



# Rural Agribusiness-based Agropolitan Area Development and Environmental Management Sustainability: Regional Economic Growth Perspectives

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**Received:** 28 June 2020

**Accepted:** 10 October 2020

**DOI:** <https://doi.org/10.32479/ijeeep.10184>

## ABSTRACT

Regional development in developing countries is predominantly oriented towards exploitation of natural resources and tends to ignore environmental problems. Optimization of the utilization of natural resources towards the development of the agropolitan area has an impact on economic growth and increases farmers' income in rural areas. This study aims to examine the significance of the development of agropolitan-based agribusiness areas in rural areas and the direct and indirect relationship of the development of agropolitan-based agropolitan areas to the improvement of community productive economic endeavors and ecosystem sustainability. Research data were obtained through observation, surveys, and documentation. The research method used a qualitative-quantitative combination in sequence. The results of the regression analysis show that the development of the agropolitan area has a significant effect on regional economic growth, and the results of the path analysis confirm that the development of the agropolitan area based on rural agribusiness has a significant effect on increasing the productive economy of the community and the ecosystem sustainability. The results of this study confirm that an increase in the productivity of the regional economic base sector has an impact on the development of agropolitan areas based on the rural agribusiness system in the direction of increasing community income and the regional economy. This article offers the concept of system integration in the development of agropolitan areas based on ecosystem sustainability and regional economic growth in developing countries.

**Keywords:** Agropolitan Area, Economic Growth, Rural Agrobusiness, Economic Effort, Ecosystem Sustainability

**JEL Classification:** Environmental Economics

## 1. INTRODUCTION

Development in developing countries is predominantly focused on utilizing natural resources for the purpose of attracting investors in spurring regional economic growth. While this trend does not support a discontinuation of these special attraction efforts, we do suggest that it does make it critical that promotional organizations in developing countries emphasize “functional” rather than “selective” policy reforms and promotional activities that are non-

discriminatory in relation to local investors (Wint and Williams, 2002). Economic growth is measured based on the availability of potential natural resources in order to meet the needs of goods or services. The process is carried out through the optimization of the utilization of natural resources and the use of technology. The relationship between the level of technology and economic absorption under supervision, with regard to the potential impact on performance growth related to innovation (Fifeková and Nemcová, 2015). A key source of productivity growth

in developing economies is moving workers from traditional agriculture to more modern sectors of the economy where labour productivity (valued added per worker) is higher and grows faster. Indonesia experienced manufacturing-led growth during the mid-1980s through to the mid-1990s (Rajah, 2018).

The perspective of regional development through the development of centres of economic growth, basically aimed at maintaining the balance of development between urban areas and rural areas towards increasing the productivity of community economic enterprises. The growth centre will encourage the economic productivity of the community and increase living standards (Tamura et al., 2019). Regional development is a process that does not occur simultaneously but appears in certain places with different speed and intensity (Friedmann, 1966). The pole of growth always develops if it is supported by the provision of infrastructure, means and transportation infrastructure, which functions to connect the production centre area to the market area. Supporting policies must include setting and enforcing rules and increasing access to markets, credit and veterinary services (Houessou et al., 2019). The development of agropolitan areas based on rural agribusiness is oriented to optimizing the utilization of the potential of natural resources and human resources as a functional unitary unit in rural areas. Effective agricultural planning requires the right system that includes all the right planning components and can handle the complexity, diversity and dynamics of the agricultural environment (Asian Productivity Organization, 2003). Furthermore, surplus labour is most evident during low-intensity cultivation phases (Dillon et al., 2019).

The agropolitan area is an area developed as a pole of economic growth oriented to optimizing the management of the agricultural sector, in order to support the increase of productivity of community economic ventures and regional economic income. Furthermore, transformation to fundamentally changes the relationship between environmental actors, especially those related to entrepreneurial actions (Townsend and Hunt, 2019). In this context, it is understood that the agribusiness system has a vertical connection between subsystems and horizontal links with other systems or sub-systems including, financial, banking, transportation, trade, education, etc. (Saragih, 2001).

The rural agribusiness system is a part of industrial, agricultural and service development in an integrated and sustainable agropolitan area development system. Increased productivity is carried out in an environmentally, economically and socially sustainable way (Rotz et al., 2019). Rural agribusiness basically cover 7 main fields, namely; (i) food crops, (ii) horticulture, (iii) livestock, (iv) plantations, (v) home industries, (vi) micro-scale agricultural product marketing, and (vii) other agriculture-based businesses, according to conditions and potential rural area. Agro-food networks are characterized by complex material exchanges among farms, processors, consumers, and waste managers involved in fertilization, food, feed and bioenergy production (Mena et al., 2019).

The concept of agribusiness refers to all activities including procurement, processing, distribution, and marketing of the

products produced by a farm or agro-industry which are interrelated to one another (Dwiyanto, 2011; Suryani and Rahmadi, 2014). "Agribusiness is a dynamic and systemic endeavor that serves consumers globally and locally through innovation and management of multiple value chains that deliver valued goods and services derived from the sustainable orchestration of food, fiber, and natural resources." (Edwards et al., 2005). Furthermore, the economic agribusiness sector consists of all organizations, large and small, profit-seeking and eleemosynary, involved in the production, distribution, marketing, or utilization of food, fiber, forest products, or biofuels, including those that supply water to and collect waste from (Fleet, 2016).

Rural-urban relations in the perspective of developing the agropolitan area will include economic links and distribution of the flow of goods and services to support regional economic growth. Linkages can be grouped into physical, economic, technological, population movement, social relations, service delivery and various political relations (Rondinelli, 1985; Nugroho, 2018). There are two things that principally affect each other, namely; (a) the linkages of the regional development cycle and the integration of the development of the agropolitan area, which includes the structure and relationship between rural and urban areas, and (b) the concept, cycle and process of developing an agropolitan model based on rural agribusiness will have an impact on the design and implementation, as well as the formulation of government policy interventions. Fiscal and political decentralization as an institutional arrangement for rent-sharing and political codetermination of regions within a country may limit the destructive effect of natural resource rents on internal stability (Farzanegan et al., 2018).

The phenomenon of development in Indonesia shows that urban and rural disparities remain, in the sense that the success of achieving national economic growth has not been accompanied by an increase in economic ventures and the welfare of the community in rural areas. The success of national organic regulation systems will have a significant impact on whether, and how, conventional agriculture is supplemented or replaced with alternatives (Dentzman and Goldberger, 2020). Furthermore, the fragile state of the major developed market economies, persistent global imbalances and soaring oil and non-oil commodity prices are slowing growth of the global economy (United Nations, 2008). Pranoto, 2005, stated that three main issues that require attention in the development of agropolitan areas include: (i) Access to agricultural land and water resources, (ii) political devolution and administrative authority from the central level to the local level, and (iii) paradigm or policy changes national development to better support diversification of agricultural products. System integration is needed between production centres and market areas. Market area connectivity is to achieve sustainable economic growth, but markets play an important role in promoting economic growth in rural areas (Escobal et al., 2015).

