THE ROLE OF THE AGRICULTURE SECTOR IN REGIONAL DEVELOPMENT DISPARITY IN PEGUNUNGAN ARFAK REGENCY

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Abstract

Developing inequality is a phenomenon that is always present in every process of development and varies between one region and another. Developing regions in Pegunungan Arfak regency still rely on the agricultural sector as a driving force of the development in their territory to reduce the disparity. This study aims to assess the potential of the agricultural leading sector at the Pegunungan Arfak regency, the level of the regional development disparity, as well as the role and the relevance of the leading sector of agriculture in regional development. The result based on LQ method, it showed that the leading sector of agriculture in Pegunungan Arfak regency consists of food crops sub sector, horticulture sub sector and plantation sub sector. At the same time, the result further suggested that the level of the development disparity, horizontally (among regions) showed high values refer to the Williamson Index about 0.86, as well as the level of the development imbalance, vertically (among community group's income) using the Gini Index had a value about 0.43. Agricultural leading sector is one of the factors that can be spurred on into a prime mover of the development in order to reduce the inequality of regional development.

1. INTRODUCTION

Agriculture sector, until this day, is still having great contribution in regional economic development in Pegunungan Arfak (PEGAF) regency. It can be seen from its share to Gross Domestic Regional Product (GDRP) of PEGAF about 72.60% (PEGAF, 2014), and supported by the availability of land resources that use especially to land intensification of agriculture as well as animal husbandry both. As we known, regional economic development is one urgent aspect that need more focus on development programs because it was a driven force in order to spur the development of social and economic and also to reduce development disparity among regions. Table 1 below shows the level of contribution of economic sectors in PEGAF regency.

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Table 1: Contribution of economic sectors and its shares to GDRP of PEGAF regency

No.	Economic sector	Share to GDRP (%)
1	Sector of agriculture	72.60
2	Sector of mining and quarrying	0.18
3	Sector of manufacturing industry	0.00
4	Sector of electricity and water supply	1.02
5	Sector of building and construction	3.63
6	Sector of trade, hotel and restaurant	0.05
7	Sector of transport and communication	0.00
8	Sector of finance, ownership and business services	0.00
9	Sector of services	22.53

Source: PEGAF, 2014

The contribution of the agricultural sector, in addition supported by land resources, it's also supported by the role of farmer families in pursuing agricultural commodities include sub sectors of food crops, horticultural crops, plantation crops and livestock sub-sector.

The development in the PEGAF regency should be developed more intensively with emphasis on the utilization of local resources and the agricultural sector (sector basis and non-base) that are potentially give a positive impact on improving people's welfare. The basic sector (leading sector) by Rustiadi *et al.* (2009) and Tarigan (2005) is the sector with the ability to export orientation, meaning that the industry will produce a product basis (agriculture) for both the domestic market as well as market area outside the territory. Whereas non bases sector is a sector with economic activity in the market, which only serve their own region and the export capacity of the areas has not increased. In reformation era, the policy development in local government had been supported by Law No. 23/2004 about Local Government and Law No. 33/2004 about Financial Balancing between Central Government and Local Government, this means that the local government has full right to manage its own resources along with the obligation to manage his own region becomes greater as all government matters decentralized to local government except in regard to foreign relations and defense and security. Policy development in the PEGAF regency can be formulated in the development sector of the economy, however, to develop all sectors of the economy will require huge investments. If capital or investment is not sufficient, then the need for prioritization of development, typically the sector that gets these priorities is the leading sectors (Setiawan, 2006; James & Movshuk, 2003) which is expected to be push factor to other economic sectors to develop into a prime mover of economic growth of the region, besides that, Miranti *et al*. (2013) says that the mapping of potential economic sectors in each of the regions is essential to overcome the problems of regional development imbalances.

