

# FoSSA 2017

# PROCEEDINGS

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of The International Conference on  
FOOD SOVEREIGNTY AND  
SUSTAINABLE AGRICULTURE

**BUILDING OF FOOD SOVEREIGNTY  
THROUGH A SUSTAINABLE AGRICULTURE**  
Challenges toward Climate Change and  
Global Economic Community

OF THE INTERNATIONAL CONFERENCE ON  
FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE

**BUILDING OF FOOD SOVEREIGNTY  
THROUGH A SUSTAINABLE AGRICULTURE**  
Challenges toward Climate Change and  
Global Economic Community

# FoSSA 2017

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Jl. Kallimantan 37 Jember 68121  
Telp. 0331-330224, psw. 0319  
E-mail: [upt-penerbitan@unej.ac.id](mailto:upt-penerbitan@unej.ac.id)



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**PROCEEDING OF THE INTERNATIONAL CONFERENCE OF FOOD SOVEREIGNTY AND SUSTAINABLE AGRICULTURE (FoSSA 2017) : BUILDING OF FOOD SOVEREIGNTY THROUGH A SUSTAINABLE AGRICULTURE, CHALLENGES TOWARD CLIMATE CHANGE AND GLOBAL ECONOMIC COMMUNITY**

Agriculture Faculty, Jember University, Indonesia

Agriculture Faculty, Jember University, Indonesia  
Agriculture Faculty Building, Tegalboto Campus, Jember, Indonesia  
Email: fossa2017@unej.ac.id  
Website: www.fossa2017.org  
Telp./Fax : (+622331)334054

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Editor : Wen-Chi Huang, Nobutaka Ito, Nick Rose, Isnaini Jalil, Yuli Hariyati,  
Mohammad Rondhi, Tri Handoyo, Hari Purnomo, Didik Pudji Restanto,  
Layout : Sukron Romadhona, Susan Barbara P. SM, Himmatul Khasanah,  
Nurul Pratiwi  
Cover Design : Priyo Sugeng Winarto

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## WELCOMING SPEECH



### **Rector of University of Jember: Drs. Moh. Hasan, M.Sc., Ph.D.**

One of the numerous challenges we face today to overcome the problem of uncontrolled human population growth is the imbalance between supply and demand for food and energy. These would impact in general to the environment and the quality of life. To respond these global challenges, the development of technologies for food and natural resources aiming to create sustainable agriculture will play a strategic role.

Efforts have been made by many researchers focusing on the development of technologies and management natural resources, which will lead to the application and improvement of agriculture systems to better provide human needs – especially in the context of food security. Producing adequate food becomes a common goal. However, such efforts to achieve food security have mainly focused on large scale corporate farming and industries. This can have regrettable impacts on small scale food producers as well as on the environment.

Hence, food sovereignty, a relatively new concept which refers to the rights of communities to choose their own policies regarding agricultural development and food production, is no less important than food security. Agricultural development therefore no longer exclusively focuses on producing enough amount of food for the human population. It now also aims to provide larger freedom for small producers and farmers.

We believe that achieving sustainable agriculture is essential in order to achieve food sovereignty. In line with the efforts to develop agricultural innovations, University of Jember has established many facilities and research centers, such as the Agrotechnopark and the Center for Development of Advanced Science and Technology (CDAST). Furthermore, University of Jember fully supports this conference as a medium for researchers to share their research results including technological innovations, and to engage research collaborations in the area of agriculture for the quality and welfare of mankind.

Lastly, I would like to give my warmest greeting to all presenters and participants of this conference. I appreciate your commitment for the successfull of this conference. Thank you.

Jember, August 1<sup>st</sup>, 2017  
Rector,

**Moh.Hasan**



**Dean of Faculty of Agriculture-University of Jember: Ir. Sigit Soeparjono, MS, Ph.D.**

Assalamualaikum Wr. Wb.

Praise goes to the most merciful God Allah SWT for the blessings of life and knowledge for us to gather in this meaningful occasion.

To start with, I would like to warmly welcome the heads of both Indonesian and foreign universities to the Faculty of Agriculture, University of Jember, Indonesia. It is a great pleasure to have you

with us today.

This event is a reflection of our faculty's commitment to always improve the quality of our education and to accommodate more and more opportunities in academic collaborations. We have been working hard to refine our agricultural research facilities and to offer students increasingly more comprehensive and extensive methods of learning in the world of agriculture.

Today, the development of modern agricultural systems and techniques has brought us many benefits. However, these benefits have often come at a certain costs, such as negative ecological impacts and the decreasing quality of working conditions for farmers. Such negative consequences have made us realize that agriculture must also take into account the preservation of the environment and the rights and welfare of food producers themselves. This is what we know as sustainable agriculture.

Therefore I believe this international conference will be able to present an interesting discussion on the aforementioned topic, with prominent speakers from Indonesia, Australia, Japan, Sri Lanka, Malaysia, Taiwan, and Philippines, giving a contribution to the development of science, and hopefully encouraging more research on this area.

I would also like to congratulate the Faculty of Agriculture, University of Jember as the main host of this international conference, along with four other co-hosts which include Brawijaya University, Andalas University, Warmadewa University and UPN Jatim. May it support efforts to become world-class universities in the near future.

I also wish to thank all the sponsors who have provided financial support for this event, and to everyone else who has helped make this event possible.

Finally, I would like to convey a warmest welcome to all the distinguished guests and participants of this international conference. We are truly grateful for your presence today. May we have a fruitful discussion and may we all gain new and valuable knowledge.

Wassalamuallaikum Wr. Wb.

Jember, August 1<sup>st</sup> 2017.

