finally, in order to fulfill the needs of rice in Madiun city, it could be supplied from Madiun city, and for Surabaya city, it could be supplied from Lamongan regency.

**Keywords:** Distribution, rice, East Java.

## 1. INTRODUCTION

The needs of food, especially rice for people in Indonesia is a daily need of human for supporting human's lives. It can be understood that the presence of rice as one of primary needs is one of the strategic commodities because the government's spending for this commodity grows rapidly every year. Food in Indonesia has strategic values with a very wide and complex dimensions. (Mashuri, cited in Sri Widodo, 2002). The availability, distribution equity, and affordability of society's power is the central issue affecting national economic authorities because food scarcity can trigger the occurrence of social and political fluctuation. Based on one experience occurred in 1966 and 1998, it showed that the political fluctuation can turn into a very terrible political crisis due to the high prices of food in a short time, and political debate always occurs due to the high price or the low prices of food. Society wants the stability of food supplies and prices, available all the time, equal distribution, and affordable prices (Achmad, 2001).

Food stability becomes one of the priorities in national development. There are three main reasons underlying the awareness of all components in a country for the importance of food stability, such as: (i) access for adequate and nutritious food for every person is one of the fulfillments for human rights; (ii) adequate food consumption and nutrition is the basis for the establishment of human resource quality; (iii) food stability is the basis for economic stabilization, even for national stability of a country (Arifin, 2004).

One of the characteristics of national food stability is the presence of the availability of adequate food in macro aspect. Nevertheless, there are still many regions where the society cannot access the adequate food. That condition occurs due to a poverty or inadequate income to get the access of food. On the other hand, the wide Indonesian territory where the central region of agriculture production, especially rice and corns are in different topography, have the availability of infrastructure to support the sector (production, processing, storage) that are very variable. The harvest time is not the same from one region to other region, and the unsupport climate at planting and harvest time (Arifin, 2001).

Food distribution is one of food stability sub-system whose role is very crucial. If it cannot be implemented well and smoothly, the food needed by society will not be fulfilled. The distribution is expected to do effectively, efficiently, and equitably in every location where the food transaction is being conducted for the primary needs of society. The obstacles of food distribution has an impact on scarcity of food and the increase of food price as well as the impact on the low access to the society because the purchasing power of the society will decline (Garside dan Syaifullah, 2013). Food distribution refers to the availability and the supply of food equally all the time in terms of quantity, quality, safety, and variety to fulfill society needs of food. Whereas food access refers to the ability of household to be able to reach or to get the needs of food all the time in terms of quantity, quality, safety, and variety to support the effective, productive, and health life. Food problems are the condition of food surplus, food deficit, and or household inability to fulfill the needs of food. The presence of poor people, food prone region, inequitable of food production among region and all the time, and different human resources

in every region will affect the distribution and the supply of food. Finally, this condition triggers food access for every person in household get lower if the the food availability is limited, unavailability markets, limited transportations, low income, limited education, high unemployment, and inadequate culture. Thus, the role of affordable and equitable food distribution all the time will affect the increase of food access for every household to fulfill food adequacy (Garside and Syaifullah, 2013).

Therefore, food stability is produced by a system of food stability consisting of three sub-system: (1) food availability in terms of adequate quantity and types for all societies, (2) smooth and equitable food distribution, and (3) affordable food for every person to fulfill adequate nutrition and health rules. The problems when reaching food stability is about imbalance between the availability and affordability of food. The problems are caused by the production of various types of food which cannot be produced in all region and in every time it is needed. The problems of production which only happen in certain region of Indonesia and in certain time have caused the availability concentration of food in production centre and in harvest time. Referring to the food distribution for society and the obstacles faced by society, the researcher conducted a research entitled, "Analysis of Distribution Pattern of Rice Commodity in East Java".

As described before, East Java is one of the region which has the biggest potency of food production in Indonesia. East Java is able to supply more than 17% of national rice and the needs of rice on 15 provinces through National State Logistics Agency 'move' (Central Bureau of Statistics, 2012). The increase of food demand in East Java has grown along with the growth of population pushed the occurrence of food production acceleration in terms of the actualization of price and food stabilization, so the food stability is highly related to the government's ability to maintain the stabilization of food availability supported by the fulfillment of the supporting access.

## 2. LITERATURE REVIEW

### Definition of Market/Distribution

Food is a vital and strategic commodity since it refers to the primary needs firstly needed by every human. Thus, the fulfillment of the needs of food cannot be suspended. Meanwhile, food commodity or agriculture products has specific characteristics because the production is affected by 'season' factor.

Marketing system is the crucial part of goods chain since the goods are produced to consumers. It can determine market efficiency in a trading system, including food. The marketing causes high cost which will affect not only the decrease of producers surplus, but also the consumers' burden. In the food marketing, there are many varieties in terms of agents or the long market chains, from the short chain of the simple market to the long ones.