The development of the region is a comprehensive and integrated program of activities taking into account available resources and it contributes to the development of a region. The concept of regional development is an attempt to realize integration in the use of resources by balancing and harmonizing the development of inter-regional, inter- sector and development actors in achieving regional development objectives, as is well known that the strategy of development of a region is determined by the characteristics and the potential contained in the region. Therefore, prior to the formulation of policies to be implemented need to know the type or kind of policy that appropriate in the development of the region. Anwar (2005) says that in a region, there will be some kind of regional characteristics that is developed region, the developing region and the underdeveloped region. While Alkadri (2001) says that the development of the region in general covers various dimensions of the construction carried out gradually. In the early stages, the regional development activities are usually emphasized in physical development to stimulate economic growth, followed by the construction of socio-political systems. However, this step is not a standard provision, because every region has a growth potential which is different from other areas, caused by the potential of natural resources, social, cultural, economic communities, the availability of

infrastructure and others, highly influential on the application of the concept of regional development used.

In the process of development of the region itself, is certainly the disparity of the development take effect, it is an aspect that is common in the economic activity of a region and this imbalance is usually due to differences in the content of the natural resources and demographic conditions contained in the respective regions. Sjafrizal (2008) told that as a result of this difference, the ability of a region to encourage the development process are also to be different, so that there is a developed region and the developing region. Inequality of development among regions carry implications for the level of welfare of the people as expressed by Rouch *et al.* (2001) found that inequality causes poverty to occur because of the gap between the system prevailing in a region of a service provider to the community. This is because aspects of the development gaps among regions have implications for the formulation of regional development policies carried out by the local government. Associated with the development of the region, there are two types of imbalance in the concept of empirical studies that became the center of attention. First, the unequal distribution of income among groups (vertical inequality), usually measured using the Gini Index, where, it is a measure of aggregate inequality and the scores ranged from zero (perfect equalization) to one (perfect inequality). Second, the development gaps among regions (inequality horizontally) that differ from Gini Index who commonly used to measure the distribution of income, Williamson Index uses Gross Domestic Regional Product (GDRP) per capita as a baseline data, because being compared is the level of development among regions and not prosperity levels among groups.

Based on the explanation above, the strategy for the development of the potential sector of agricultural as the engine of growth in the PEGAF regency can be pursued through the determination of the location of the development is in accordance with the potential of agricultural sub-sector, beside that, the support and policies that affirmative from the local government of PEGAF is a force that can boost the farmers in order to increased production of the agricultural sector and increase their income. This study aims to assess (1) the potential of the agricultural leading sector in PEGAF regency, (2) the level of inequality of the development in regency of PEGAF, (3) the role and relevance of the agricultural leading sectors in regional development at PEGAF regency.

2. BRIEF OVERVIEW OF PEGAF REGENCY

PEGAF is a new regency (New Autonomous Region) separated from Manokwari regency by Law No. 24/2012 on the Establishment of PEGAF regency in West Papua Province. Geographically, PEGAF regency is at 0^0 55' - 1^0 40' South Latitude and 133^0 10'- 134^0 - 05' East Longitude as well as administratively border with Manokwari regency in the north, in the south side of the Regency of Bintuni Bay, west side of Regency of Tambrauw and east side of the Regency of South Manokwari. It located at an altitude ± 2500 asl, with a total area of 2773.74 km^2 consisting of ten districts of the region, namely, Sururei, Didohu, Anggi, Taige, Anggigida, Membey, Menyambouw, Hingk, Catubouw and Testega. District residents are natives of Papuan who are a large ethnic group of Arfak tribe, divided of the subs-group ethnic, they were *Atam* tribal, *Meyakh* tribe, *Sough* tribal and *Moyle* tribal. The main livelihood of the population is farming, hunting and gathering food.
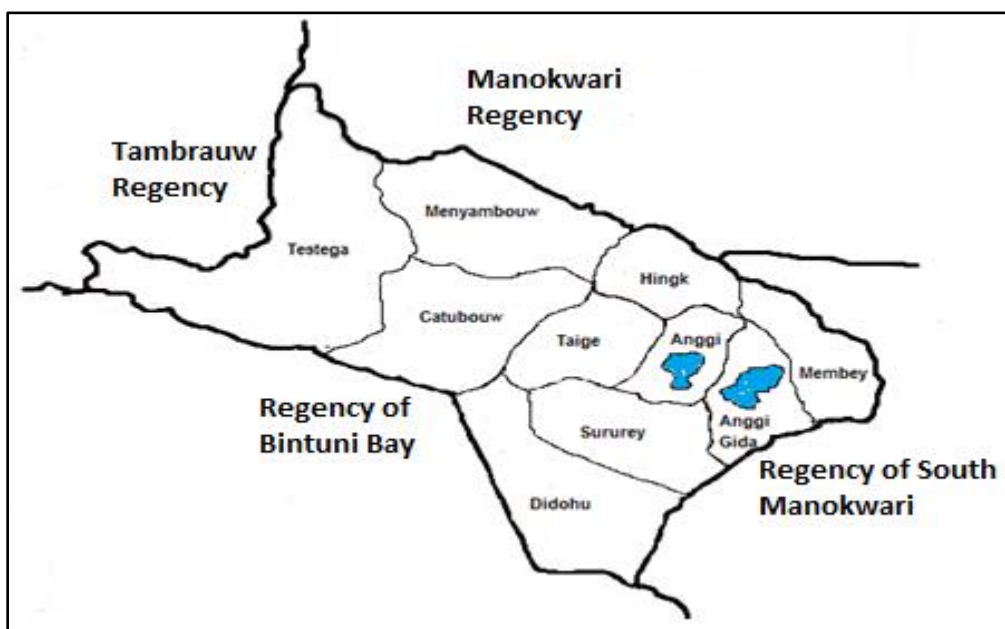
Figure 1: Map of PEGAF regency