Dean,

**Sigit Soeparjono**



### Message from Chairman: Prof. Dr. Ir. Yuli Hariyati, MS

Assalamualaikum Wr. Wb.

Ladies and gentlemen ...

First of all, I would like to expressed my gratitude to all of you .. for being present and participate in this FoSSA 2017 International Conference. This conference addresses all experts in food sovereignty from many different countries with the main theme of : **“Building of**

#### **Food Sovereignty through a Sustainable Agriculture: Challenge of Climate Change and Global Economic Community”.**

Lately, the concept of food-sovereignty and sustainable agriculture are still very attractive among government-officers ... activist ... academician and also grassroot-elements.

Food sovereignty is defined as the right of every person ... every society ... and every country in the world ... to determine its own food policy by prioritizing local food products for their own needs, and forbidding the practice of food trade by means of dumping.

In principle .... each country has their own right to determine and control its own food-production, distribution and consumption systems ... in accordance with local ecological, social, economic, and cultural conditions, as well as its own sovereignty.. no intervention of others.

Food Sovereignty term was first introduced by the international peasant organization La Via Campesina at the World Food Summit (WFS), in November 1996 in Rome, Italy.

Moreover.. Food Sovereignty has even been declared by 400 delegates of farmer organizations, indigenous-peoples, fishermen, NGOs, social activists, academician and researchers from 60 countries at the World Forum on Food Sovereignty in Havana ... September 2001.

Therefore ... currently ... collective bargaining for food sovereignty is a global issue.

FoSSA 2017 International Conference activities will cover four main activities, namely :

- FoSSA2017 International Seminar
- FoSSA Meeting and SAFE Workshop
- FoSSA Cultural-Event
- Bromo Tengger FoSSA-FieldTrip

The seminar covers 5 sub-topics ...

- (1) Food Sovereignty dimensions in sustainable agriculture production systems, current situation, challenges and opportunities;
- (2) Recent advances on the climate change information and mitigation systems in agriculture and its practical implications on small-scale mixed-farming operations;
- (3) Sustainable agriculture production system on food, strategic-products and energy diversifications: policies and lesson learnt;
- (4) Fostering / Building a global action for cooperation and policy development towards sustainable agriculture;
- (5) The local resources utilization and the local-wisdom on sustainable agricultural production systems : with special emphasis on the global economic community.

At this moment ... we are now 258 participants from Myanmar, Japan, Thailand, Sri Lanka, Germany, VietNam, Bhutan, UK, Phillippine, Australia, Korea, Malaysia, and Indonesia... 205 oral presentations and 28 poster presentations and other would be performed..

FoSSA2017 seminar will present 15 speakers ... this morning we have Dr. Nur Masripatin (Director of PPI) ... Dr. Nick Rose (Executive Director of SUSTAIN: The Australian Food Network) ..... and also 13 speakers from Japan, Taiwan, Malaysia, Philippines, Sri Lanka, Australia, and Indonesia.

We would like to thank to The Directorate General of PPI, PTPN X, BRIA-Germany, and The Research Institute – University of Jember for sponsorships.

And also to UPN University .. Warmadewa University ... and Andalas University ... and The Asia-Pacific SAFE Network .. for collaborative-hosting this FoSSA2017 Conference..

Wassalamualaikum WRB

Jember, August 1<sup>st</sup>, 2017

Chairperson of FoSSA International Conference

Yuli Hariyati



## **EMPLOYMENT ABSORPTIVE CAPACITY OF SMALLHOLDER COFFEE PLANTATIONS AND SUSTAINABLE COFFEE DEVELOPMENT IN JEMBER DISTRICT**

Joni Murti Mulyo Aji, Ebban Bagus Kuntadi, Dewi Churfa H. Sholihah

Agribusiness Department, Faculty of Agriculture, Jember University  
Jalan Kalimantan 37, Jember 68121

email : [joniaji@gmail.com](mailto:joniaji@gmail.com)

### **Abstract**

Jember District is the second largest of coffee producing area in East Java (after Malang) with coffee planted area around 5,608 hectares. Based on the data in 2012, 27 of 31 sub districts in Jember are coffee producers which means only 4 sub-districts in this region do not produce coffee. Each area, however, has a different potency on coffee production. To understand the role of coffee in the regional development, an area mapping on distribution of smallholder coffee plantation is therefore needed as it related to labor employment in plantation sector, particularly as most of those run by smallholders as well as the change of economic structure in Jember District. The importance of smallholder coffee plantation's role on labor absorption and economic growth on Jember will eventually determine the further policy on the development of smallholder coffee plantation as an important subsector in Jember. This research aimed to: (1) describe the characteristic of distribution coffee plantation area by smallholders in Jember District, (2) know the shift of GDP value from smallholder coffee in Jember, and (3) know the employment absorptive capacity on smallholder coffee plantation in Jember District. Both descriptive and analytic methods were used in this research. Methods of analysis used in this research include location quotient (LQ), locality coefficient and specialization coefficient, shift-share analysis, demo-metric model, and contribution. The result of this study showed that (1) the characteristics of distribution smallholder coffee area in Jember Regency were not concentrated, (2) the shift share and position of GDP value from smallholder coffee were positive, and (3) smallholder coffee plantation ability on producing the economic outputs and its contribution to the region economic growth is followed by increasing labor absorption and have positive impacts on the district regional development.