Generally, food marketing pattern or agriculture products always change and develop as the growth and the development of production and consumption structure. The marketing pattern of agriculture products also has closely relations with economic development because it is one of the overall economic sub-system. Efficient marketing system is highly needed in goods market of agriculture products in order to increase additional values and producers or consumers surplus. Kim (1986) noted that the base differences in marketing system between developed countries and developing countries lie on the supply system of agriculture, wage labor, level of consumers income, level of urbanization, cultural background (including eating habits), and so on.

Kotler (2002) said, "Marketing is a social process in which the individual or group get what they need and what they want by making, offering, and freely interchanging valuable products to other parties. The products are made to satisfy human needs or desire, so there is a process to get the products they want or need as the effort from producers to consumers." The concept of marketing stands on four pillars: target markets, customers needs, integrated marketing, and income ability. Marketing is one of business functions producing acceptability for the producers or the consumers. Said dan Intan (2004) defined marketing as a number of business activity aimed to give the satisfaction from the goods or services that are exchanged to the consumers or the users in agriculture, whether in the form of agriculture input or products. On the other hand, Limbong and Sitorus (1987) said, "Marketing is the series of activity happened in the process of goods or services flow from production centre to the consumption centre in order to fulfill the needs and to give benefits for producers." This concept shows that the role of marketing is very crucial in increasing the values of form, time, place, and belonging of goods or services generally, and for agriculture commodity. According to Dahl and Hammond (1977), marketing is the series of marketing institution function needed to trigger products or input from production point to the last consumers. Thus, marketing can be defined a productive activity since it gives additional values and produces many benefits in terms of time, place, form, and belonging. This definition describes that marketing is a process of business activity to carry out the strategic plans leading to the fulfillment of consumers needs through an exchange with other parties.

Nowadays, rice marketing pattern has been segmented, the rice for the consumers with middle-up income and the consumers with low income. Generally, the consumers with middle-up income will buy the rice from special markets that sell rice with certain attributes, such as color, taste, texture, and so on. Whereas for

those who have low income will buy the rice in traditional market that usually sell the rice with middle-down quality. According to Natawidjaja (2001), there are two factors causing the different prices of rice that push the rice to be distributed from one place to another place, that is (a) different quantity of rice availability, so the rice is transferred from the surplus region to the deficit ones; and (b) different buying power and preferences of society, so the rice with good quality is transferred to the region with the consumers with high buying power and taste in order to be replaced and then added with the rice with lower and cheaper quality.

### **Marketing Channels and Institutions**

Said and Intan (2004) said, "The role of marketing channels and distributions become the spearhead of the success of agribusiness development since they function as a facilitator that connect the deficit units (consumers who need the products) and the surplus units (producers who produce the products). Marketing institutions and distributions also play an important role in strengthening the integration among sub-system in agribusiness system. Thus, an integrated agribusiness development should also strengthen its role and empower marketing institution and distribution effectively and efficiently. An improvement to the marketing institution and distribution is highly needed because the series of activity has become the primary indicator on margin between the prices among producers and the prices among consumers. One of the indicators is the low margin between the prices among producers and the prices among consumers. However, it does not mean that the marketing institution and distribution do not get the income, but rather the effort of fair share of all additional values scored in a system of commodity to every actor who is involved in it.

Marketing channels are the series of organizations that are mutually dependent each other in involving the process to make the products or services ready to use or to consume. Marketing channels undertake the task of moving the goods from the producers to the consumers. It overcomes the gap of time, place, and belonging that separate goods and services from the people who need it (Kotler, 2002). Said dan Intan (2004) said, "The presence of institutions that support national agribusiness development is very important to make Indonesian agribusiness more competitive and powerful. The supporting institutions really determines the way to guarantee the implementation of agribusiness integration in performing its goals. Some agribusiness institutions in Indonesia are: government, funding institutions, marketing and distribution institutions, cooperation, formal and informal educational institutions, agricultural counseling institutions, and guarantee and risk responsibility institutions.

According to Limbong and Sitorus (1987), most of the producers do not sell their goods to the last users directly. There is one or more marketing channels among the producers and the consumers, *the series of marketing intermediary that carry many functions*. The decision of marketing channels is one of the most difficult and challenging decision ever faced by the producers. The chosen channels affect all the decision of other marketing.

### **Distribution Channels Functions**

The process of goods and or services distribution from the producers to the consumers that need various activities of marketing functional aimed to smoothen the process of the distribution effectively and efficiently in order to fulfill the needs of the consumers. The functional activity is called 'marketing functions'. It is conducted by marketing institutions involved in the process of commodity marketing, and to form the series of marketing called 'marketing system'. Agriculture products flow from the producers to the consumers is followed by the increase of the values of agricultural commodity. This increase can be reached if there are marketing institutions that can run its marketing functions well. Below are the distribution channels according to Philip Kotler (2002):

1. Information: Information collection and spread of marketing research on customers, competitors, and other offenders as well as the strength in potential marketing environment and that are exist nowadays.
2. Promotion: Persuasive communication development and spread of designed offer to attract the customers.
3. Negotiation: efforts to reach the final agreement about the price and other requirements, so the transfer of belonging can be done.
4. Reservation: inverted communication from the members of marketing channels and producers about the interest of buying.
5. Funding: fund allocation and acquisition needed to finance the availability of the marketing channels.
6. Risk taking: risk assumption related to the work implementation of the marketing channels.
7. Physical belonging: storage continuity and physical product movement from the materials till the last customers.
8. Payment: the buyers pay the bill to the sellers through banks and other financial institutions.
9. Belonging right: actual belonging transfer from one organization or personal to other organizations or other person(s).

