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Analysis of Land Use of Agricultural Sector in Improving GRDP of East Lombok Regency, Indonesia

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Abstract

The purpose of this research was to understand changes of agricultural land, contribution of agriculture sector to Gross Regional Domestic Produk (GRDP) and policy direction of agricultural GRDP in East Lombok Regency. The research method was a descritive quantitative research design. This research was conducted through secondary analysis. Technique of data analysis was GIS Analysis conducted on ArcGIS software to obtain data in respect of changes of land use from agricultural area to built-up area in East Lombok Regency. Meanwhile, policy direction of agricultural GRDP was processed by using AHP (*analytic hierarchy process)* technique. The results obtained were: 1) Changes of land use from Agricultural to built-up area in East Lombok Regency had been increasing since 2012 to 2015 in term of land area which was used to be used for tobacco plantations, 2) Agricultural contribution to GRDP is 27,95%. 3) 5 policy priorities toward agricultural GRDP with regard to land use changes in East Lombok are: (1) Controlling import and supporting export of farming, (2) The availability of a firm set of rules supported by accuracy of land use mapping and data collection, (3) Society's role in improving economy, (4) The sinergy between government, farmers, and private parties, and (5) Modern agriculture based on local wisdom.

Keywords: Land Use, Agricultural GRDP, East Lombok Regency

Introduction

Multidimensional economic development aims to create growth and change in economic structure, social change, reduce or eliminate property, and decrease disparity and unemployment (Todaro, 2006). In line with that, regional economic development is supposed to be a cooperation between government, private sector and society in managing regional resources for the sake of improving economy and creating extensive employment. Agriculture sector in Indonesia has been main priority since long ago that its development has always been supported by government. In addition to meeting the needs of people lives, it can become one of the country's foreign exchange. To achieve equitable development goals and to use potential lands, clearing new lands outside Java Island has a long term strategic values (Wahyungsih, 2011).

Agricultural production process needs main production factor which is the land. As an autonomy region, East Lombok Regency's demands of non-Agricultural land have been increasing from time to time. This condition causes a competition in land use. This increased non-agricultural land demands is feared will lead to changes of agricultural land use to non-agricultural land use. Land use change will have an impact on agricultural production and indirectly affect GRDP in agricultural sector (Oktorie, 2017). Population growth has led to the expansion of agricultural area that is used as a land-based livelihood (Antomi, 2016). Fast

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population growth followed by shelter need has reduced the land in many regions. The narrow land became more fragmented due to housing and the need for industrial land area. Many farmers prefer working in informal sector to agricultural sector. Basically, a region's development is triggered by some aspects such as aspects of physic, social, culture, economy, science, and technology. Physical development of a region can be directly seen from its land use. It can also create two patterns of land-use intensification and land-use extensification. The development pattern in a relatively flat land is easy to spread and evenly distributed. However, some causal factor of one region's development has forced to change the land use from initially agricultural area to residential area. Land demands for the development in various sectors has been increasing as the pace of development and population growth. If not for government intervention, there will be problems in land tenure and utilization.

Land is an area on the earth surface which covers all biosphere components that are considered fixed or cyclical existing above and under the area including atmosphere, soil, rocks relief, hydrology, plants and animals, and all the outcomes of human activity in the past and present; all of which affect land use by humans in the present and future (Brinkman and Smyth, 1973; Hermon, 2009; Hermon, 2012; Hermon, 2014). Jhingan (2008) stated that economic development process is influenced by two factors, namely economic factor and non-economic factor. Economic factor includes natural resources, human resources, capital, business, technology and others. Non-economic factor includes social institution, political situation, and moral values. .

Khasanah (2006) explained that the picture of Denmark's economy from year to year is marked by its increasing rate of growth. It is shown through higher rate of annually Denmark's GRDP which is used as an instrument to measure the region's potential and the prosperity of its inhabitant. Denmark's GRDP is supported by 9 sectors of economic activity including agricultural sector, processing industry, electricity, construction, trading, transportation, bank and service. However, the sector that takes first place as contributor of economy in Denmark Regency is agricultural sector. Arsyad (1999) suggested that a sector contribution to GRDP can be used as a measure to know the sector's role in the economy. For example in his research, based on how agricultural sector contributed to the development of GRDP, Sarolangun is a regency with agrarian structure. If a region desires a smooth and sustainable development, they have to start it at rural area in general and at agricultural sector in particular (Todaro dan Smith, 2006).