The development of agropolitan areas based on rural agribusiness aims to improve the welfare of farmers through a sustainable economic development. According to Friedmann and Douglass (1975) the agropolitan approach as development activities

concentrated in rural areas with population between 50,000 and 150,000 people. (Douglass, 1988), rural-urban linkages can at least be described in five main forms of linkages, namely (1) people/population, (2) production, (3) commodities, (4) capital and (5) information. The core of agropolitan area development and rural agribusiness is economic empowerment towards community independence. Elements of value system which are necessary for social capital for community empowerment are: a sense of love, trust, self-esteem, empathy, honesty, openness, mutual sharing, altruism, visionary, and rationality; while advancement in meeting the material needs of the people is the initiative from the community at the grassroots level, a continuous and planned socialization and commitment is required (Fatima et al., 2015). Community economic empowerment, translated as an effort and process of how the community, functions and has the power to achieve independence (Alfitri, 2011; Mardikanto et al., 2014).

Gowa Regency is one of the regencies in South Sulawesi Province that has competitiveness and regional potential in the food crops, horticulture, plantation, animal husbandry and tourism sectors. It is located at the coordinates of 5°33'-5°34' South Latitude and 120°38'-120°33' East Longitude. West Bajeng Sub-district in the Gowa Regency Regional Spatial Plan is designated as an agropolitan area based on rural agribusiness, for the benefit of; (i) reducing disparities between regions, cities and villages, (ii) reducing income disparities between communities, (iii) reducing poverty, (iv) preventing the proliferation of productive personnel, and (v) increasing Locally-Generated Revenue (LGR). Better living conditions, often associated with safety, good manufacturing and trade conditions, and proper sanitation and waste management (Vera et al., 2011).

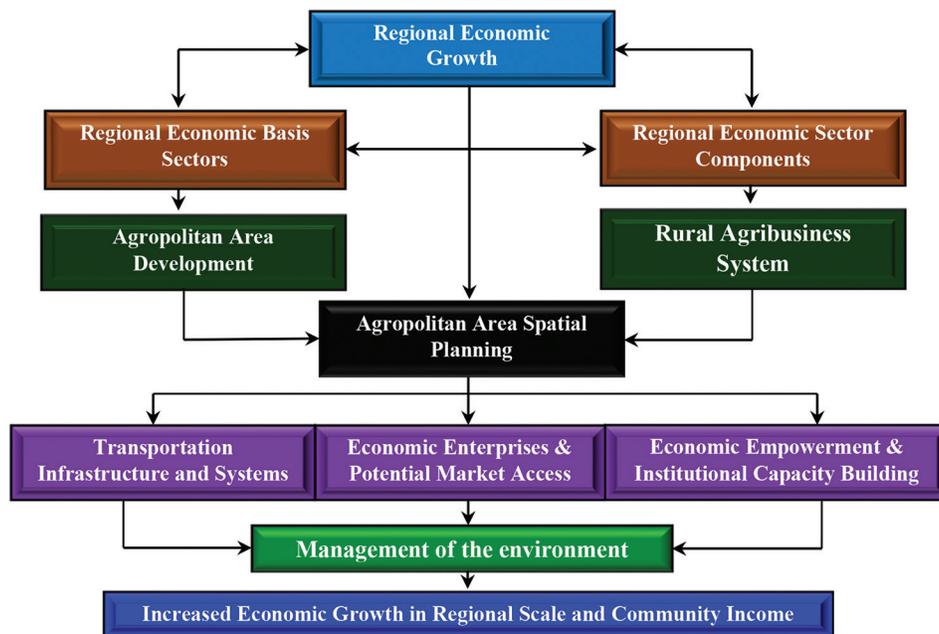
West Bajeng Sub-district is a part of Gowa Regency. The dominant types of business developed by the community include;

(i) agricultural food crops covering 3475 hectares with a total production of 23,852 tons/year, (ii) horticultural commodities covering 19 hectares with a total production of 3,769 tons/year, and (iii) plantation commodities covering 13 hectares with a total production of 2222.7 tons/Ha [14]. The concept of agropolitan area development based on rural agribusiness is intended to address regional development imbalances. Cities as centres of economic growth and rural areas as centres of agricultural activity. The interaction between the two regions functionally shows a unified system that is not yet optimal and mutually beneficial. Factors that influence these conditions include: (i) The economic productivity of the community's business tends to be stagnant, (ii) urban areas as market destinations receive excessive burdens, and (iii) social problems, poverty, and environmental degradation. Development gaps at various spatial scales, and interactions between the two regions can be used as a basis for measuring regional development inequality (Rana et al., 2019).

The sustainable development of agropolitan-based agribusiness areas in rural areas is expected to be a development solution in the framework of encouraging interaction between rural areas as the basis of agricultural production and cities as marketing centres. The process will have an impact on increasing regional competitiveness, economic added value, improving farmers' welfare and increasing regional income.

The urgency of this study is divided into three main categories (Figure 1), namely (i) formulation of agropolitan area development based on rural agribusiness, (ii) strengthening institutional capacity of community economic enterprises, (iii) sustainable development of agropolitan areas based on environmental management towards regional economic growth. Therefore, this study aims to (i) test the significance of agropolitan-based agropolitan area development in the West Bajeng Sub-district of Gowa Regency; and (ii) analyse the direct and indirect relationship of the development of agropolitan-based

**Figure 1:** Conceptual framework, development of agropolitan area based on rural agribusiness and environmental management sustainability



Source: Author elaboration



background based on respondents' perceptions. Afterwards, the results of observations and surveys were elaborated by using the results of documentation studies.

Qualitative analysis methods were used to interpret the implementation of agribusiness-based agropolitan area development in rural areas. It aimed to build a research hypothesis. Furthermore, quantitative analysis methods were used to test the hypotheses of qualitative research results, namely: relationship or correlation of  $X_1$  and  $X_2$  on  $Y$ , effect of  $X_2$  and  $X_3$  on  $Y$ , effect of  $X_1$ ,  $X_2$  on  $Y$ . The variables that were defined in this study include: (i) production economic enterprises ( $X_1$ ), (ii) commodity sales prices ( $X_2$ ), (iii) promotion of economic ventures ( $X_3$ ), (iv) infrastructure support ( $X_4$ ), and (v) market areas ( $Y$ ). Each answer of question provided by the respondent was given a score (score 5 was the highest). The second step divided the results of research scores with ideal scores. The coefficient of correlation between variables used the regression method. The equation used is

$$Y = a + b_1 X_1 + b_2 X_2 + b_n X_n$$

Sustainability of rural agribusiness-based agropolitan area development used path analysis. Path analysis that were used referred to variables including: (i)  $X_1$  exogenous independent variable (agropolitan area development), (ii)  $X_2$  exogenous independent variable (rural agribusiness system), (iii)  $X_3$  exogenous independent variable (productive economic enterprise), (iv)  $Y$  endogenous dependent variable (environmental management), and (v)  $Z$  endogenous dependent variable (ecosystem sustainability). The path diagram used structural equations:

$$Y = PYX_1 + PYX_2 + PYX_3 + e_1$$

Path analysis is used with some considerations including: (i) Research metric data are measured based on interval scale, (ii) exogenous and endogenous dependent variables refer to multiple regression models, while intermediate variables refer to mediation models and the combined mediation and multiple regression models which are complex models, (iii) the relationship between variables is one-way, and (iv) cause and effect is based on the theory indicating that there was a relationship or correlation between the development of the agropolitan area, the rural agribusiness system, productive economic endeavours, strengthening community capacity for environmental management and ecosystem sustainability.