3. MATERIALS AND RESEARCH METHOD

3.1. Source of data

The study is based on secondary and primary data, where, as a new autonomous region, very restricted and minimum secondary data are available, so that, secondary data used in this study are Gross Domestic Regional Product (GDRP) of the agricultural sector of PEGAF regency issued by the statistic of Manokwari regency for a period of 2013-2014 along with the development planning papers related to this study. Meanwhile, primary data collected by using surveys to respondent in PEGAF regency in December 2015.

3.2. Respondent sampling

The primary data conducted among respondents are representative of households that cultivate agricultural crops in ten (10) districts in the regency of PEGAF with the consideration that the characteristics of population are homogeneous. Respondent conducted at random (purposive sampling) with total respondent sample of farmer households as much as 40 respondents.

3.3. Determinants of agricultural leading sector

Determination of the agricultural leading sector in PEGAF regency by using Location Quotien (LQ) analysis, which is an index to compare the share of the sub-region in certain activities with a total share of these activities in the total activity of the region. The assumptions used in this analysis are (1) the geographical conditions are relatively equal, (2) activity patterns are equal, and (3) any activity produces the same product. Equation of LQ (Bendavid - Val, 1991) is:

$$LQ_{ij} = \frac{X_{ij}/X_{i.}}{X_{.j}/X_{..}} \qquad \qquad .... \quad (1)$$

where :

X_{ij} = degree of activity of agricultural sector-i
X_i = total activity of agricultural sector-i
X_j = total activity in district region
$X_{..}$ = degree of total activity of region in PEGAF regency.

Analysis of LQ will show the following:

1. If value of $LQij > 1$, then sub-region i have more relative share just than the activity that found generally in the whole region or activity j is an activity/leading sector in sub-region i
2. If value of $LQij < 1$, then sub-region i have less relative share just than the activity that found generally in the whole region or activity j is not an activity/leading sector in sub-region i
3. If value of $LQij = 1$, then sub-region i have equally relative share with the activity that found generally in the whole region

In this analysis, the output value of LQ will be known agricultural sectors that are leading sectors in each district area of the regency of PEGAF, while the potential of the agricultural sub-sectors commodity calculated with basic data on the number of households who undertake agricultural sub-sector.