Although the use of channels or intermediary institutions means releasing the offer or for the way and to whom the products are sold, but the consumers are generally willing to give most of the marketing tasks to this institution. Below are the advantages of using intermediary according to Kotler (2002):

1. Many producers are lack of financial resources to distribute the marketing directly.
2. Direct marketing will push many producers to be the intermediary for complementary products from other producers in order to reach mass distribution economy.

### 3. RESEARCH METHODS

#### Data Collection

The data used in this research were primary and secondary data. The data were obtained from survey and data collection. The secondary data were from data of production in every region, data of food needs, and Surplus and Decifit Data of Food Stability Board of East Java in the year of 2011-2013. Whereas the primary data needed in this research were problems and potencies of the distribution of primary needs in East Java; and distribution routes of the primary needs in every region.

#### Data Analysis

Data analysis and data processing were obtained from the primary and secondary data conducted in both qualitative and quantitative method. Qualitative analysis is a description method conducted by describing the results of a research through words and tables or matrices arrangement. Whereas the quantitative analysis is a method of LQ (*Location Quotient*) AND Gravitation Spatial Analysis.

#### LQ (Location Quotient)

LQ (Location Quotient) is an approach used for base economical models and for understanding sectors which become a trigger of the economic growth. LQ indicates the relative concentration of economic specialization degree by using comparison approach (Hood, 1998). The concept of base economy describes two sectors, *base and non0-base*. The base sector is society activity whose results can fulfill the needs in their region. The results do not only fulfill the needs in their region, but also fulfill the needs outside their region.

Rusastra, *et.al* (2002) described, "Base activity is society activity whose the results, whether in the form of goods or services aimed to be exported to outside the society or outside, regional, national, and international oriented." The concept of both technique and economic efficiency highly determines the base growth in a region. Whereas non-base activity is society activity whose the results, whether in the form of goods or services aimed to the society in the region. The concept of self-sufficiency in food, independence, welfare, and quality of life highly determines the non-base activity.

$$LQ_i = \frac{X_i^r / X^r}{X_i^n / X^n}$$

X = output (PDRB); r = regional; dan n = national.  $LQ_i > 1$  indicates exposrt activity in the sector or base sector (B), wjile  $LQ_i < 1$  is called non-base sector (NB).

LQ analysis is used to determine barns region in East Java, *a region ffor base food products*. It is the region that have wide production of food, so it is able to fulfill the needs in the region and also to expor to other regions. LQ analysis requires the data of food production in ever region and province in the end of years (2011-2013).

#### DLQ (*Dinamic Location Quotient*)

*Dynamic Location Quotient* (DLQ) is a modification of SLQ by accomodating speed factors of economic growth time by time. The DLQ value is calculated by using the following formulation (Rustiadi, 2006):

$$DLQ_{ij} = \left[ \frac{(1 + g_{ij}) / (1 + g_j)}{(1 + G_i) / (1 + G)} \right]^t = \frac{IPPS_{ij}}{IPPS_i}$$

Description:

- DLQ ij = Potential index of *i* sector in region  
 g<sub>ij</sub> = Growth speed of *i* sector in region  
 g<sub>j</sub> = Growth average speed of *i* sector in region  
 G<sub>i</sub> = Growth speed of *i* sector in national

G	= Growth average speed of <i>i</i> sector in national
t	= Difference of the end of year and the beginning of year
IPPS <sub>ij</sub>	= Development Potential Index of <i>i</i> sector in region
IPPS <sub>i</sub>	= Development Potential Index of <i>i</i> sector in nationa

The DLQ value is defined as follows: if DLQ>1, the developmet potency of *i* sector in region is faster that the same sector in national. However, if DLQ>1, the developmet potency of *i* sector in region is lower than the sector in natioanal as a whole. The combinantion of SLQ and DLQ values become the criteria in determining if the economic sector belongs to 'great, prospective, mainstay, and less prospective'.

### Gravitation Spatial Analysis

Gravitation spatial model was used to see or to indicate the relations among regions. Region was considered as a mass in gravitation model. The realtions among regions was considered as the relationship among mass (Isard, 1969). The region mass also had an antractiveness, so there was auch an influence among the regions as the actualization of the attractiveness power among regions. In the regions analysis, population classification, activity centralization, or natural resource potency was considered to have the attractiveness that could be analogized like magnetic attraction. This model was used the most in transportation analysis to indicate the interactions between two poles measured by using traffic flow. The simple version of this model was formulated sistematically as follows:

$$I_{ij} = G \frac{P_i P_j}{d_{ij}^b}$$

$I_{ij}$	= interactions between <i>i</i> and <i>j</i> region
$P_i$ dan $P_j$	= measure of <i>i</i> and <i>j</i> region
$d_{ij}$	= distance between both regions
$b$	= power or exponent applied in the distance among regions
$G$	= equivalent constants with gravitation constants determined empirically, and used for relating it with the real condition