The regional economic analysis in this study was divided into two categories, namely (i) location quotient analysis (LQ) is used to determine the extent of specialization of the economic sectors of Gowa Regency as the base sector or leading sector. If LQ results  $> 1$ , the sector falls into the category of base sector, while if  $LQ < 1$ , it is not base, so a policy is needed to increase the base. (ii) shift-share is used to analyse regional statistical data in the form of sector output to be compared to regional growth. It aims to determine the performance or productivity of the regional economy. The formulation used was

$$LQ = Si/Ni/S/N = Si/S/Ni/N,$$

$$PEK = KPN + KPP + KPK.$$

Meanwhile, the indicators that were assessed included: (i) changes in regency revenue, (ii) provincial growth component, (iii) proportional growth component, and (iv) regency competitiveness growth component.

### 3. RESULTS AND DISCUSSION

Dynamic regional growth is closely related to increasing productivity of basic economic sectors and their impact on global environmental change. Continued global economic and population growth have driven a persistent rise in greenhouse gases (GHG) and other gases stemming from human activities (United Nations, 2019). Furthermore, elasticity varies greatly depending on affected sectors and regions, and very important is determined by the economic spatial structure (Caliendo et al., 2017). The base sector plays an important role in contributing to regional income and increasing community income and welfare of farmers in rural areas through government policy support. The importance of initial support from the government and other partners for start-up capital, subsidized access to training and technical assistance, and navigating complex bureaucratic systems, and positive effects that can increase productivity over time, economies of scale, and access to markets influence the reduction of potential poverty (Humphries et al., 2020). The base economic sectors in Gowa Regency can be seen in the following table.

The economic base sectors of Gowa Regency (Table 1) tended to increase including: (i) Agriculture with a contribution of Rp. 3,708,332.48., a business index of 104.30 and a location quotient value of 1.46 or  $LQ > 1$ , (ii) electricity and gas with a contribution of Rp. 24,324.25, business index of 105.44 and location quotient value of 1.98 or  $LQ > 1$ , (iii) food and drink accommodation with a contribution of Rp. 329,238.00., business index value of 111.85, location quotient value of 1.78 or  $LQ > 1$ , (iv) real estate with a contribution of Rp. 963,116.85., business index value of 105.85, location quotient value of 2.04 or  $LQ > 1$ , and (v) information and communication with contributions of Rp 1,423,443.84., business index of 110.38, and a location quotient value of 1.64 or  $LQ > 1$ .

Potential economic sectors that can be developed in order to encourage economic growth in the region included: (i) Water supply and waste treatment with a contribution of Rp17,265.91., business index of 110.09, and location quotient value of 1.27 or  $LQ > 1$ , (ii) defence and social security with a contribution of Rp. 632,192.43., business index of 103.60, location quotient value of 1.23 or  $LQ > 1$ , and (iii) services with a contribution of Rp.190,537.10., business index of 112.80 and location quotient value of 1.23 or  $LQ > 1$ . To improve regional competitiveness, efforts are needed to encourage the role of the banking and non-banking financial systems, especially in developing infrastructure in leading sectors (Istifadah et al., 2016). Furthermore, the base economic sectors that need to be improved in the future include: (i) mining and excavation, (ii) construction, (iii) wholesale and retail trade, and (iv) education and health services. Therefore, it can be concluded that the agriculture, electricity and gas, accommodation and real estate sectors are strategic economic sectors that trigger economic growth in Gowa Regency and South Sulawesi Province. Thus, harmonized innovation is needed for all sectors of the economy to

**Table 1: The base economic sector in Gowa Regency, South Sulawesi, in 2018-2019**

No	Economic sector	Potential of economic sector			LQ value
		Land area (Ha)	Contribution to GDP (Rp)	Business index	
1.	Agriculture	34,362.50	3,708,332.48	104.30	1.46
2.	Mining and excavation	237	427,992.83	112.64	0.75
3.	Processing industry	14,044	811,124.76	104.04	0.45
4.	Electricity and gas	535	24,324.25	105.44	1.98
5.	Water supply and waste management	105	17,265.91	110.09	1.27
6.	Construction	535	1,390,947.66	108.51	0.89
7.	Wholesale and retail trade	46,526	1,585,644.38	109.82	0.81
8.	Transportation	2,946	181,622.81	108.91	0.45
9.	Food and drink accommodatio	7,174	329,238.00	111.85	1.78
10.	Information and communication	2,159	1,423,443.84	110.38	1.64
11.	Financial service	353	289,657.77	103.80	0.69
12.	Real estate	295	963,116.85	105.85	2.04
13.	Company service	965	15,463.14	109.28	0.27
14.	Defence and social security	95	632,192.43	103.60	1.23
15.	Educational services	1,614	594,121.44	109.92	0.87
16.	Health services	400	237,653.13	108.49	0.96
17.	Other services	2,395	190,537.10	112.80	1.27

Source: Statistics of Gowa Regency, 2019 [14]

have implications for innovation and to increase the productivity of community economic ventures (Gault, 2018).

### 3.1. Regional Economic Growth

The shift in the economic structure of Gowa Regency to the GDP of South Sulawesi Province during the 2014-2019 period showed that the potential of the agriculture, electricity and gas, accommodation and real estate sectors had a tendency to increase with an average growth of 1.89 percent. This figure, after being confirmed in the field, illustrates that the growth of the sector was triggered by the existence of the agropolitan area in the West Bajeng Sub-district and the existence of Gowa Regency which is part of the development of the Mamminasata metropolitan city in the South Sulawesi Province. Current rapid economic growth is exclusively resource-oriented (Song et al., 2020). Furthermore, the relationship between the following production programs that leads to the responsiveness of the larger factory-PR is needed for market needs: SRS strategic reconfigurable systems (RT reconfigurable technology supported by MS-manufacturing and management strategies technology-TM), with emphasis on the role of SCM interventions (Jimenez et al., 2020). The shift in the sector of economic activity in Gowa Regency can be seen in the following figure.

The contribution of growth in the economic activity sector of Gowa Regency (Figure 3) shows a growth rate of 8.87 percent, higher than the national economic growth of 5.1 percent. Therefore, it can be concluded that agricultural sector has very strategic role to support the economic growth of the South Sulawesi Province. This means that to increase production of both food crops and horticulture, it is necessary to determine the area that is the center of production (Hapsari et al., 2015). Furthermore, agriculture contributes to MDG 1 through agriculture-led economic growth and through improved nutrition (World Bank, 2015). Changes in economic growth in Gowa Regency can be seen in the following figure.