3.4. Determinants of regional development disparity
Analysis on the level of regional development disparity in the regency of PEGAF are calculated by using two equations, first, by calculating the value of the Williamson Index (Amos, 2004) in PEGAF regency and Manokwari regency, I use the output of the Williamson Index in Manokwari regency to compare it with the result of PEGAF regency, can be seen in Equation (2) below.

$$I_w = \frac{\sqrt{\Sigma(Y_i - Y_s)^2 - P_i/P_s}}{Y_s} \qquad \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (2)$$

Data using to analyze the levels of regional development disparity in PEGAF and Manokwari regency are Gross Domestic Regional Product (GDRP) for a period of 2013-2014, the formula of Equation (2) becomes Equation (3):

$$I_{wit} = \frac{\sqrt{\Sigma(Y_{it} - Y_{sit})^2 - P_{it}/P_{sit}}}{Y_{sit}} \qquad \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (3)$$

Where I_w = variation of Williamson Index value, Y_i = GDRP per capita in regency i, Y_s = average of GDRP per capita in regency i, P_i = population in regency i, P_s = total of population in regency i, subscript i (regency of PEGAF and regency of Manokwari), subscript t year of 2013 and 2014.

While the second approach, by counting the inequality of income distribution (Gini Index) vertically among the segments of the population in the regency of PEGAF, usually measured by calculating the ratio of the areas located between the diagonal line and the Lorenz curve divided by the half area of the rectangle in which the Lorenz curve is, mathematically, the calculation of the Gini Index (Todaro and Smith, 2011) as in Equation (4).

$$GR = 1 - \sum_{i=1}^{n} fpi \, (F_{ci} + F_{ci-1}) \qquad \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (4)$$

Where, GR = Gini Index, fpi = frequency of population in the level of income i, F_{ci} = cumulative frequency and the total of expenditure or income on the level of income i, F_{ci-1} = cumulative frequency and the total of expenditure or income at the level (i-1).

4. RESULT AND DISCUSSION

4.1. Develop on potential leading sector of agriculture

4.1.1. Food crops sub sector
The performance of the potential spread of food crops in the regency of PEGAF according in LQ analysis by category basis and non bases are presented in the following, see Table 2.

Table 2: The LQ value of food crops sub sector in the regency of PEGAF

No.	District	LQ value		
		Paddy field	Crops planted	Corn
1	Sururey	0	1.48	0.01

2	Anggi	0	1.13	0.74
3	Taige	0	1.45	0.07
4	Membey	0	0.75	1.54
5	Menyambouw	2.76	0.76	1.48
6	Catubouw	0	1.29	0.40
7	Testega	0	1.30	0.39
8	Didohu	0	1.20	0.60
9	Anggigida	0	1.24	0.50
10	Hingk	0	1.02	0.98

Table 2 above, it can be seen that there are three types of groupings of food crops were identified from the 10 district in the regency of PEGAF namely paddy fields, crops and corn. The results of the analysis in Table 2 above shows that the food crops sub sector, which has a value of LQ > 1 has the potential to become a dominant sector (leading sector) which can be developed as a prime mover of the economy. The results of the analysis also shows that the development of food crops, especially paddy fields and corn can be done in the area of Menyambouw district.

4.1.2. Horticulture sub sector
Horticultural plants that had been cultivated by people in the region of PEGAF regency consist of pepper, onion, potato, turmeric and vegetables. The LQ value of each horticultural sub sector in district region displayed below.

Table 3: The LQ value of horticultura sub sector in the regency of PEGAF

No.	District	LQ value				
		Pepper	Onion	Potato	Turmeric	Vegetables
1	Sururey	0.00	2.95	1.38	0.00	0.58
2	Anggi	0.00	0.15	1.98	0.00	0.83
3	Taige	0.00	0.00	1.56	0.00	1.03
4	Membey	5.87	2.33	0.73	0.00	0.53
5	Menyambouw	0.83	0.43	0.46	0.12	1.34
6	Catubouw	0.69	0.85	0.85	0.00	1.12
7	Testega	0.00	0.00	0.00	0.00	0.00
8	Didohu	0.00	0.20	1.94	0.00	0.83
9	Anggigida	1.15	1.53	1.41	0.00	0.73
10	Hingk	0.29	0.50	0.79	4.55	1.20

The analysis result displayed above showed that the potential of regional development based on the leading sector of horticultural sub sector explained that commodity with an index of LQ>1 especially pepper plants can be built to be developed in the district region of Membey and Anggigida, onions can be done to develop in the district of Sururey, Membey and Anggigida, potatoes can be developed in the district area of Sururey, Anggi, Taige, Didohu and Anggigida, turmeric plants can be developed in the district of Hingk as well as vegetable plant can be developed in the district of Taige, Catubouw and Hingk.