This gravitation model was used to determine the distribution model of the primary needs in East Java. The indicators are activity centres, natural resources, distance among regions, time, and road conditions. This method can formulate the distribution model of the primary needs integrated by considering the nearest distance among regions, road condirtions, and natural resources potencies. The distribution model of food in this analysis used the following assumptions:

1. Distribution cost was directly proportional with distance
2. Transportation cost by truck per kilometers based on *organda*
3. Transportation capacities per truck (with no double tandem) was 8 tons per one way
4. The longer the chains of marketing, the more expensive the cost of rice
5. Conversion of field dry rice 1 kg = 0,6 kg of rice

## 4. RESULTS AND DISCUSSION

### Regional Analysis/Rice Centres in East Java

The analysis used to identify the central regions of the primary needs of rice was *Location Quotient* (LQ) by using data of production in 2011-2013. The value of LQ was the average value of production in 2011-2013 or called '*Dinamic Location Quotient* (DLQ)'. The people of East Java wes still highly dependent on rice to fulfill their daily primary needs. Rice commodity is the primary needs of food, so the needs of rice becomes very crucial, especially in East Java. Local government or food centre, in this case is rice, used *Location Quotient* (LQ) analysis. It would produce index rate based on the value of rice production in every regency/city. The results are presented in Table 1.

**Table 1. The Results of LQ Calculation of Rice in East Java in 2011-2013**

No.	Regency/ City	Average of Production of Rice (Tons)	Total Average of Rice (Tons)	DLQ of Rice
<b>Regency</b>				
1	Pacitan	173.114	757.664	0.4371
2	Ponorogo	369.776	1.217.492	0.5810
3	Trenggalek	166.15	597.194	0.5320
4	Tulungagung	275.331	645.319	0.8162
5	Blitar	306.535	720.325	0.8141
6	Kediri	296.152	687.216	0.8244
7	Malang	442.032	1.162.881	0.9272
8	<b>Lumajang</b>	384.521	602.527	<b>1.3400</b>
9	<b>Jember</b>	915.34	1.380.492	<b>1.2790</b>
10	<b>Banyuwangi</b>	711.548	914.993	<b>1.9340</b>
11	Bondowoso	317.007	638.179	0.9500
12	Situbondo	256.763	517.908	0.9485
13	Probolinggo	306.009	739.175	0.7920
14	Pasuruan	593.814	915.803	1.2405
15	Sidoarjo	180.443	181.169	1.9055
16	Mojokerto	299.798	523.969	1.0946
17	Jombang	425.207	660.677	1.2313
18	Nganjuk	441.854	822.281	1.0280
19	Madiun	455.205	551.503	1.5791
20	Magetan	285.692	520.616	1.0498
21	<b>Ngawi</b>	686.618	967.507	<b>1.3530</b>
22	<b>Bojonegoro</b>	763.452	1.013.743	<b>1.4370</b>
23	Tuban	511.437	1.179.880	0.8293
24	<b>Lamongan</b>	768.223	1.125.830	<b>1.2850</b>
25	Gresik	342.22	954.178	0.8861
26	Bangkalan	269.577	504.957	1.2213
27	Sampang	225.771	529.089	0.8164
28	Pamekasan	158.232	324.031	0.9342
29	Sumenep	180.725	701.931	0.4925
<b>City</b>				
71	Kediri	11.988	18.918	1.2123
72	Blitar	9.588	17.142	1.0700
73	<b>Malang</b>	11.79	14.257	<b>1.6220</b>
74	Probolinggo	11.581	38.172	0.5804
75	<b>Pasuruan</b>	16.261	16.261	<b>1.7350</b>
76	<b>Mojokerto</b>	5.042	5.052	<b>1.9150</b>

77	Madiun	15.903	15.904	1.5770
78	Surabaya	12.651	13.643	1.0961
79	Batu	4.846	11.197	0.8279

Source: Central Bureau of Statistics of East Java in 2010-2014, processed in 2015

Based on the results, it can be described in Table 1 that there were 10 regions which became the centre of rice in East Java. It can also be known that those 10 regions were the regions with LQ value belongs 10 in East Java. The 10 regions of rice commodity centre can be described in Table 2 below.

**Table 2. Central regions of Rice in East Java**

Rank	Regency/City	DLQ of Rice
1	Banyuwangi	1,934
2	Mojokerto	1,915
3	Pasuruan	1,735
4	Malang	1,622
5	Madiun	1,577
6	Bojonegoro	1,437
7	Ngawi	1,353
8	Lumajang	1,340
9	Lamongan	1,285
10	Jember	1,279

Source: Central Bureau of Statistics of East Java in 2010-2014, processed in 2015

Table 2 confirmed that Banyuwangi was the highest central region of rice in East Java. Other regions were Mojokerto, Pasuruan, Malang, Madiun, Bojonegoro, Ngawi, Lumajang, Lamongan, and Jember.