The contribution of economic growth (Figure 4) of Gowa Regency, based on the shift share component was divided into

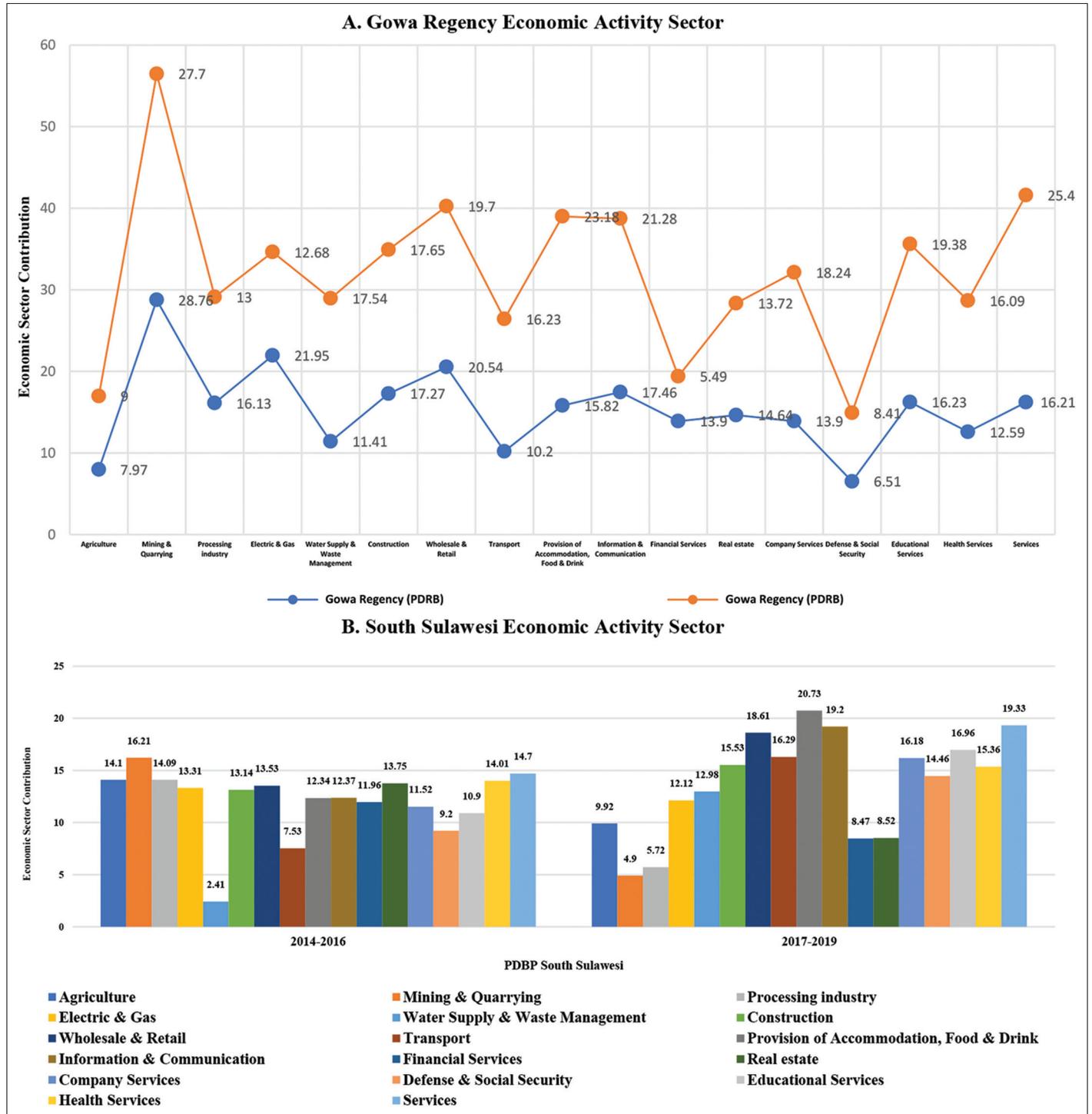
four categories including: (i) Shift in the economic structure of a region influenced by national or KPN with a value of 0.07, (ii) proportional shift based on the gross value of each sector to the total sector of provincial economic activity with a KPP value of 0.167 or  $PP > 0$ . This means that the economic activity sector of Gowa Regency shows a rapid growth; meanwhile if  $PP < 0$ , it does not have specialization in the provincial economic activity sector, (iii) differential shift or competitive position based on gross value added with the same sector as the KPK of 0.116 or  $PPK > 0$ .

The agriculture, mining and excavation, the processing industry, accommodation, information and communication, real estate, education services and services sectors had competitiveness, compared to other sectors of economic activity. Furthermore, the PEK value was obtained at 1.5 percent. This means that the economic growth of Gowa Regency has the potential to develop in the future. Therefore, it can be concluded that the economic sector potential of Gowa Regency will experience significant growth through the development of the agropolitan area in the future. A national development approach that greatly emphasizes macroeconomic growth tends to ignore the great inter-regional development inequality that exists (Latuconsina et al., 2018). Furthermore, the shift from a traditional economy to a circular economy requires the realization of environmental innovations and sustainable engineering solutions (Vaskalis et al., 2019).

### 3.2. Development of Agrobusiness-based Agropolitan Area in the Rural Region

The agropolitan area was created and developed basically to increase the productivity of agricultural businesses towards regional economic growth and resolve disparities between cities and villages. Efforts need to be continuously carried out in the development of agropolitan region which is essential for accelerating rural development in general and agriculture in particular (Oryzanti et al., 2018). The economic system depends on variety factors, such as producer and consumer behavior, technology change, resource availability and productivity, and

Figure 3: Economic growth of the Gowa Regency. Region towards South Sulawesi Province