4.1.3. Plantation sub sector
The performance of the potential spread of plantation sub sector that can be built in the district area of PEGAF regency related to the analysis of LQ method can be seen in the Table 4 below.

Table 4: The LQ value of plantation sub sector in the regency of PEGAF

No.	District	LQ value		
		Banana	Lemon	Manggo
1	Sururey	0.00	0.00	0.00
2	Anggi	0.00	0.00	0.00

3	Taige	0.00	0.00	0.00
4	Membey	0.00	0.00	0.00
5	Menyambouw	0.69	1.62	1.26
6	Catubouw	1.58	0.00	0.08
7	Testega	0.00	0.00	0.00
8	Didohu	0.00	0.00	0.00
9	Anggigida	1.59	0.00	0.00
10	Hingk	1.30	0.21	1.22

The result given on the Table 4 above explained that in agro-ecologies, the district region of Menyambouw have the potential to develop the plantation sub sector, especially lemon and mango, besides that, district of Catubouw and district of Anggigida have potential to expand banana plants, and also district of Hingk is expandable to develop the plantation sub sector of banana and mango.

Based on the study of the leading sector of agricultural sub sector (comparative) in the PEGAF regency, it can be seen that the planning of agriculture development must be pursued through investment in the agricultural sub sector featured accordance with its development potential in every area of the district. The development of the leading sector of agricultural sub-sector is expected to spur an increase in income of farmers in every region of the district, so that the agricultural sub-sector is expected to be the main engine (prime mover) for the development of other economic sectors (Arifien *et al.,* 2012). Therefore, the increasing of the development of agricultural leading sector in PEGAF regency should be supported through the following points that are the focus of attention of the local government of PEGAF regency: (1) extension and advisory intense for farmers in each district area in intensifying the production of agriculture sub-sector, (2) provision of special transport to serve the mobilization of agricultural products to the market, this is because during this day, the farmers are very difficult to transporting and marketing the harvest of their agricultural products to the market, (3) provision of information from a service provider (local government) about the prices of agricultural products prevailing in the market, this is due to the fluctuations in product prices of agricultural sub-sector due to high inflow of imported products of agriculture sub sector from outside the region, other than that, the marketing of agricultural product by the people in the market tend to oligopsony (Supriadi, 2008) so that the trader have a role in determining the price, (4) providing aid farming equipment as well as technical training to use, as long as land management systems and farming is still done traditionally with a simple farming tool, so that the number harvest of agricultural sub-sector products has been limited in quantity. It is also in line with research conducted by Syahza and Suarman (2013) that the government can do in spurring development in the newly autonomy area (developing area) with due to respect to poverty alleviation, human resource aspects along with the development aspect infrastructures as supporting in regional development.
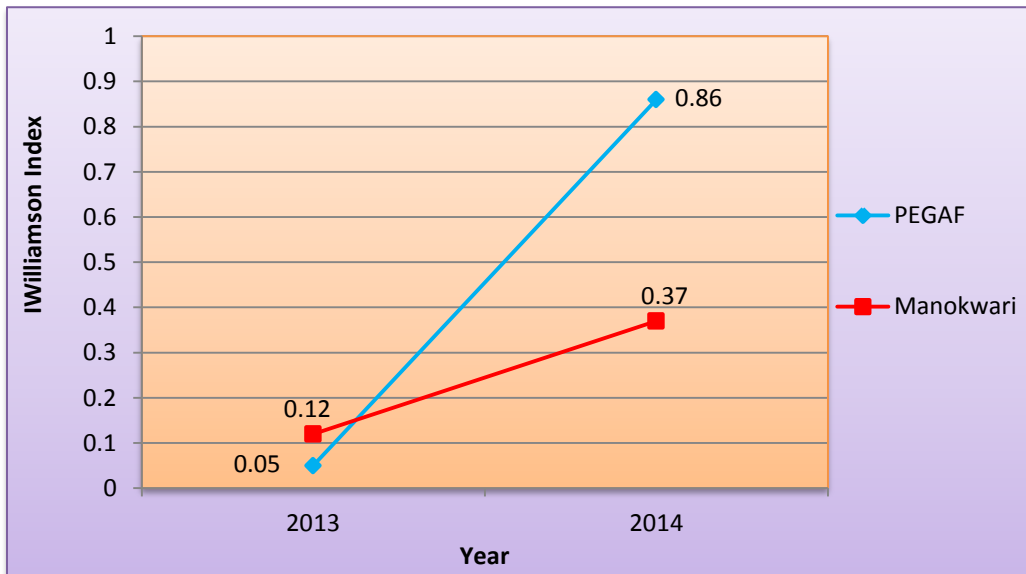
The attention focus of the local government of PEGAF regency for the development of the agricultural sub sector based upon some of the findings when doing surveys and discussion with the farmers, some of them are, some areas of the district have comparative advantage in the agricultural sub sector as a basic sector and non bases sector based on LQ analysis written out above. As a basic sector because of the fulfill needs of consumption in Manokwari regency and South Manokwari regency, especially the consumption of the sub sector of horticultural crops, such as chili, onions, potatoes and vegetables (collards, cabbage, leeks) supplied from the regency of PEGAF.