The role of agriculture according to World Bank (2008) contributes to the development as an economic activity, livelihood, and as a way of conserving environment so that this sector is considered a unique instrument for the development. GRDP of sub-sectors of crops, plantation, forestry, animal husbandry, and fishery has a significant effect on employment opportunity in agricultural sector of South Sumatera Province (Rufaidah, 2005). Agricultural products in East Lombok Regency fluctuated. In term of agricultural land, in 2007 and 2014 rice production and the area of agricultural land reduced. The same thing happened in 2013 followed by the decrease in corn production. To see whether the shifting land area affects agricultural GRDP in East Lombok Regency, this research was conducted. By studying the changes of land area over a period of time, this research discussed about the impact of land use change on agricultural GRDP in East Lombok Regency.

Method

The analysis of agricultural sector contribution to GRDP was done in a descriptive quantitative research through secondary analysis. Techniques of data collection were field observation, the collection of remote sensing data in the form of 2007's and 2015's image data of East Lombok Regency, and documentation of document information related to agricultural sector contribution to GRDP in East Lombok. This research was set in East Lombok Regency. Data used were primary and secondary data. Primary data was collected through observation and interview while secondary data as supporting data was obtained from Development Planning Agency at Sub-National Level (hereinafter referred to as BAPEDDA) and Central Bureau Statistics (hereinafter referred to as BPS). To analyze the data, the researcher adopted SIG analysis technique which is done on ArcGIS software to process the data of agricultural land use change in East Lombok Regency. Meanwhile, policy direction of GRDP was process through *Analitycal Hierarchy Process* (AHP).

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Results and Discussion

East Lombok Regency which is included in Nusa Tenggara Barat Ptovince is a regency in Lombok Island located at East Longitude of 116º – 117º and South Altitude of 8º – 9º. The area of East Lombok Regency is 2,679.99 km2 which consists of land area of 1,605.55 km2 (59.91% of East Lombok area) and sea area of 1.074,33 km2 (40.09 % of East lombok area). The area of East Lombok Regency is including 33.88 percent of Lombok Island or 7.97 percent of land area of Nusa Tenggara Barat Province. In 2014 land area being used in East Lombok was about 47,312 Ha (29.47 percent) for rice field and 113,243 Ha (70.53 percent) for dry land. Toprographic elevation in East Lombok Regency is various ranging from 0 m.a.s.l which is the coastal area in the southern East Lombok to 3,775 m.a.s.l which is the mountain area (Rinjani area) in the northern part. While the capital of East Lombok district, Selong City, has a height of 148 m.a.sl

Like any other areas in Indonesia, East Lombok also fall under tropical zone with a climate ranging from 20°–33° C. The impact of global warming in these last periods of time, has resulted in climate change which is marked by the fluctuations of rainfall and rainy day in recent years. During 2014, the average monthly rainfall was 102.5 mm and the average monthly rainy day was 7 days per month. Total population of East Lombok in 2010 has reached 1,105,671 people including 514,327 males and 591,344 females. The level of existing population density in the last 5 years in East Lombok was 213 people/Km according to an analysis of population density level in the projected years which showed an increase of 1%. The level of population density in East Lombok until 2009 was assumed to be 240 people/Km. Workforce is a part of workers which actually involves or tries to involve in a productive activity.

Table 1. Number of Workforce Aged 15 y.o and Over with Categories of Worked and NEVER work

Year	Workforce		Total
	Worked	Never Work	
2014	495.475	38.231	533.706
2015	485.340	33.528	518.868

Source: BPS of East Lombok Regency

From table 1 it can be seen that the level of workforce participation is decreasing along with the decrease of workforce numbers in 2015. This is because the number of employment is not proportional to the number of workforce that will lead to an increase of unemployment number by 2015.