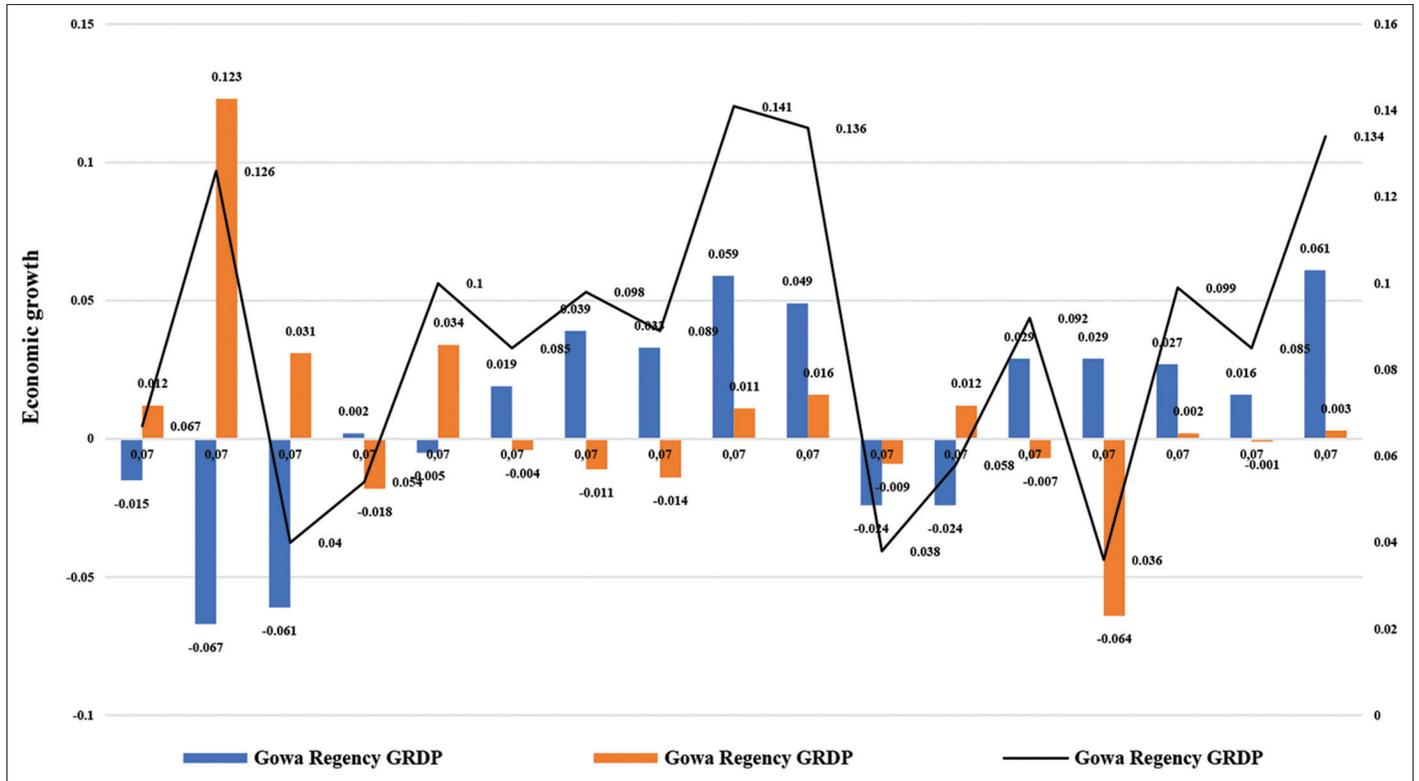


Source: Statistics of Gowa Regency (BPS Kabupaten Gowa, 2019), and statistics of South Sulawesi, 2019 (BPS Provinsi Sulawesi Selatan, 2019)

population dynamics (Food and Agriculture Organization, 2017). Furthermore, the rural agribusiness system is a concrete manifestation of the economic system business chain of rural communities. A stronger role of the market-related factors in changing agricultural practices over the time asking policymakers to design better market-based interventions and incentives for increasing the adaptation in the agriculture community (Javed et al., 2020). The results of regression analysis can be seen in the following table.

The results of regression towards the tested variables (Table 2) obtained an illustration: (i) the relationship of economic production business towards market demand of 5.309 with the coefficient of effect determination of 11.5, (ii) the relationship of the commodity selling price towards market demand was 8.226 with the coefficient of effect determination of 11.5, (iii) the relationship between economic business promotion and market demand was 2.487 with the coefficient of effect determination of 11.5, (iv) the relationship between infrastructure support and market demand was 2.990 with

Figure 4: Shift in economic growth in the Gowa Regency region



Source: Analysis results. KPN: Provincial Growth Component, 0.07. KPK: Components of regency competitiveness growth. KPP: Components of proportional growth. PEK: Changes in regency revenues

Table 2: Summary of results of associative hypothesis testing

Correlated variables	R-table	T-table	t count	Sig.
Production economic business towards market demand (ryx <sub>1</sub> )	0.115	1.960	5.309	0.002
Commodity selling price towards market demand (ryx <sub>2</sub> )	0.115	1.960	8.226	0.001
Economic business promotion towards market demand (ryx <sub>3</sub> )	0.115	1.960	2.487	0.038
Infrastructure support towards market demand (ryx <sub>4</sub> )	0.115	1.960	2.990	0.015
Production economic business, commodity selling price, production economic business promotion, and infrastructure support for market demand (R)	F count=61,996 > F table=2.60			

Source: Analysis results

the coefficient of effect determination if 11.5. Therefore, it can be concluded that the economic production business, the selling price of commodities, the economic business promotion, and the support of infrastructure together have a significant effect on market demand.

The results of the regression analysis confirm that remote rural areas facing difficulty in terms of marketing the production will experience a significant change with the existence of the agropolitan area developed in the West Bajeng Sub-district of Gowa Regency. Daily life in rural areas is often shaped by different mores than urban life, especially in more remote rural areas; labour markets are smaller, and access to social services such as schools, shops and public transport are more often inadequate (Bock, 2015). Therefore, the agropolitan area will have a positive association with economic growth in the Gowa Regency, South Sulawesi Province and increase community economic business.

The role of the developed agropolitan area will encourage the creation of new jobs for rural communities due to spatial

interaction through the distribution of production marketing and the support of regional transportation systems. Manufacturing, which replaced agriculture and other natural resource sectors in the first half of the 20th century, is decreasing along with the public sector, and since the 1980s the service sector has been the largest growing employment segment (Hedlund and Lundholm, 2015). In this context, it was understood that the progress of an area or city positively contributed to the population mobility process, transportation service and the distribution of good and service fully influenced by the city attraction as geographic area unity (Surya, 2015a). Furthermore, the service industries are indicated as a significant part of trade and industry in larger cities, and the cities are described as playing a significant role as a driver of growth in the region (Kvist, 2020).

The agropolitan area of West Bajeng Sub-district, Gowa Regency was oriented to several components of activities in its development, namely; (i) transportation infrastructure development to facilitate the transportation process from the production location to