**Keywords:** Smallholder Coffee, Location Quotient, Locality, Specialization, Shift Share, Demometrics

### **BACKGROUND**

Coffee is one of Indonesia's the main plantation export commodities other than rubber, palm oil, tea, and tobacco. Coffee in Indonesia consists of many types, Arabica coffee, Robusta coffee, Liberika coffee, and others. Robusta and Arabica are the types of coffee widely grown in Indonesia, in which more than 80 percent of the area planted to Robusta. According to data from the ICO (2012), Indonesia is the third largest coffee producer in the world after Brazil and Vietnam. The number of Indonesian coffee production in 2012 amounted to 748 thousand tons or 6.6% of world coffee production. This amount consists of Robusta coffee production reached more than 601 thousand tons (80.4%) and Arabica coffee production reached more than 147 thousand tons (19.6%). The data give an idea of the important role of coffee as one of Indonesian plantation export commodities. Not surprisingly, it sustains more than 1.4 million farmers' life and agro-industry and agribusiness thus gives a relatively large supply on the foreign exchange.

East Java is the fourth-largest coffee producer in Indonesia after South Sumatra, Lampung and North Sumatra. Total area planted to coffee in East Java in 2012 reaching 95,266 hectares. Around 79,000 hectares (83%) of this area are planted to Robusta, while the rest of 17% are planted to Arabica. Meanwhile, Jember was noted as the second largest coffee producing area in East Java with the total planted area of 5,608 hectares after Malang which planted 11,900 hectares coffee in this particular year.

Types of coffee that are commonly found in Jember is robusta coffee. Coffee cultivation in Jember spread almost in all districts. Based on data from the Agency of Plantation and Forestry in Jember (2012), Silo Sub-district is noted as the largest coffee producer in Jember with a coffee planted area of 2288.70 ha, and production reaching 1166.45 tons. The second largest coffee producer is Sumberjambe Sub-district, which is followed by the Sub-districts of Ledokombo, Panti, Jelbuk, Sumberbaru, Tanggul, Tempurejo, Bangsalsari, Sukorambi, and 17 other sub-districts.

Clearly, the differences in the production of each area suggest that the potential of the coffee commodity depending on the conditions of each region. Therefore, a proper policy and planning is needed in the development of the coffee commodity so as to meet the consumption needs and to supply the needs of local agro-industries as well as exports. The coffee commodity development can be done if the distribution of the basic and non-basic regions of coffee is properly mapped.

Cultivation of the coffee commodity spread to almost all areas in Jember District is also associated with employment in the plantations subsector. In general, agriculture sector requires a relatively large number of workforces. While more employment is potentially absorbed in agricultural activities, the number of labors who want to work or participate in agriculture sector tends to decrease. This also applies to all agricultural activities including coffee plantations subsector in Jember. The increase in acreage and production of coffee may result in more employment in coffee sectors. As it is known that the management of the coffee plantation crops in a single production requires handling a wide range of labor and require relatively high. Therefore, seeking the potential of coffee plantations subsector to absorb labors in Jember is ultimately important.

Furthermore, with proper planning and management, the role of smallholders' coffee is certainly able to change or shift the economic structure of a region. Therefore, identifying a change and a shift in the economy due to the contribution of smallholders' coffee commodity in the GDP as a reference for the development of these commodities in certain areas, especially in Jember is necessary in order to establish proper policies related to the development of coffee sector.

This study is aimed to seek: 1) to determine the basic regions of smallholders' coffee when viewed from production side in Jember; 2) to know the changes and shifts of the GRDP of the coffee plantations subsector in Jember; and 3) to determine the impact of the total output from the smallholders' coffee plantations towards the absorption of employment in Jember.

## **METHODS**

The study was purposively conducted in Jember. Determination of the study area is based on the consideration that the Jember district is the second largest coffee production in East Java, thus it has a relatively great potential to develop the contribution of coffee sector to the region economy.

The research method used in this research is descriptive and analytical method. Descriptive method is a method that aims to provide a picture of systematic, factual and accurate information on the facts, characteristics and the relationships of phenomena under investigation. Meanwhile, analytical method is aimed to test hypotheses and to interpret of the results of the analysis (Nazir, 2003).

Data collected in this study were mainly secondary data. Secondary data were obtained from institutions and agencies associated with this research. The main source of data in this study were the Central Statistics Agency (BPS) East Java, BPS Jember and Agency of Plantation and Forestry Jember.

The first problem addressed in this study concerning the mapping of basic and non-basic regions of coffee subsector in Jember was analyzed using the Location Quotient (LQ) with formulation as follows:

$$LQ = \frac{(X_{iB} / \sum X_{iB})}{(X_{iK} / \sum X_{iK})}$$

Notes:

LQ<sub>iB</sub>: LQ value of coffee plantations subsector

X<sub>iB</sub>: Smallholder's coffee production at the sub-district i (kw)

∑ X<sub>iB</sub>: Total production of plantation crops at the sub-district i (kw)

X<sub>iK</sub>: Smallholder's coffee production at the district i (kw)

∑ X<sub>iK</sub>: Total production of plantation crops in the district i (kw)

There are three possible values of LQ, namely:

- 1) The value of LQ in sector i = 1, this means i sector in the study area B is equal to the share of the same sector in the regional economy reference K.
- 2) The value of LQ in sector i > 1, this means that sector i is the economic basic sector of the study area B.
- 3) The value of LQ in sector i < 1, this means that sector i is not an economic basic sector of the study area B.

The second problem regarding the magnitude of the changes and shifts in the value of GDP of coffee plantations in Jember was analyzed using shift share analysis. Shift share method is a simple technique to analyze the changes in the economic structure of the local region (Jember) in economic relation to a particular of greater region (East Java) reference in a certain period. The data used in the analysis of this shift is the GDP share and Jember East Java in 2003 and 2012 according to economic sectors (business fields) based on constant prices in 2000. Through the shift share analysis, economic growth and economic structural shifts of Jember region can be identified and analyzed. Components of the shift share analysis include the provincial share, proportional shift, and differential shift. The formulations of each of these three components are described as follows (Tarin, 2009).