4.2. Regional development disparity in PEGAF regency
The regional disparity in PEGAF regency is still high, this has happened because of the regional inequality is a real condition that always there in the development progress, at the early stage of the development process, the imbalance always increasing and next will tend to decline as long as the process of development (reverse "U" shape curve). The level of the regional disparity in
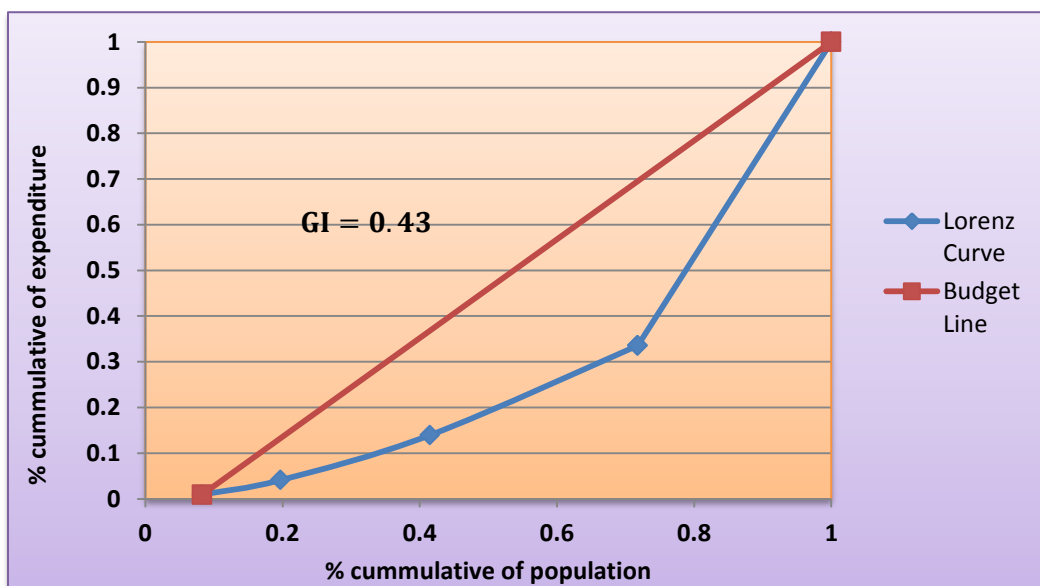
PEGAF regency based on the analysis using the Williamson Index in Equation (2) displayed in Figure 2 below.

Figure 2: Trend value of Williamson Index in PEGAF regency for a period of 2013 – 2014

The result of Williamson Index analysis by using data collected from per capita Gross Domestic Regional Product for a period of 2013-2014 based on constant price displayed in Figure 2 showed that the regional development disparity between region in PEGAF regency is very high. The value of Williamson Index has a range from 0-1, where, when the value close to the 1 then the disparity increase and vice versa. Figure 2 also explained that for a period of 2013-2014, the trend of regional development disparity (horizontally) in PEGAF regency experienced a significant increase when compared to Manokwari regency. This is can be explained that economic development horizontally between region in PEGAF regency is under development because of the lack of the development activities. The condition of high disparity (divergence) of the area in accordance with the view of regional development disparity indicated that the regency of PEGAF is a newly autonomous area (of the division of Manokwari regency) so that the development process is still in its early stages. In line with the development process, is expected for the level of disparity will gradually be decreased (convergence of development).