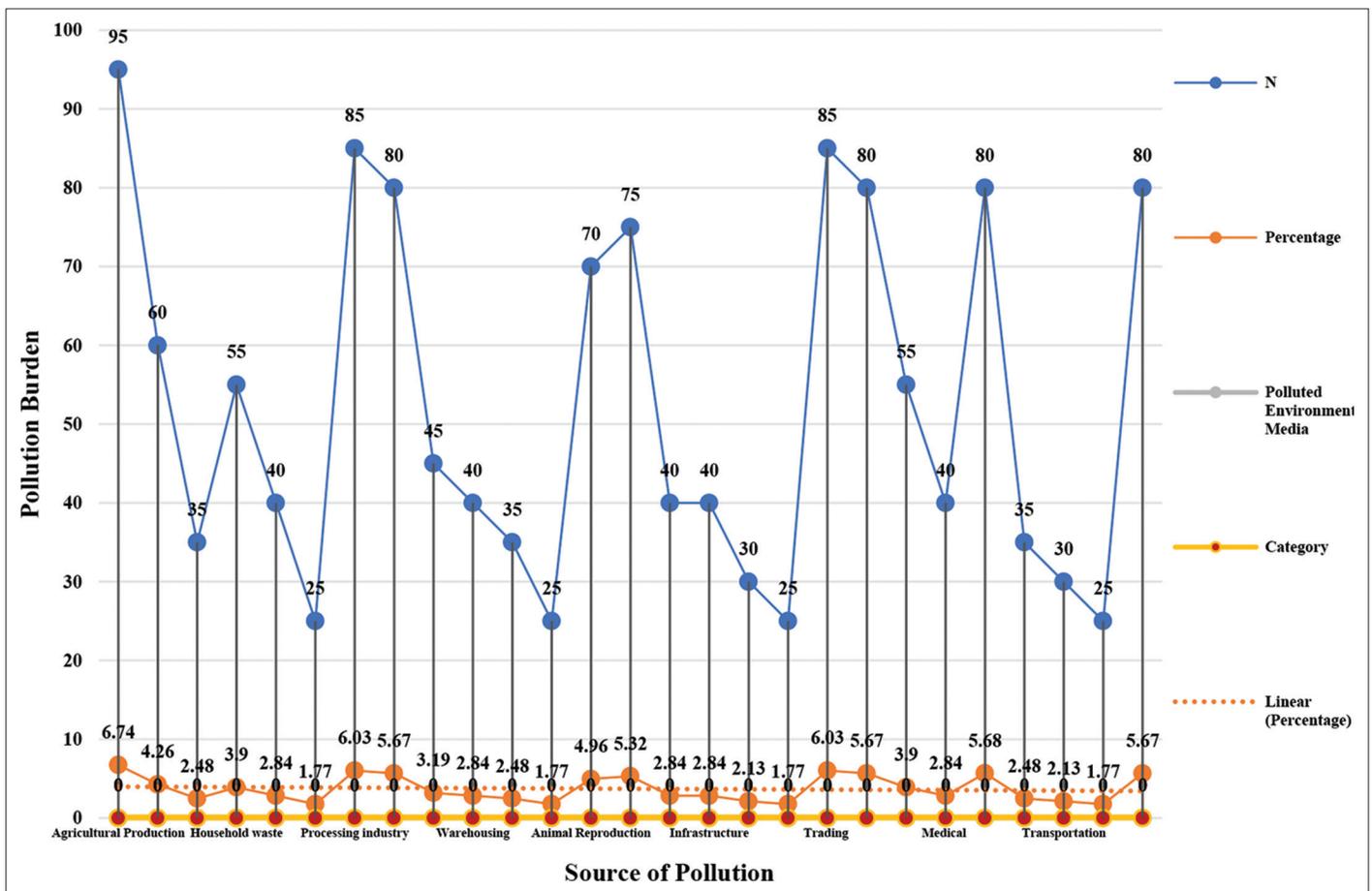
the market location, (ii) agricultural production facilities, (iii) warehousing to collect the products before they are marketed, and (iv) other supporting facilities related to industry for the needs of the production process and technological innovation. The activity component of the agropolitan area has the potential threat of environmental pollution leading to decrease environmental quality. This means that food demand is quite high, increasing consumer needs and supported by the existence of potential centres of agricultural production causing environmental degradation due to high pollution caused by various economic activities. Population growth and increasing food and energy demands have led to nitrogen pollution (Zeng et al., 2019). Furthermore, globally, sustainable management of solid waste in low-income countries is becoming increasingly important (Ferronato et al., 2019). Potential environmental pollution in the agropolitan area of West Bajeng Sub-district, Gowa Regency can be seen in the following figure.

Development activities that tend to increase in the West Bajeng agropolitan area, Gowa Regency, have an impact on environmental quality degradation and pollution (Figure 5). Increasing environmental pollution will require the support of government policies in terms of environmental management and management in a sustainable manner. It is imperative for the government to urgently formulate public policies to enhance the ability of the lower socioeconomic groups to circumvent air pollution and reduce the health damage caused by air

pollution (Jiao et al., 2018). Furthermore, an area has significant social, economic and environmental characteristics of the agricultural sector, a planner can propose agropolitan development policies that assess ecosystem services (Schröter et al., 2014; Zanten et al., 2014; Haaren et al., 2014).

There are several strategic steps needed in the context of controlling environmental pollution in the West Bajeng agropolitan area, Gowa Regency. First, building an environmentally conscious culture of the actors and the community related to the process of increasing the productivity of economic businesses that utilize environmental media in the production process. Support environmentally conscious consumer decisions about the acquisition of a new versus a second-hand product and enable End-of-Life decision making in terms of the separation of reusable devices at collection points (Boldoczki et al., 2020). Second, controlling environmental pollution was carried out through the participation of the community and economic actors including: (a) Waste management was carried out in a way that originated from socioeconomic activities through recycling system and processing it into compost for agricultural needs. Furthermore, organic waste was buried in the soil to become compost, while inorganic waste including plastic and used cans were recycled into household appliances and other items of economic value; (b) Prevention of household waste, industrial waste, trading activities and health facilities that specifically contain chemicals and toxic substances

Figure 5: Sources of environmental pollution in the Agropolitan Area, West Bajeng Sub-district, Gowa Regency, South Sulawesi



Source: Author elaboration and primary data

was firstly distributed using a piping system and processed in the form of closed waste management before being overtaken to the environmental media. This aims to reduce pollution in watersheds, so that pollutant waste containing poisons can be removed to not disturb the ecosystem. Municipal solid waste (MSW) management solutions must be financially sustainable, technically feasible, socially acceptable, and environmentally friendly (Hussein et al., 2018). Furthermore, comprehensive impact measurement and planning of solid waste management and treatment systems are needed, to improve environmental sustainability as part of global issues (Ferronato and Torretta, 2019).

Third, prevention of air pollution was carried out by anticipating and handling the potential residual combustion of motor vehicles and household industrial fumes, reducing the use of fuel oil and shifting to alternative energy that is environmentally friendly and zero emission. It is important to integrate the central utility system in the industry with adjacent waste-to-energy networks to form an environmentally friendly energy management system (Hwangbo et al., 2020). Fourth, greening and planting trees was done by developing green open space and urban forest programs consisting of 20 percent of the agropolitan area. This aims to change the metabolism of the air in this case the developed vegetation is able to absorb CO<sub>2</sub> in the air for photosynthesis. The green open spaces and urban forests are expected to reduce CO<sub>2</sub> levels in the air coming from motor vehicle fumes or industrial fumes and to reduce air pollution and increase levels of O<sub>2</sub> into the atmosphere and flood control. The phenomenon of climate change adds to the city's severe problems going forward the idea to develop a comprehensive and realistic green city park program as a solution to climate change (Setyowati et al., 2016).

Fifth, the use of fertilizers and pesticides was in accordance to the provisions and standards set. This process was out by limiting the process of eutrophication, in this case the negative impact caused by artificial fertilizers that enter the waters and watersheds. Bivalves present one of the most attractive solutions to integrate remediation strategies owing to their notable filtration capabilities and often their extensive tolerance to several chemical contaminants (Domingues et al., 2020). Furthermore, the use of pesticides was very important based on the standards set since the excessive use will pollute the environment and cause the destruction of certain organisms needed, i.e. decomposing bacteria or insects that function to help pollinate plants. Supervision is very important to do since pest eradication is biologically preferred as an alternative to reducing pollution and damage to agricultural ecosystems. The combined optimisation, energy recovery and creation of optimized multiple-task district stations lead to an efficient, resilient, sustainable, and low-cost management strategy for water distribution networks (Giudicianni et al., 2020). Sixth, limiting the use of CFCs, i.e. organic compounds containing carbon, chlorine, and fluorine, which are produced as volatile derivatives of methane, ethane, and propane. This aims to prevent damage to the ozone layer in the atmosphere and reduce global warming.