1) *Provincial Share (PS)*

$$PS \Delta_i^t = Y \Delta_i^t X \frac{(Y \Delta_{Jatim}^{t12})}{(Y \Delta_{Jatim}^{t03})} - 1$$

2) *Proportional Shift (P)*

$$P \Delta_i^t = Y \Delta_i^t X \frac{(Y \Delta_{Jatim}^{t12})}{(Y \Delta_{Jatim}^{t03})} - \frac{(Y \Delta_{Jatim}^{t12})}{(Y \Delta_{Jatim}^{t03})}$$

3) *Differential Shift (D)*

$$D \Delta_i^t = Y \Delta_i^t X \frac{(Y_{Jember}^{t12})}{(Y_{Jember}^{t03})} - \frac{(Y_{Jatim}^{t12})}{(Y_{Jatim}^{t03})}$$

where:

Jatim : East Java Province

J : Jember District

Y : GDP

i : GDP sectors

t<sub>03</sub> : 2012 as analysis year

t<sub>12</sub> : 2003 as base year

Changes (growth) of gross value added (i) in a given sector in Jember GDP can be formulated as follows.

$$\Delta Y_i^t = PS\Delta_i^t + P\Delta_i^t + D\Delta_i^t$$

In addition to the calculation of the growth component of the above, the shift share analysis can also be used to show the sensitivity and GDP growth projections which are conducted to get an idea of the factors that determine the growth of the GDP. For that, three possible growth scenarios as a basic for calculating growth projections are applied. The first scenario is the basic scenario where growth is assumed to remain unchanged or equal to the previous period. The second scenario is a condition of assuming regional growth is stagnant, while the third scenario is a condition of assuming local sectors (sectoral) growth is stagnant. The total of each of these scenarios will eventually show the projected percentage of each sector or subsector there. The results of the calculation of the projected growth will indicate how sensitive a factor influencing the growth of the local economy as a whole.

The third problem regarding the ability of coffee plantations to absorbing employment in Jember was analyzed using the demometric model. The Demometric model consists of several equations that generally will be analyzed using OLS (Ordinary Least Square) approach. The equations used in this study are described as follows:

To ensure the validity, these demo-metric equations must first be tested with classical assumptions. Classical assumptions used include multicollinearity test, heteroscedasticity test and autocorrelation test (Priyatno, 2012).

## RESULTS AND DISCUSSION

### Basic Areas Analysis of Coffee Commodity Based on Production in Jember

Mapping of basic and non-basic areas (regions) can be determined by calculating the value of Location Quotient (LQ) of commodity coffee for each region. Based on the calculation of LQ, it is known that during the period of five years (2008-2012), regions considered as the basic of the coffee commodity producing area in Jember is relatively constant.

There are nine largest production-producing sub-districts in Jember. These nine sub-districts are Silo, Panti, Tanggul, Sumberbaru, Sukorambi, Sumberjambe, Bangsalsari, Jelbuk, and Ledokombo with an average value of LQ for each regions is 10,563; 7.369; 4,167; 3.807; 2,619; 2,444; 1,808; 1,767; and 1,585 respectively. The structure of basic areas of the coffee commodity in Jember suggests that the potential of smallholder coffee plantation in Jember is quite high. Therefore, it is necessary to emphasize the necessity of proper planning and management, especially for these basic areas, in order to promote more sustainable development of coffee commodity as one of the leading commodity Jember.

Meanwhile, *localization* coefficient value of commodity coffee in Jember from 2008 to 2012, respectively 0.664; 0,701; 0.715; 0.698; and 0.736. Sub-districts that have a positive value of *localization* include Silo, Sukorambi, Sumberbaru, Tanggul, Bangsalsari, Subdistrict, Jelbuk, Ledokombo, and Sumberjambe. Basically, the more the areas in Jember which have a positive value of localization coefficient for coffee, the higher the production of coffee in Jember. In fact, there are only these nine districts that have a positive localization value of

commodities in terms of coffee production. This result suggests that smallholder coffee plantation at these nine districts are able to produce coffee commodity with higher production compared to other districts in the region. Commodity distribution characteristics of coffee that is not concentrated in one region has an advantage, among others, the production of coffee is not only produced in one area alone, so that if in case one area of coffee production decrease, the needs for coffee can be fulfilled by other regions .

Furthermore, the result of specialization coefficient analysis suggests that the nine sub-districts specialize in coffee production. It means that coffee is the main plantation commodity, so the production of coffee is higher compared to the production of other commodities in these basic regions. This result indicates that the coffee basic areas have a tendency to specialize coffee as a special (main) commodity.

#### **Change and Shift Values of GDP of Coffee Plantations in Jember**

In general, the shift share method is a simple technique to analyze the changes in the economic structure of the local area economic relation with particular reference greater in certain periods. Local economies are discussed in this study is the level of the district, namely Jember economy. Economic unit of reference used is the larger regional economy, namely East Java Province. Here are presented the data and the GDP of Jember in East Java Province GDP along with the changes in the period 2003-2012.