It was differ with Williamson Index, to see the regional disparity vertically (income inequality among community groups) by using the Gini Index in Equation (3) above, where, the data that use to analyze are people income. So that, the ability of the people in PEGAF regency to fulfill the need of their life necessities was the aspect seen out. The analysis result of the Gini Index in PEGAF regency can be seen in Figure 3 below.

Figure 3: Lorenz curve and gini index value in PEGAF regency

Figure 3 showed that the value of GI = 0.43, where the coefficient of Gini Index is a measurement of the aggregation disparity which its numeral range from '0' (perfect equality) to '1' (perfect inequality). So it can be concluded that the income distribution of people in the region of PEGAF regency as an indicator of unequal disparity. The value of the Gini Index drawn out the positive correlation with the value of Williamson Index, when the regional development disparity in PEGAF regency increases (divergence), then it had implications for the level of the community's welfare, showed by the imbalance of the income distribution among community groups in the region of PEGAF regency, this the phenomena that usually happen in the new autonomous area (new developing area).

4.3. The Implication of regional development policy based on agricultural leading sector in PEGAF Regency

Development disparity was phenomena that always happen in the development process of a region and its caused by factors of economic development progress, political issue and fiscal decentralization, accessibility issue, ethnic discrimination and market failure as well as the concentration of natural resources owned by some of the region than the others, in such a way that the effort did in order to decrease the development imbalance by handling the factors that caused the lameness, where, the factors usually varies between one region with the others (Baransano *et al.,* 2016).

Agricultural leading sector is not an absolute factor that can overcome the problems in regional development (Baransano *et al.,* 2016), but it was one of the factors to solve the problems of regional development in PEGAF regency. It can be done by increasing the development investment in the leading sector of agriculture, especially in the sub sector of food crops, sub sector of horticulture and sub sector of plantation based on the analysis using LQ method. This thing had been explained out by Miranti *et al.* (2013) that mapping potential sector in each region is essential to overcome the problem of development of the region. Overall, the advantages sub sector of food crops, horticulture and plantation crops is a priority for development in PEGAF regency, so that, be expected that the development of the agricultural leading sector in PEGAF regency can trigger the development (prime mover) to other economic sectors (multiplier effect) in favor of equitable development in the region of PEGAF regency.

The development disparity in PEGAF regency measured by Williamson Index and Gini Index explained that the inequality both horizontally (among regions in PEGAF regency) and vertically (among community group's income) showed a very high value. Efforts to reduce the inequality can be done either by developing with intensification of the leading sector of agriculture in PEGAF regency includes the sub sectors of food crops, horticultural crops sub-sector and plantation sub-sector and also by developing extensively can be done in the district area that have potential to develop the agriculture sub sector. The development of the agricultural sub sector as one of the alternatives to reduce the inequality of development because the people who inhabit in the whole area of PEGAF regency are a farming community with their main agricultural commodities are food crops, horticulture and plantation crops.

5. CONCLUSION

Leading sectors, especially the agricultural sector has a significant relationship to regional development in the PEGAF regency. The analysis result showed that PEGAF regency has potential to develop the leading sector of agriculture, especially the sub sector of food crops include paddy field, crops planted and corn, sub sector of horticulture includes pepper, onions, potatoes, turmeric and vegetables, as well as a sub sector of plantation include banana, lemon and mango. Concerned with regional development, PEGAF has very high levels of disparity both horizontally (among regions) with the Williamson Index value about 0.86 in the year of 2014, and vertically (among community group's income) with the Gini Index value about 0.43. It had been known that agriculture sub sector had an important role to support regional development that can be beneficial as a push factor to other sectors in order to grow up as driving force of the regional development in the PEGAF regency to reduce regional development disparity both among regions and community group's income.

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