#### Analysis of Surplus/Deficit of Rice Commodity in East Java

Analysis of surplus and deficit was used to find out the availability of the primary commodity in East Java. The regions with deficit should get a supply from the nearest region. The calculation of surplus/deficit was used to find out the condition of rice fulfillment in ever region. If the difference of total production with the needs of rice was positive, the region would be the surplus one. If the difference of total production with the needs of rice was negative, the region would be the deficit one and need the distribution from other regions. Based on table 3, in the last three years, the regions with the highest surplus of rice in East Java was Lamongan followed by Ngawi, Bojonegoro, Jember, and Banyuwangi.

Based on the calculation of surplus/deficit in the last three years, the region of cities tend to be deficit. They had the narrower area and the area utilization was dominated by building area, so they could produce rice to fulfill their needs. All cities of East Java need rice supply from the surrounding regions.

Beside the regions of cities, Sidoarjo also had the deficit of rice and it became the only region in East Java with deficit rice. The all central regions of rice in East Java had the deficit rice. The condition showed that all the regions were able to distribute the surplus production to other regions, especially the surrounding regions with deficit rice.

**Table 3. Surplus/Deficit of Rice in East Java in 2013**

Region		Surplus/ Deficit of Rice Commodity (Tons)		
		2011	2012	2013
Regency	01 Pacitan	47,391	54,834	58,742
	02 Ponorogo	103,141	166,929	155,325
	03 Trenggalek	28,523	39,850	44,630
	04 Tulungagung	71,052	90,976	59,827
	05 Blitar	95,686	81,793	65,808
	06 Kediri	46,085	49,327	25,899
	<b>07 Malang</b>	48,153	31,244	44,629
	<b>08 Lumajang</b>	123,912	154,339	132,299
	<b>09 Jember</b>	277,779	370,978	344,682
	<b>10 Banyuwangi</b>	277,254	299,031	267,191
	11 Bondowoso	115,872	123,887	123,224
	12 Situbondo	69,665	101,261	109,222
	13 Probolinggo	83,896	83,003	79,524
	<b>14 Pasuruan</b>	215,485	206,921	222,020
	15 Sidoarjo	-78,703	-51,260	-79,076
	<b>16 Mojokerto</b>	73,729	92,088	88,369
	17 Jombang	120,235	169,483	139,944
	18 Nganjuk	154,843	212,867	142,641
	<b>19 Madiun</b>	179,778	239,847	209,576
	20 Magetan	101,911	117,380	120,735
	<b>21 Ngawi</b>	270,011	350,679	375,768
	<b>22 Bojonegoro</b>	295,309	375,116	356,615
	23 Tuban	171,548	245,345	189,178
	<b>24 Lamongan</b>	253,794	406,988	383,361
	25 Gresik	57,665	126,183	103,111
	26 Bangkalan	70,683	74,420	86,976
	27 Sampang	49,595	68,458	44,361
	28 Pamekasan	17,095	36,046	12,022
	29 Sumenep	12,292	2,896	24,128
Region		Surplus/ Deficit of Rice Commodity (Tons)		
		2011	2012	2013
City	71 Kediri	-14,938	-18,084	-18,272
	72 Blitar	-6,719	-5,244	-6,697
	73 Malang	-66,200	-65,572	-68,617
	74 Probolinggo	-13,603	-11,468	-13,112
	75 Pasuruan	-8,340	-4,727	-8,436
	76 Mojokerto	-7,916	-6,720	-8,889
	77 Madiun	-6,778	-4,982	-6,057
	78 Surabaya	-238,574	-238,169	-245,801



	79 Batu	-13,812	-14,033	-14,986
<b>Jawa Timur</b>		<b>2.976.801</b>	<b>3.951.910</b>	<b>3.539.865</b>

Source: Board of Food Commodity Jawa Timur, 2011-2013

Based on the information shown in Table 3, it can be seen that there were some regencies/cities with surplus and deficit in 2011-2013. Surplus commodity of rice was marked by the [ositive rice stock, while the deficit was marked by the negative one. Based on table 3, it can be seen that all cities in East Java and Sidoarjo had deficit commodity of rice in 2011-2013 since it had negative value.

#### Analysis of Rice Distribution Pattern in East Java

Rice distribution pattern was conducted to distribute the surplus rice production in the central regions to the deficit ones. The consideration taken to determine the distribution pattern was the nearest distance. The near distance between the central regions and the deficit regions was the important factor determining the model. The goods prices was directly proportional with the distance, thus the longer distance the higher the prices would be. This distribution pattern used gravitation analysis. The analysis of Fravitation Model aimed to see the economic interactions among regions. In doing the calculation of the gravitation, distance assumption was used to indicate the satellite-based 'google earth'