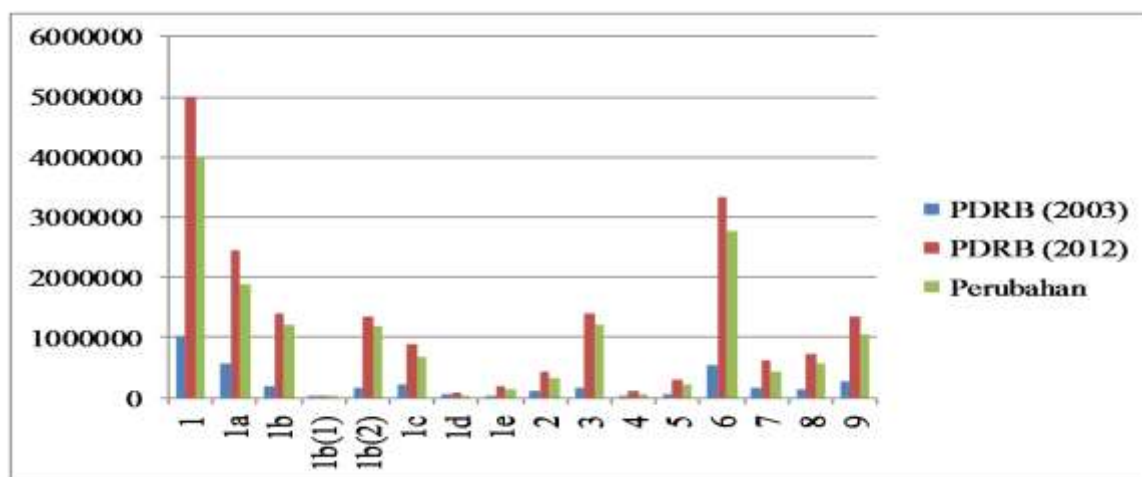


Figure 1 Jember GDP Value in 2003 and 2012 along with the Shift

Specification: 1 = Agricultural Sector; 1a = Food Crops; 1b = Plantation Crops; 1b (1) = Coffee; 1b (2) = Commodities other than Coffee; 1c = Livestock; 1d = Forestry; 1e = Fisheries; 2 = Mining And Quarrying; 3 = Processing Industry; 4 = Electricity, Gas, and Water; 5 = Constructions; 6 = Trade, Hotel, and Restaurant; 7 = Transport And Communications; 8 = Finance, Real Estate, and Company Services; 9 = Services.

Based on the value of Jember GDP from 2003 to 2012, it is known that there were some changes in the economic structure of the analysis period. In 2003, GDP of each sectors from the highest to the lowest respectively were the agricultural sector; trade, hotels and restaurants; services sector; the manufacturing sector; transport and communications; finance, leasing, and service companies; mining and quarrying; constructions sector; and electricity, gas and water. However, within a period of ten years, Jember economic structure has changed with sector-forming sequence from the largest to the smallest GDP respectively were the agricultural sector; trade, hotels, and restaurants; the manufacturing sector; services sector; finance, leasing, and service companies; transport and communications; mining and quarrying; constructions sector; and electricity, gas and water. Obviously, changes in the value of GDP in 2003 and in 2012 have resulted in a change in the economic structure of Jember. Changes in economic structure Jember within ten years were as a result of the increasing value of the manufacturing sector GDP, so as to shift the position of the service sector as well as increasing the value of GDP finance, leasing, and service companies

that shifted the position of the transport and communications sector. Changes in the value of GDP were able to change the position of these selected sectors in Jember within a period of ten years.

Meanwhile, as the main concern of this study, i.e., the agricultural sector is divided into five sub-sectors. Food subsector is the largest contributing to the agricultural sector GDP in Jember, its changes is also the greatest among the five sub-sectors contributing to the agricultural sector. It is respectively followed by the plantation sub-sector, livestock sub-sector, fisheries sub-sector, and forestry sub-sector.

At the plantation sub-sector, there were some leading sector commodities from Jember which accounts for the formation of the value of GDP this subsector. One of them is coffee. Coffee production was fluctuated. In 2012, coffee production declined when compared to production in 2003. Nonetheless, this does not result in a decrease in GDP as a decrease in production was accompanied by increasing coffee prices.

Increasing coffee prices was mainly affected by rising domestic coffee consumption. Increased domestic consumption of coffee was anticipated due to increasing consumers' income and standards of living, shifting social patterns in the consumption of coffee, coffee presentation and practicality of products, the diversity of taste or flavor that suit to consumers' demand, as well as the proliferation of cafe, restaurant, and hotel serving coffee as one of their prestigious menu.

Based on the theory of shift share analysis, the growth of economic sectors in Jember is generally influenced by growth in the three components, namely provincial share, proportional shifts and differential shift. In general, share values between Jember and East Java during the ten year period from is equal to 0.7199. This value can be interpreted that the growth rate of regional GDP (East Java Province) in the period 2003-2012 was 71.99%.

The value of the proportional shift contains the shift of economic growth in the regional (East Java Province) due to the contribution of regional sector growth (East Java Province). In general, from proportional shift value, there are five sectors which experienced relatively rapid growth, namely mining and quarrying; trade, hotels, and restaurants; transport and communications; finance, leasing, and service companies; as well as the services sector. The proportional shift of each sector were 0.1418; 0.3337; 0.6455; 0.2403; and 0.0244 respectively. The positive value indicates that the regional sector growth is higher than the growth of the regional economy in general. This means that the sector in East Java with a positive value of proportional shift has higher growth than economic growth in East Java. Based on the value of the proportional shift, it is known that the transport and communications sector as well as trade, hotels, and restaurants are two dominant sectors for the regional economy (East Java Province).

Meanwhile, the proportional shift value of each sub-sectors forming the agricultural sector, except fisheries sub-sector, were negative. The value of each sub sector namely, food crops -0.5178; plantation crops -0.6472; livestock -0.2466; forestry to -0.1558; and fisheries 0.3194. Negative values of these sub-sectors in agricultural sector indicate that these sub-sectors have lower growth than economic growth in East Java.