### 3.3. Integration of the Agropolitan Area Development System

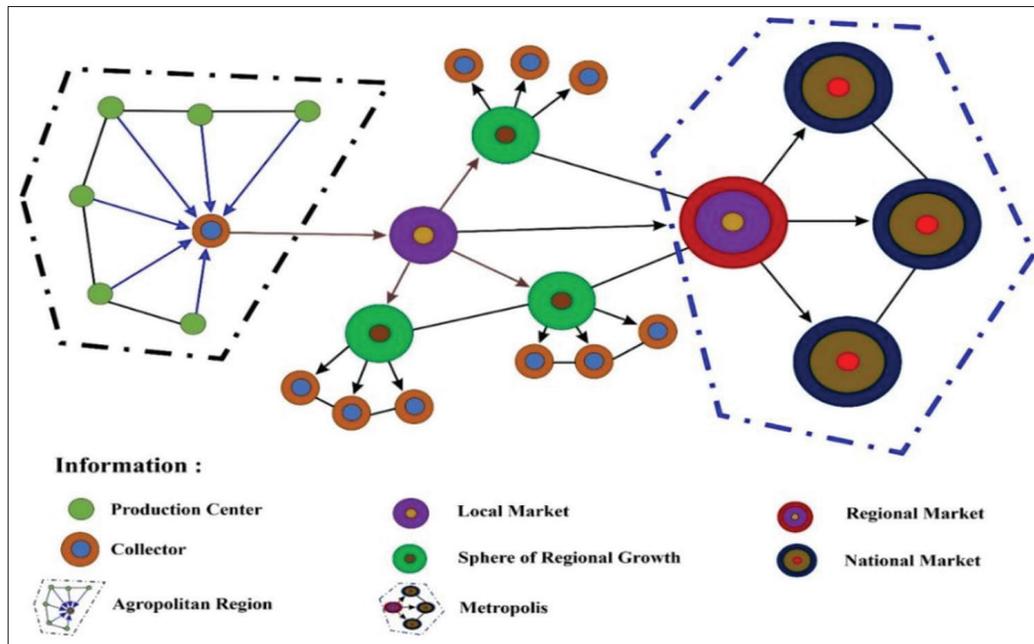
The integration of the agropolitan area development system in the perspective of regional development is needed to synergize

the productivity of economic enterprises towards the production marketing system. The integration of the agropolitan area development system is an effort to combine the ability of human resources and the use of natural resources to increase added value, artificial resources and social capital that will enhance regional capabilities in implementation development (Prasetya et al., 2014). Furthermore, the dominant trends in the development and creation of inter-regional regions are centered on economic growth and make a positive contribution to spatial economic agglomeration (Surya et al., 2019).

The regional transportation system plays an important role and becomes a driving factor in the distribution of the flow of goods and services towards economic agglomeration and spatial interaction between production centres and market areas. Irrespective of the relative importance of physical versus human capital, development cannot occur without both interacting as infrastructures cannot remain effective without proper operations and maintenance while economic activities cannot take place without an infrastructure base (Rodrigue and Notteboom, 2018). Furthermore, the sustainability of agricultural production systems, the rural economy, and the environment can be maintained and enhanced as an integrated system for the development of the agropolitan area (Surya, 2015b; Fatkhianti et al., 2015). The patterns of production marketing distribution and regional spatial interactions can be seen in the following figure.

The marketing system of agropolitan production will be related to the existence of regional growth centres, regional markets, and the existence of metropolitan cities as national market centres (Figure 6) which has global orientation. Regional development policies and practices have taken significant transformation over the past five decades. Its relevance has been challenged in recent years by the new economic geography that has emerged in the view of globalization and because most countries are turning towards a more democratic and decentralized approach to planning and implementing their various development activities (Mercado, 2002; Ruben, 2002). Furthermore, many large cities have turned into manufacturing centres supported by modern transportation systems, including roads, railways, and river lines, in a sense, each citizen of each of the 28 major cities in the world interacting with rural areas and villages has a dependency, on a production marketing system for urban communities as consumers (Berdegué et al., 2014).

Interpretations about the process that can be submitted include: First, the integration of the production centre area into the production centre, in this case the role of the West Bajeng Sub-district as the initial distribution centre, starting from the production process, product packaging and finally to be forwarded to the district capital to meet local needs. In this process, there is a high possibility of uncertainty and will be very vulnerable to risks and obstacles. That is, the local business world, a limited supply chain network becomes increasingly vulnerable to uncertainty and complexity (Chowdhury et al., 2019). Second, the product marketing process from the capital city of Gowa Regency was then continued to the growth centres of the South Sulawesi Province in relation to the supply of products, in order to meet the needs

**Figure 6:** Patterns of production marketing distribution from production centres to market areas

Source: Author elaboration

of consumers at the regional level. Supply chain organization strategies (or supply networks) aimed at re-territorialising the agri-food system through the development of what in the economic literature is defined as value-based food supply chains (Berti and Mulligan, 2016).

Third, regional marketing towards the production of agropolitan areas was intended to meet the needs of urban residents within the scope of metropolitan cities. It is thus expected to drive economic growth by creating new business and employment opportunities, saving material costs, reducing price volatility, increasing supply security while at the same time reducing environmental pressures and impacts (Kova et al., 2018). Furthermore, the transportation services have a very important role and the choice of available modes include land transportation, air transportation, and sea transportation. The process shows that the role of production centres in this agropolitan area is very strategic as a driving force for regional economic growth through the relationship between rural and urban areas towards the integration of sustainable regional development systems. Support government regulations that protect the needs of the most vulnerable groups and the formulation of strategies related to the provisions as basis and requirements for sustainable economic growth (Tacoli, 2003; Surya, 2015c). Therefore, it can be concluded that the development of a well-managed agropolitan area has a positive impact on regional economic growth, the integration of urban systems and the relationship between local, regional, national and global marketing towards sustainable regional development.

### 3.4. Agribusiness Economy Based on Environmental Management

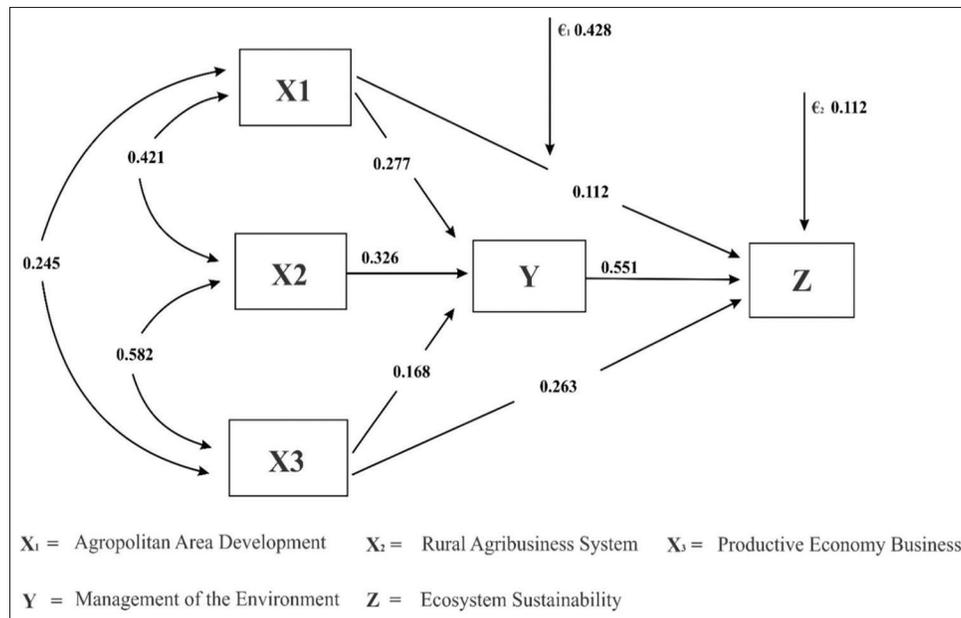
Economic business that tend to increase through the pattern of rural agribusiness systems encourages economic growth and has an impact on opening employment opportunities and reducing

poverty in rural areas. Strong economic growth therefore advances human development, which, in turn, driving economic growth (Department For International Development, 2007). Furthermore, rural investment, pro-poor policies, social protection and strengthened rural institutions create the necessary positive climate for family farmers, small-scale producers and poor rural people to invest in their businesses and build sustainable, income-generating activities (United Nations, 2015). Figure 7 shows the path analysis results that show the development of agropolitan areas, rural agribusiness systems, productive economic endeavours, strengthening community capacity for environmental management and ecosystem sustainability.