Land Use East Lombok Regency

Land has an important role in human life because every construction will need land. Land use is one of global main research subjects related to environmental change and sustainable development. According to Sumardjono, 2008 , land has special characteristic in two aspects. First, land as an object and second, land as natural resources. Land become an object when it has been used by humans for for example agricultural land or urban land development. The development is done by government by providing infrastructures. This provision will result in an increase of land value. Other land characteristics are its fixed nature, limited number and its permanent provision. Arotaa (2016), in his research said that there is a relation between agricultural land area and agricultural GRDP. In respect of its use, most land in East Lombok is arranged by agricultural land area and non-rice field area. In 2015 non-rice field area was 94,365 ha (58.80 % of East Lombok) where 55,928 ha was state forest. Non-agricultural land area was about 18,427 ha (11.44%). In addition, the rice field area reached 47,763 ha (29.76 %). In regard to profession, people of East Lombok Regency have professions in farming (4.69%), industrial management (9.95%), construction (2.66%), trading (20,13%), transportation and communication (4.04%), services (19.55%), and others (0,98%).

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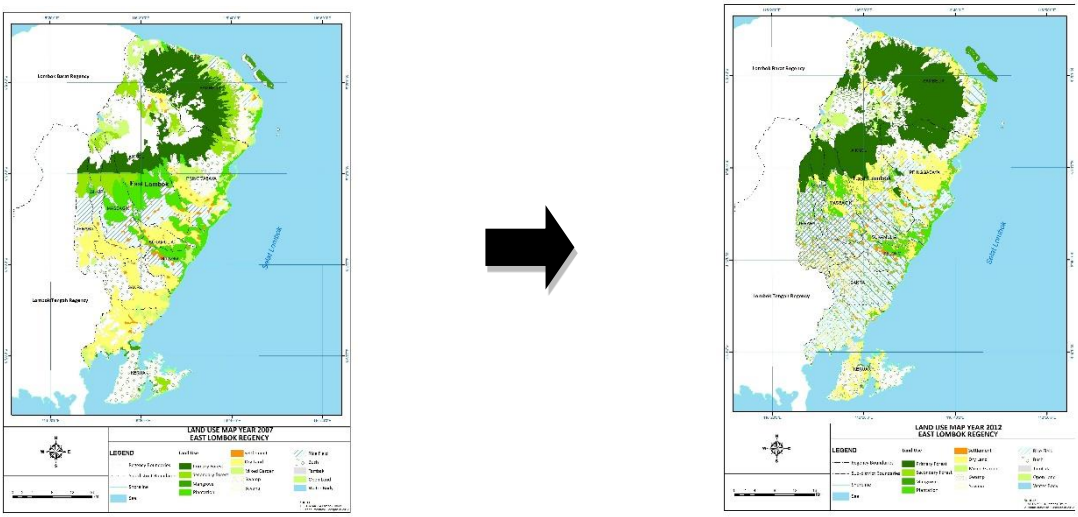

Figure 1. Land Use Change year 2007 to 2012

Change of agricultural land use to built-up area in East Lombok can be seen from the land specification which consists of rice field area, non-rice field area and non-agricultural area. Rice field area changed from 45,813 ha to 47,763 ha, non-rice field area like plantations, fields and others changed from 38,751 ha to 94,365 ha , and non-agricultural area has changed from 75,991 ha to 18,427 ha. These changes had been occurring since 2012 until 2015.

From two pictures above, it can be seen that there is an addition to agricultural lands, both rice field area and non-rice field area and a transition of non-agricultural land. The change was caused by the economic value from tobacco investor and was because many East Lombok people turned to develop tobacco plantation. On the other hand, people who are owners of the land have higher income compared to those who work as laborers. So, according to the level of property in East Lombok, there are still many people who cannot fulfill their needs yet.

Agricultural GRDP of East Lombok Regency

Gross Regional Domestic Product is defined as the total of added values obtained by all business unit in a region, or the total of all final values of goods and services obtained by all economic business unit in a region. GRDP calculation only covers the scope of domestic economy. This allows to measure to what extent economic policies applied by government can support domestic economic activities in order to create justice and prosperity reflected in increased revenue.