Nevertheless, the value of the proportional shift of the coffee plant is positive, which was equal to 0.8647, whereas the value of proportional shift of plantation crops other than coffee was equal to -0.7399. This means that the GDP growth of the coffee plantation in East Java was higher than the economic growth in East Java by 86.47%, while the GDP growth of plantation crops other than coffee plant in East Java was lower than the economic growth in East Java by 73.99%. This is not surprising given increasing coffee values as described above. The value of the differential shift indicates a shift of regional growth (East Java) due to the contribution of local sector growth (Jember). Based on the results, it is known that the nine sectors comprising agriculture; mining and quarrying; manufacturing sector; electricity, gas and water supply sector; building sector; trade, hotels, and restaurants; transport and communications; finance, leasing and service companies; as well as the services sector has positive values. Differential shift value of each sector respectively were 3.5487; 1.9695;

6.6517; 1.2427; 2.8260; 3.9726; 1.2212; 2.8660; and 2.9593. From the values of the differential shift, it is known that the growth of the whole sectors at the local level (Jember) was higher than the growth of the whole sectors at the regional level (East Java Province). In general, the manufacturing sector; trade, hotels, and restaurants; as well as the agricultural sector was the dominant sector Jember during 2003 to 2012.

The differential shift values of for sub-sectors in the agricultural sector in Jember, namely food crops, plantation crops, livestock sub-sector, and fisheries sub-sector were positive. The values for each sub-sector were 3.0340; 6.3889; 2.4568; 3.5709 respectively. Meanwhile, the differential shift value forestry sector was negative at -0.4501.

From the differential shift values, it is noted that the plantation sub-sector has the highest value among agricultural sub-sectors. It means that plantation subsector is the most important sub-sector contributed to the agricultural sector GDP in Jember. It has a higher growth rate compared to other subsectors. Nonetheless, coffee has a negative differential shift value that is equal to -0.6181. It means that GDP growth of coffee in Jember is lower than GDP growth of coffee in general in East Java Province. This is due to coffee commodity value of GDP in Jember was much lower when compared to the value of GDP in the other coffee production areas in the region.

In addition to the calculation of the above four components of growth, the shift share analysis can also be used to show the sensitivity and projected GDP growth of a region. For that, three possible growth scenarios as a basic for calculating growth projections are applied. In the first scenario, growth is assumed to be the same or is equal to the previous period (no changing). Projection of the agricultural sector, which consists of food crops, plantation crops, livestock, forestry, and fisheries sub-sectors will have the value of GDP for the period 2012-2022 amounted to 10,371,463.0 million rupiah; 10,468,587.0 million rupiah; 3,512,417.2 million rupiah; 82,008.2 million rupiah; and 1,024,206.9 million rupiah. Meanwhile, the GDP coffee plantation accounted for 85,478.3 million rupiah, while plantation crops commodities other than coffee GDP of 11,139,422.4 million rupiah.

In scenario two, the regional economic (East Java) growth is assumed to have stagnated. Projection of the agricultural sector, which consists of food crops, plantation crops, livestock subsector, the forestry sub-sector, and fisheries, each have a value of GDP for the period 2012-2022 amounted to 8,607,346.1 million rupiah; 9,458,528.4 million rupiah; 2,868,996.2 million rupiah; 29,014.5 million rupiah; and 892,774.1 million rupiah. Meanwhile, the value of GDP of commodity coffee plantation sub-sector amounted to USD 54,185.6 million, while the value of GDP of plantation commodities other than coffee is 10160656.5 million rupiah.

In scenario three, the local economic (Jember) growth is assumed to have stagnated, so that the value of the differential shift is assumed to be zero. Projection of the agricultural sector, which consists of food crops, plantation crops, livestock subsector and the result, the forestry sub-sector, and fisheries sub-sectors each have a value of GDP for the period 2012-2022 amounted to 2,945,726.5 million rupiah; 1,505,037.5 million rupiah; 1,316,705.8 million rupiah; 115,137.5 million rupiah; 372,305.1 million rupiah. Meanwhile, the value of GDP of commodity coffee plantation was 112,345.2 million rupiah, while the value of GDP of plantation commodities other than coffee is 1,332,366.8 million rupiah.

As the sensitivity analysis were obtained for each assumed scenario conditions as the reference, it was found that the total amount of GDP for the first two scenarios was equivalent to 86.56% of the total GDP of the scenario. Meanwhile, the total amount of GDP of the third scenario is equivalent to only 31.09% of the total GDP of the first scenario. It means that the regional economic stagnation results in decreasing the total amount of GDP 13.44%, while the impact of local sector growth stagnation (differential shift) resulted in a decrease in the amount of 68.91% of total GDP. Thus, the regional economic stagnation affects the local economy by 31.09% and economic growth is relatively more sensitive to changes in the local economy rather than changes in the regional economy. Due to the stagnation of the local economy (differential shift) gives a greater impact to the decline in value of the total GDP, it

can be said that the growth sectors of the local economy is very dependent and sensitive to local economic growth than regional growth. This condition indicates that the local economy has had an optimal structure in harnessing the power of endogenous, so it does not depend on the regional economy.

### **Capacity of Smallholders' Coffee Subsector Plantation in Absorbing Employment (Labors) in Jember**

Applying the Demometric Model, the independent variables of equation (model) generally consisting of population and the nine sectors' GDP of Jember District which is assumed to influence employment in each sector sub-sector in Jember.

There are eleven equations consisting of nine major sectors of the economy, the plantation subsector equation, and coffee plantation subsector equation. The whole equations used in this study have already passed the classical assumption tests, i.e., multicollinearity, heteroscedasticity, and autocorrelation. Table 1 presents the coefficients of two independent variables showing the influence of GDP and population to the GDP of each economic sectors and subsectors in Jember.

Table 1 Value of Coefficients of Total Population (Pop) and GDP Sector / Subsector in Jember.