**Table 4. Results of Gravitation Analysis Calculation from the Central regions to Deficit Regions**

Index of Gravitation	Sidoarjo Regency	Kediri City	Blitar City	Malang City	Probolinggo City	Pasuruan City	Mojokerto City	Madiun City	Surabaya City	Batu City	
R e g e n c y	Banyuwangi	46,175,814	3,197,760	1,666,344	16,732,597	9,129,607	5,653,752	2,266,806	1,639,205	53,842,898	3,666,536
	Mojokerto	418,100,653	41,469,642	13,797,257	224,088,723	25,696,952	62,604,066	<b>774,928,859</b>	11,787,468	<b>1,243,256,590</b>	93,947,621
	Pasuruan	<b>2,329,933,561</b>	17,923,656	13,963,170	618,566,767	<b>139,407,206</b>	<b>829,174,999</b>	30,114,088	7,055,528	1,220,257,754	97,388,257
	Malang	1.180,047,539	<b>47,397,960</b>	<b>48,247,638</b>	<b>1,386,798,688</b>	55,058,310	55,773,499	17,297,386	10,293,134	893,746,704	<b>175,215,006</b>
	Madiun	37,344,804	32,177,217	6,894,205	22,067,236	3,476,836	4,523,407	6,874,640	<b>596,858,350</b>	66,384,445	6,269,491
	Bojonegoro	146,585,182	34,650,164	8,748,261	26,598,397	6,414,609	8,364,125	20,551,260	26,390,180	297,024,479	11,455,982
	Ngawi	40,598,982	23,750,149	5,961,858	20,702,775	3,489,780	4,346,255	5,771,317	149,398,690	71,027,318	5,800,670
	Lumajang	140,942,539	5,353,639	5,041,884	58,795,796	81,599,643	23,259,079	5,344,696	2,427,269	137,414,588	8,809,343
	Lamongan	525,709,366	25,700,979	7,060,849	56,391,743	13,172,406	21,091,296	58,752,484	9,430,502	1,653,276,924	11,543,101
	Jember	161,165,783	8,647,612	6,108,899	56,651,433	54,397,532	24,044,712	7,370,790	4,126,174	173,159,363	12,038,560

Source: Central Bureau of Statistics of East Java in 2010-2014, processed in 2015

Sidoarjo directly that is directly bordered with Pasuruan also had strong gravitation interactions. It meant that the close relationship of the high flow of goods, services, and society mobility between both regions had caused the distribution pattern of rice run from Sidoarjo to Pasuruan. Kediri had strong attractions with Malang and Mojokerto. It showed that there was a movement of distribution pattern from Kediri to Malang and Mojokerto. Blitar also had the strong attractions with Malang. It showed that there was rice distribution pattern from Blitar to Malang. Whereas Malang city had the strong attractions with Malang regency and Pasuruan regency. It showed that there was the strong rice distributions pattern from Malang city to Malang regency and Pasuruan regency.

Probolinggo had the strong attractions with Pasuruan regency and Lumajang regency. It showed that the rice distribution pattern from Probolinggo regency to Pasuruan regency and Lumajang regency. Pasuruan city had the strong attractions with Pasuruan regency. It showed that there was a movement of rice distribution patterns from Pasuruan city to Pasuruan regency. Mojokerto city had the strong attractions with Mojokerto regency. It showed that there was a movement of rice distribution pattern from Mojokerto city to Mojokerto regency. Madiun city had the strong power with Madiun regency. It showed that there was a movement of rice distribution pattern from Madiun city to Madiun regency. Surabaya city had the strong attractions with Lamongan regency. It showed that there was a movement of rice distribution pattern from Surabaya city to Lamongan regency. Batu city also had the strong attractions with Malang regency and Pasuruan regency. It showed that there was a movement of rice distribution pattern from Batu city to Malang regency and Pasuruan regency.

The strong attractions showed the close relations among regions. It showed that there was economic source mobility like the flow of human resource in both regions in the regency and vice versa. The analysis of gravitation gave an information that the higher value of gravitation, the higher gravitation of the relations among regions in spatial. Based on the calculation of gravitation shown in Table 4, it did not only describe the close relations of the distance, but also the relations power among regions in spatial. Those findings could produce rice distribution systematics from the central regions to the deficit regions that had the biggest relations with the central regions itself.