Growth rate of sectoral GRDP can be used as basis of projection making or estimated revenue of a region for the sake of regional development planning. The rate of East Lombok's GRDP showed that the sectors of agriculture, forestry, and fishery were the highest contributors in the forming of GRDP. Percentage of agricultural sector in East Lombok has been decreasing every year. Agricultural GRDP of East Lombok in 2010 contributed 33.87% while in 2015 the percentage of contribution was 27.90%. Arotaa (2016) stated that when land area increase and decrease GRDP continues to increase. Generally, growth rate of GRDP in East Lombok Regency has been increasing since 2014.

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Table 2. Sectoral contributions to Economy of East Lombok Regency year 2010-2014

No	Sector	Contribution (%)				
		2010	**2011**	**2012**	**2013**	**2014**
1	Agriculture	31,15	30,32	29,73	29,11	27,96
2	Mining	5,70	5,60	5,65	5,70	6,34
3	Processing Industry	10,25	9,75	9,54	9,02	8,88
4	Procurement of Electricity and Gas	0,06	0,06	0,06	0,05	0,06
5	Water Supply, Waste Management, Cesspit and Recycling.	0,08	0,08	0,08	0,08	0,08
6	Construction	11,04	11,04	10,83	10,87	10,82
7	Large and Retail Trade	13,64	14,28	14,83	15,20	15,67
8	Transportation and Warehousing	4,39	4,32	4,30	4,29	4,41
9	Accomodation and Food and Beverage Provision	0,82	0,84	0,85	0,92	0,97
10	Information and Communication	1,80	1,81	1,80	1,81	1,76
11	Financial Services and Insurance	1,80	1,81	1,80	1,81	1,76
12	Real Estate	3,17	3,30	3,44	3,58	3,63
13	Company Services	0,11	0,11	0,11	0,11	0,11
14	Government Administration	7,01	7,33	7,36	7,43	7,41
14	Government Administration, Defense and Mandatory Social Security	7,01	7,33	7,36	7,43	7,71
15	Educational Services	4,85	5,10	5,19	5,38	5,18
16	Health Services and Social Activities	2,12	2,12	2,07	2,12	2,11
17	Other services	2,02	2,01	1,99	2,02	1,97

Source: BPS of East Lombok Regency 2015

Based on the table above, it can be seen that contribution of agricultural sector in GRDP of East Lombok Regency takes the first place with a contribution of 31.15% in 2010 and has been decreasing to 27.96% in 2014. According to 2012-2015 data of land use change in East Lombok Regency, rice-field area changed from 45,813 ha to 47,763 ha, non-rice field area like plantations, fields, and others changed from 38,751 ha to 94,365 ha, and non-agricultural area changed from 75,991 ha to 18,427. As for GRDP of agricultural sector, its contribution decreased from 31.15% to 27.96% from 2010 to 2014. The increase of agricultural area in East Lombok Regency has not effect on the declining of agricultural sector.

Setyowati (2012) about agricultural sector as a basic sector in Sukoharjo Regency, it was found that agricultural sector could meet local needs and its surplus production could be exported to outside Sukoharjo. Agricultural sector must be supported because it is the key sector for economic improvement in Central Java (Agustono, 2013). However, the result of study conducted in East Lombok Regency, agricultural sector had decreased. Central Bureau of Statistics (BPS) showed high decline of farmer exchange rate (NTP) in NTB province. It was even recorded as the highest decline in Indonesia. In a release officially submitted by the chief of BPS of NTB province, Endang Tri Wahyuningsih, it was recorded that the exchange rate of crop farmer (NTPP) was 110,58, horticulture farmer (NTPH) was 81,23, smallholder farmer (NTPR) was 92,35, livestock producer (NTPT) was 120,17 and fish farmer (NTNP) was 104,30. From the result of interview, the majority of NTUP (exchange rate of farmer's business) scored more than 100 except for subsector of horticulture which only scored 92,28. Other NTUP's subsector's scores were 133,47 (animal husbandry), 117,31 (crops), 114,31 (fishery) and 104,79 (smallholdings). Among 33 provinces in Indonesia, there were 14 provinces which had increased NTP and 19 provinces had decreased NTP. The highest increase was obtained by Riau Province with the score of 1,16 percent and the highest decrease of NTP was obtained by NTB Province with the score of 1,66 percent.