Sector/Subsector	Population (pop)	GDP of Sector/ Subsector -i
Agr	-0.7	0.18
Plant	-0,627	0,543
Coffee	-1,025	9,483
Mining	-0,807	2,114
Manuf	-0,905	1,088
LGA	-0,669	6,423
Const	-0,764	1,897
Trade	-0,792	0,300
Transp	-0,801	1,355
Fin	-0,652	0,903
Serve	-0.8	0.69

Note: Dependent Variable is Employment Absorption of Sector/Subsector-i

Table 1 describes that the variable of population in various sectors/sub-sectors generally has a negative impact to employment in Jember, while the GDP variable in each sector/sub-sector generally has a positive effect on employment in Jember.

Population has been found to negatively affect employment in each sector because the number of population in Jember tends to increase each year, so the number of labor supplied also increases, but employment absorption capacity growth is not matched with the population and thus the labor growth.

Economic conditions can also be seen from the condition GDP or output generated by a region capable. Economic development within a particular time is usually followed by changes in the employment structure. That is, the ability to produce output by a sector of the economy should take the role of labor in the production process, so that the greater the resulting output will describe the greater the amount of labor required producing the output. Coefficient values presented in Table 1 shows the degree of influence of each sector or sub-sector of the labor market in Jember. Positive and negative sign of each coefficient indicates the direction of the relationship. Based on the nine sectors in Jember, the manufacturing sector is a sector that has the largest coefficient value when compared to the sector / subsector other views of the variable population. The coefficient of the total population of the manufacturing sector amounted to -0.905, meaning that the total population has increased by one unit will reduce employment by 0.905 manufacturing unit. In contrast, the coefficient of the population is the smallest financial sector amounted to -0.652, meaning that the total population has increased by one unit will reduce employment by 0.652 manufacturing unit.



Plantation sub-sector which is one of the sub-sector GDP-forming agricultural-sector has a population coefficient of -0.627. It means that the one unit increase of total population will reduce employment in the plantation subsector amounted to 0.627 units. In contrast, coffee plantations sector has an estimated population coefficient -1.025, meaning that one unit increase in the total population will reduce employment by 1,025 coffee plantations unit.

Meanwhile, when viewed from the variable GDP each sector, sector of Electricity, Gas, and Water (LGA) has the largest GDP coefficient, is equal to 6.423, meaning that each increase of one unit of GDP, it will increase employment in the electricity sector, gas, and water (LGA) as many as 6,423 units. In contrast, the sector has the smallest GDP coefficient is the agricultural sector, which amounted to 0.175, meaning that any increase in agricultural GDP of one unit, it will increase the ability of employment in the sector amounted to 0.175 units. Meanwhile, the plantation sub-sector GDP has a coefficient of 0.543, meaning that any increase in GDP of one unit of coffee plantations, it will increase the ability of employment in the sector amounted to 0.543 units, while the coffee plantation has a GDP coefficient value of 9.483, meaning that any increase in GDP coffee plantations of one unit, it will increase the ability of employment in the sector amounted to 9.483 units.

Results of statistical tests of the equation agriculture (agr), equation plantations (estates), and equation coffee plantations (coffee) is presented in the following description.

a) The equation of Agriculture (AGR)

The results of the regression equation agriculture (agr) indicates that the variable number of population (pop) and variable agricultural sector GDP (qagr) a significant effect on the number of workers absorbed in this sector. Based on the equation of the agricultural sector, the estimation results obtained in the following table.

Table 2 Estimation Results of the Agricultural Sector (agr)

Variabel	Coef	t-stat	Prob
Agr			
C	1987620	8,292*	
Pop	-,699	-5,829*	,000
Qagr	,175	13,278*	,000
F stat			88,703
Prob (F-statistic)			,000
Adj R-squared			0.95

Source: Secondary data processed

Note: \*) significant at 95%

Based on estimates of the agricultural sector, the results obtained regression equation agriculture (agr) is as follows:

$$\text{Agr} = 1987620 - 0,699\text{pop} + 0,175\text{qagr}$$

The results of the regression equation agriculture (agr) indicates that the variable number of population (pop) negatively affect the agricultural sector employment. That is, the increasing number of population of one unit will decrease the absorption of agricultural labor by 0.699 units. Total population negatively affect employment in the agricultural sector due to land conversion activities. Most of the agricultural land is now converted into residential land / settlement. The decline of agricultural land will eventually reduce the activities in agriculture, so that the labor required on the wane. The decline in demand for labor in the agricultural sector, which is not proportional to population growth increasing, so that the level of employment by the number of population is negative. In addition, most of the agricultural activities in the current technology has been used in practice. This technology makes use of the agricultural sector no longer require that much labor as before the existence of the technology, meaning that the use of technology to reduce the use of labor. Factors wages are small and climate (related to risk) also affect the community are reluctant to work in the agricultural sector.

Above regression results also indicate that the agricultural sector GDP (qagr) positive effect on employment in the agricultural sector. That is, any increase in agricultural GDP of one unit, it will increase the ability of employment in the sector amounted to 0.175 units. This shows that the agricultural sector (agr) in generating economic output and its contribution to economic growth is also followed by the ability in terms of employment.

#### b) Equation Subsector Plantation (Plantation)

The results of the regression equation plantation subsector (plantations) showed that the total population (pop) and GDP estate crops (plantations). significant effect on the number of workers absorbed in this sector. The estimation results of this sub-sector equation is presented in the following table.