**Table 5. Rice Distribution of East Java in 2013**

<b>Surplus Regions</b>	<b>Deficit Regions</b>
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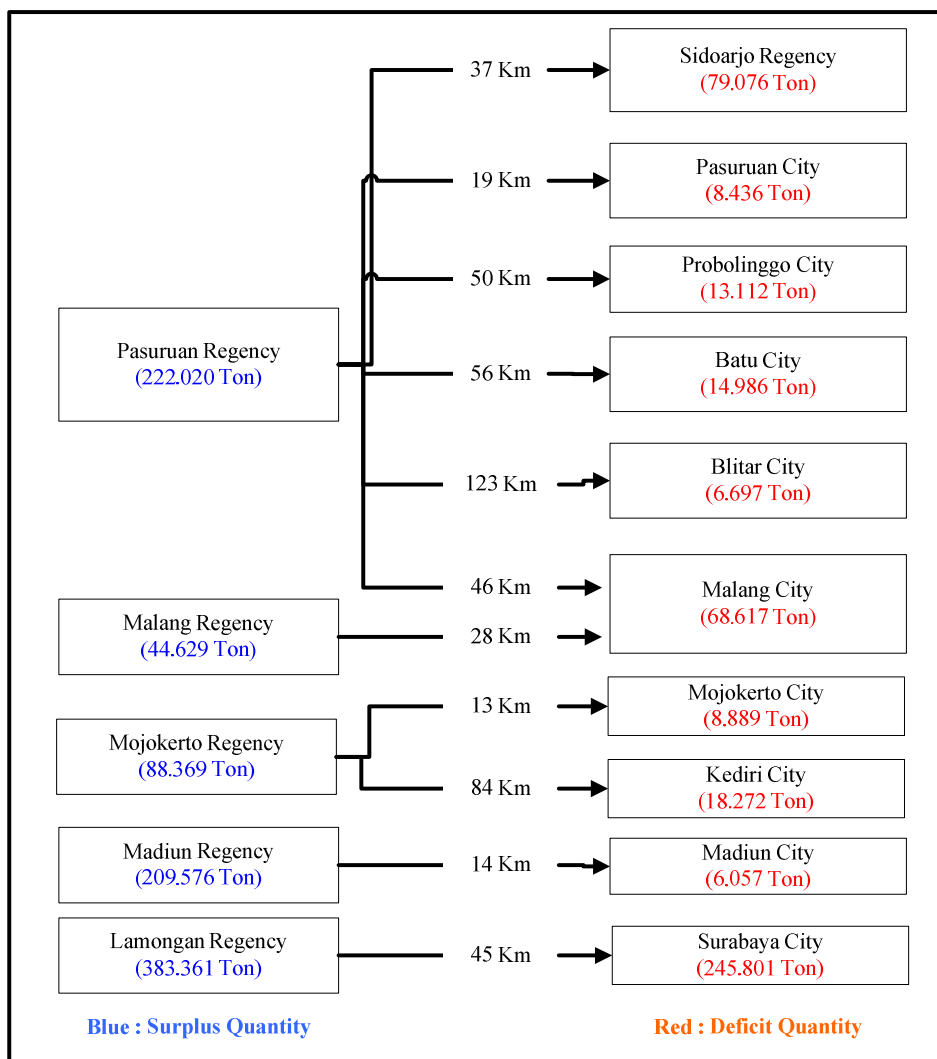
	Regency/ City	Quantity(Tons)
Pasuruan Regency (222.020 Ton)	Sidoarjo Regency	79.076
	Pasuruan City	8.436
	Probolinggo City	13.112
	Batu City	14.986
	Blitar City	6.697
Malang Regency (44.629Ton)	Malang City	68.617
Mojokerto Regency (88.369 Ton)	Mojokerto City	8.889
	Kediri City	18.272
Madiun Regency (209.576 Ton)	Madiun City	6.057
Lamongan Regency (383.361 Ton)	Surabaya City	245.801

Source: Central Bureau of Statistics of East Java in 2010-2014, processed in 2015

Based in Table 5. Malang regency only could give the rice distribution to Malang city and the total of the rice was still deficit, so Malang city was still distributed from pasuruan regency. Pasuruan regency was considered as the supplier of Malang city after Malang regency because Pasuruan regency also had big gravitation value toward Malang city after Malang regency. Malang regency still could supply the rice in Malang city. Whereas Kediri city, Blitar city, and Batu city also had the high gravitation value toward Malang regency, had to be supplied by other regions. Kediri city also had the high gravitation value toward Mojokerto regency after Malang regency. Mojokerto city could also be supplied from Mojokerto regency. Whereas Blitar city and Batu city also had the gravitation value toward Pasuruan regency after Malang regency. Madiun city could also be supplied from Madiun regency and Surabaya city could be supplied from Lamongan regency.

#### **Distribution Flow of Rice Distribution**

Distribution flow alternative of primary needs (rice) is rice distribution direction for the deficit regions and the nearest central regions of rice based on the spatial analysis results. The distribution flow can be geographically illustrated in Figure 1 below.