Generally, the decline of NTP was because price received index of farmers in subcategories of palawija (traditional upland crops) decreased compared to previous month. This was also caused by the decrease in sale price of corn, peanut, sweet potato, grain and cassava. Meanwhile, price paid index of farmers increased 1.12 percent due to an increase in household consumption index of 1.39 percent which was used to buy groceries. Exchange rate of horticulture farmers (NTPH) decreased 2.94 percent. It was due to farmer's price paid index (1.04 percent) was higher than farmer's price received index (1.94 percent). Price received index in subcategories of vegetables and fruit decreased 2.55 percent (vegetables) and 1.14 percent (fruits) which was caused by the decrease in the selling prices of carrot, potato, green onion, shallot, cabbage, melon, mangosteen, banana, papaya, and duku/langsat. However, Farmer's price paid index in subsector of

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horticulture increased 1.04 percent. This was caused by the decrease in household consumption index of 1.30 percent which was used to buy subcategories of eggplant, tomato, red chilli pepper, bird's eye chilli, garlic, spinach, agar, white cigarette, clove cigarette, instant coffee, granulated sugar, gas lighter, light bulb, ojek (motorcycle taxi).

Agricultural Policy Direction

Based on the result of interview conducted, there were some problem faced by the local farmers related to low farmer's exchange rate and government's role in watching sale price of agricultural products. Therefore, some alternative policies are suggested in order to help local farmers solving their problems and management of agricultural sector improving GRDP of East Lombok Regency.

Khasanah (2006) opined that in order to improve next year's GRDP it is necessary to have the supports from agricultural subsectors of crops, plantation crops, livestock and its products, forestry and hunt, and fishery. So, the government of Demak Regency should pay attention and make special policy for the five mentioned agricultural subsectors. In addition, Widianingsih (2015) said that national economy growth is the dominant factor that affects the growth sector or subsector of agriculture in West Java Province. In land use policy making, government should see agriculture as a dominant sector. The steps are improving productivity, controlling land conversion, improving planting intesity, improving investment in agricultural sector and giving more fiscal support toward policy in macro level and monetary support in central level. The management of agricultural sector in improving GRDP of East Lombok Regency: (1) controlling import and supporting export in agricultural business, (2) the availability of a firm set of rule and supported by the accuracy of land use mapping and data collection, (3) society's role in improving the economy, (4) modern agriculture based on local wisdom, and (5) the synergy between local government, farmers and private parties.

The analysis above shows five main alternative policy direction priorities of agricultural sector in regard of improving GRDP of East Lombok Regency. They are: (1) controlling import and supporting export in agricultural business (0.429), (2) Optimizing a firm set of rules and supporting it with accuracy of land use mapping and data collection (0.269), (3) Increasing society's role in improving the economy (0.154), (4) Creating modern agriculture based on local wisdom (0.082), and (5) Building the synergy between local government, farmers, and private parties in respect of agricultural products (0,066).

Conclusion

Based on this research result, it can be concluded that there is an expansion of agricultural area to non-agricultural area in the period of 2012-2015 which results in the decrease of GRDP in agricultural sector. Agriculture's contribution to GRDP of East Lombok is 27.95%. To overcome the imbalace of agricultural GRDP in East Lombok Regency, there needs policy directions for agricultural GRDP based on land use change in East Lombok. The policy directions are controlling import and supporting export in sector of agriculture, the sinergy between local government, farmers, and private parties in order to improve the performance of agricultural sector as an effort to maintain agriculture as basic sector in East Lombok Regency, optimizing a firm set of rules which is supported by accuracy of land use mapping and data collection, involving more local people in improving the economy, creating modern agriculture based on local wisdom and building sinergy between local government, farmers, and related private parties in regard to agricultural products.

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