Table 3 Estimation Results of the Plantation Subsector (plant)

Variabel	Coef	t-stat	Prob
Plant			
C	1930773	7,944*	
Pop	-,627	-5,240*	,000
Qplant	,543	13,006*	,000
F stat			85,107
Prob (F-statistic)			,000
Adj R-squared			0.94

Source: Secondary data processed

Note: \*) significant at 95%

Based on estimates of the plantation sub-sector, the results of the regression equation obtained plantations (estates) are as follows:

$$\text{plantation} = 1930773 - 0,627\text{pop} + 0,543\text{qplant}$$

The results of the regression equation plantation subsector (plantations) indicates that the variable number of population (pop) negatively affect employment in the plantation subsector. That is, the increasing number of population of one unit will decrease the plantation sector employment by 0.627 units. The decline in employment can be caused by the presence of plantation land conversion activities, as well as agricultural land conversion. Most of the current plantation area has been converted into residential land / settlement or other activities outside the plantation activities. The decline in plantation area will eventually reduce the activities in the plantation sub-sector, so that the labor required in plantation activities will be on the wane. The decline in demand for labor in the plantation sub-sector which is not proportional to population growth increasing, so that the level of employment by the number of population is negative.

In addition, the tendency of the population to work in the plantation sector, in addition to also be one of the causes of reduced employment in the plantation subsector. Most residents prefer to work in sectors other than plantations because they assume that in this sub-sector, the wages earned far less than the wage earned when working in other sectors. In addition, the risk of working in the plantation sub-sector is also higher when compared to other sectors, as subsector is still influenced by the fact that climate can not be controlled by humans. In contrast, GDP plantation subsector (plantations) positive effect on employment in the plantation subsector. That is, any increase in agricultural GDP of one unit, it will increase the ability of employment in the sector amounted to 0.543 units. This suggests that the plantation sub-sector (plantations) in generating economic output and its contribution to economic growth is also followed by the ability in terms of employment.

#### c) Equation Plantation Coffee (coffee)

The results of the regression equation coffee plantations (coffee) indicates that the variable number of population (pop) and GDP coffee plantations (coffee) have a significant effect on the number of workers absorbed in this sector. Based on the equation of coffee plantations (coffee), obtained estimation results are presented in the following table.

Table 4 Estimation Results Smallholders Coffee Plantation (coffee)

Variabel	Coef	t-stat	Prob
Coffee			
C	3119886	4,597*	
Pop	-1,025	-3,228*	,012
qcoffee	9,483	4,299*	,003
F stat			11,084
Prob (F-statistic)			,005
Adj R-squared			0.67

Source: Secondary data processed

Note: \*) significant at 95%

Based on estimates of coffee plantations, the results obtained regression equation coffee plantations (coffee) is as follows:

$$\text{coffee} = 3119886 - 1,025\text{pop} + 9,483\text{qcoffee}$$

The results of the regression equation coffee plantations (coffee) indicates that the variable number of population (pop) negatively affect the employment of coffee plantations. That is, the increasing number of population of one unit will reduce employment by 1,025 units coffee estates. The decline in employment can be caused by land conversion activities of the coffee plantation. Most of the coffee plantation is now converted into residential land / settlement or other activities outside the coffee plantation activities. The decline in coffee plantation area will eventually reduce activity in coffee plantation sub-sector, so that the labor required in the coffee plantation activities will be on the wane. The decline in demand for labor in the coffee plantations subsector is not proportional to population growth increasing, so that the level of employment by the total population berbadang reversed. The decline in employment can be caused by the tendency of the population to work in the sector, in addition to coffee plantations. Wages to be one person deciding factor will be working in the sector. As it is known that if the wages earned working in the agricultural sector (including coffee plantations) is much smaller than the salary earned when working in other sectors. Risk factors of agricultural activities may also lead to disinterest residents to work in this field. The risk of working in coffee plantations is higher if compared to other sectors, as subsector is still influenced by the climate which incidentally no one can control climate anomalies. In contrast, GDP coffee plantations (coffee) positive effect on employment in this sector. That is, any increase in agricultural GDP of one unit, it will increase the ability to absorb labor in the sector amounted to 9.483. This indicates that the coffee plantations (coffee) in generating economic output and its contribution to economic growth is also followed by the ability in terms of employment.

## CONCLUSIONS AND RECOMMENDATIONS

- 1) There are nine sub-districts in Jember District identified as basic sector of smallholders' coffee plantation when viewed from the side of production in Jember, i.e., Silo, Panti, Tanggul, Sumberbaru, Sukorambi, Sumberjambe, Bangsal Sari, Jelbuk and Ledokombo each with an average LQ value of 10,563; 7.369; 4,167; 3.807; 2,619; 2,444; 1,808; 1,767; and 1,585.
- 2) The characteristic of the smallholders' coffee plantation in Jember is not concentrated on a particular region or territory but has a specific characteristic for each basic sector regions. This finding is important for sustainability of regional development, particularly as coffee production in Jember is higher compared to other plantation crops. Planning

and coffee development roadmap is necessary to be initiated by local government so that sustainability of coffee sector development is nourished. Such rigorous planning is expected to generate more value, increase coffee competitiveness and eventually guarantee that coffee, especially smallholders' coffee plantation can contribute more to the local economic growth.

- 3) Changes and shift in the value of GDP from smallholders' coffee plantation sector in the period of 2003-2012 was positive, amounting to 96.66%, while other plantation commodities also experienced positive growth that was equal to 719.36%. It means that plantation sub-sector, more specifically smallholders' coffee plantation, is still important sub sector for Jember District.
- 4) The capability of smallholders' coffee plantations sector (coffee) in generating economic output and thus its contribution to economic growth is indeed followed by its ability in terms of employment or labor absorption. This is evidenced by the coefficient of GDP coffee plantations (coffee) of 9.483. It means that any increase in GDP coffee plantations of one unit will increase the ability of employment in the sector amounted to 9.483 units.

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