**Figure 1. Distribution Model of Primary Needs (Rice) in East Java**

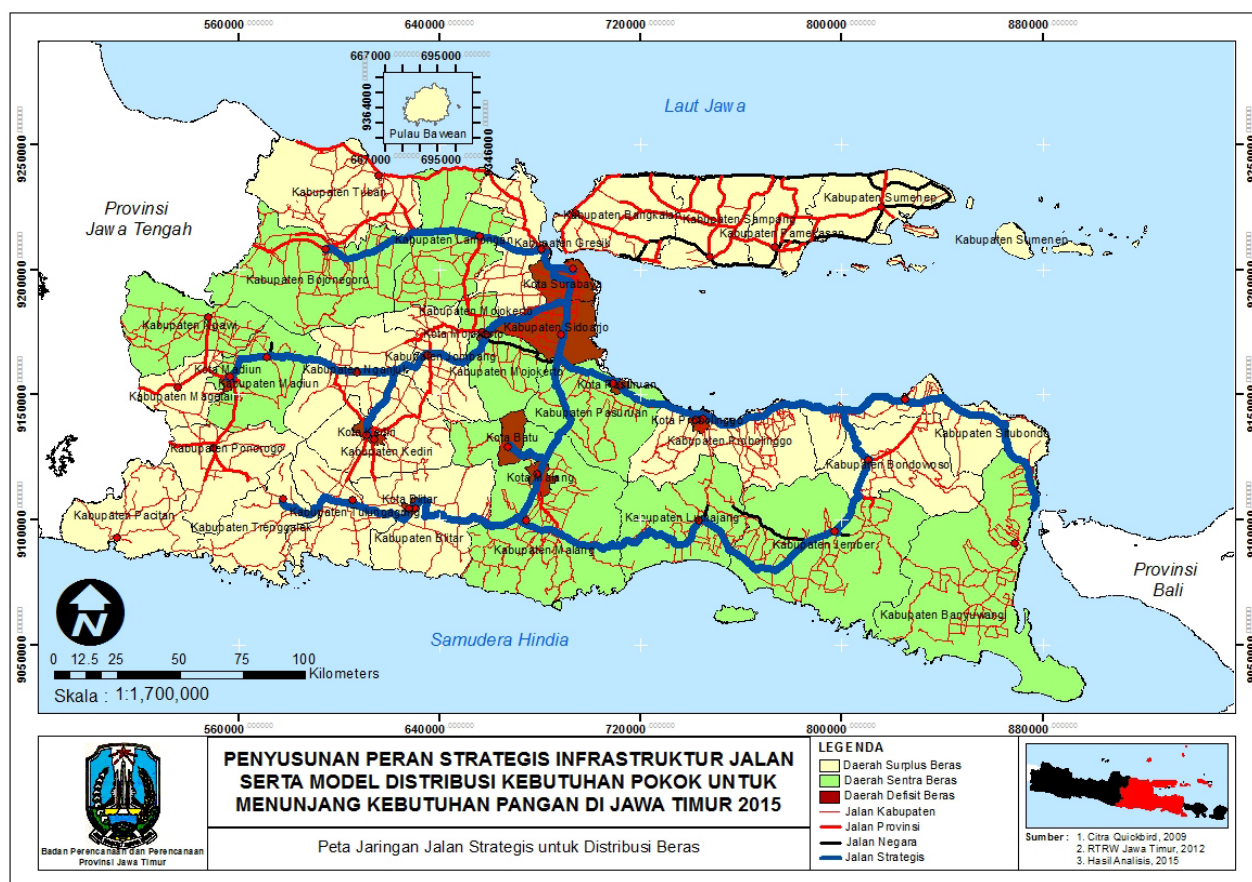


Figure 2. Rice Distribution Model Map in East Java

Pasuruan regency had many surplus of rice in East Java and Pasuruan regency could supply its six surrounding deficit regions. Malang city had the big quantity deficit of rice and Malang city had the close distance with Malang regency, so the rice supplies from Malang regency to Malang city would be more efficient. However, the quantity of the deficit of rice in Malang city could not be supplied yet only from Malang regency, so the rice for Malang city could also be supplied from Pasuruan regency.

Surabaya city had the most deficit of rice in East Java. Surabaya city had high building density and agriculture area that was getting narrower. It was this condition that made Surabaya city could fulfill the needs of rice from within, while the number of population and the needs of rice were also getting higher. In spatial, Surabaya city had the close distance with Lamongan regency was one of the biggest surplus region of rice in East Java.

## 5. CONCLUSION

Based on the analysis, the researcher concluded:

1. The central regions of rice were: Banyuwangi regency, Mojokerto regency, Pasuruan regency, Malang regency, Madiun regency, Bojonegoro regency, Ngawi regency, Lumajang regency, Lamongan regency, and Jember regency.
2. The distribution routes of rice commodity could be described based on the analysis. The distribution routes were based on the nearest distance-based identification between the surplus regions and deficit of food commodity. The rice commodity for Malang city was supplied from Malang regency and Pasuruan regency. The number of the surplus of rice in Malang regency could only fulfill the needs of rice in Malang city. However, the quantity of the rice still did not cover the deficit of rice in Malang city, so it needed to be supplied from Pasuruan regency. The needs of rice in Kediri city and Batu city were supplied from Mojokerto regency and Pasuruan regency. Whereas the needs of rice in Madiun city was supplied from Madiun regency, and Surabaya city was supplied from Lamongan regency.

## 6. SUGGESTION

Suggestion is the researcher's messages or recommendations to support the reach of food commodity availability based on the fact and the results of analysis. The suggestion can be seen as follows:

1. The local government needs to make a regulation to limit the number of the commodity of primary needs outside of East Java so that the needs in the regions can be fulfilled and the problems of food commodity deficit can be solved. It is highly important to make food stabilization.
2. The local and province governments need to improve the quality and the development of the road based on the authority. The government also needs to improve the development of national roads in East Java to be able to decrease the burden of Province Government in making a treatment and supervision. National roads play an important role to smoothen the primary needs distribution in East Java.
3. The government needs to regulate the availability of primary commodity, especially the needs of food through market operations to avoid scarcity that can cause the increase of food prices.
4. The province and local governments need to improve some acts to maintain and to keep the availability of food agricultural area in East Java through the limitation of area use permission, especially the area for commodity production of primary needs and the implementation of disincentive instruments over the function transfer of productive agricultural area.

## 6. GRATITUDE

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