The development of agropolitan areas through rural agribusiness systems based on economic empowerment which is oriented towards increasing the economic productivity of the community is then contextualized towards the sustainability of the environmental ecosystem (Figure 7). The results of the path analysis confirm that: (i) the relationship or correlation between the development of the agropolitan area and the agribusiness system was 0.421, (ii) the relationship or correlation between the rural agribusiness system and community economic empowerment was 0.582, and (iii) the relationship or correlation between economic empowerment and an increase in economic business productivity was 0.245 therefore, it can be concluded that the development of the agropolitan area is positively correlated to the agribusiness system and economic empowerment is positively correlated to an increase in community economic productivity.

The direct effect of the development of the agropolitan area on the rural agribusiness system was 0.277 or 27.7 percent. Meanwhile, the direct effect of the agribusiness system on community economic empowerment was 0.326 or 32.6 percent. In addition, the direct effect of economic empowerment on

**Figure 7:** Relationship of agropolitan area development, rural agribusiness system, productive economic endeavours, community capacity building towards environmental management and ecosystem sustainability



Source: Analysis results

increasing the economic productivity of the community was 0.168 or 16.8 percent. Therefore, it can be concluded that the development of agropolitan areas, rural agribusiness systems, and economic empowerment positively correlated with the increasing economic productivity and ecosystem sustainability. Ecosystem economics and biodiversity will help pave the way for the “green economy” to emerge as the dominant policy approach to achieve environmental protection and economic growth (Kill, 2015). Furthermore, policymakers must maximize the relationship between the social economy, the capacity of society and other sectors, and policies that encourage entrepreneurship through the role of the private sector as an integrated whole system (Noya and Clarence, 2009).

The indirect effect of regional development through economic empowerment on the productivity of economic ventures was 0.828 or 82.8 percent. The indirect effect of economic empowerment through the development of the agropolitan area on the productivity of economic ventures was 0.877 or 87.7 percent. The indirect effect of the development of the agropolitan area through the rural agribusiness system on the increasing productivity of economic ventures was 0.719 or 71.9 percent. The indirect effect of the agribusiness system through the development of the agropolitan area was 0.112 or 11.2 percent. The indirect effect of developing the agropolitan area through economic empowerment was 0.263 or 26.3 percent. The indirect effect of increasing economic business productivity through economic empowerment was 0.551 or 55.1 percent.

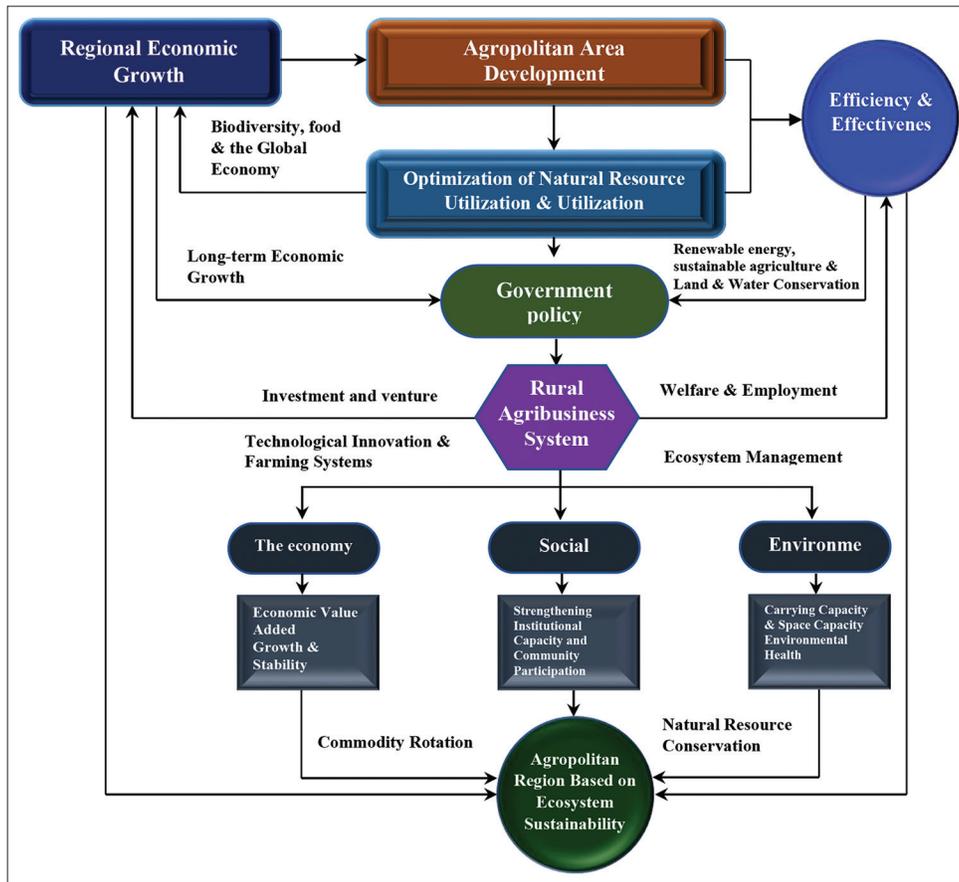
The total effect was 57.2 percent. The residual effect or the influence of other variables on the productivity of economic enterprises which were not examined was 0.428 or 42.8 percent. Furthermore, the direct effect of economic business productivity on ecosystem sustainability was 0.638. The residual effect or

influence of other variables on the sustainability of the ecosystem that was not studied was 0.362 or 36.2 percent. The results indicate that there is a strengthening of Y by 57.2 percent and the effect of Y on Z by 63.8 percent. Therefore, it can be concluded that the development of the agropolitan area through the rural agribusiness system that was integrated with economic empowerment, environmental management and improvement in productivity of economic businesses contributed positively to the sustainability of the environmental ecosystem. The results obtained support the triple bottom-line approach namely, integrating economic, environmental and social factors (Harrington, 2013). Furthermore, a sustainable circular economy not only adopts an environmental perspective, but also considers economic, social and environmental performance (Haupt and Hellweg, 2019). The results of the analysis confirm that the community’s economic circulation and distribution of production marketing through rural agribusiness systems in the agropolitan area will remain stable and sustainable by optimizing natural resources, strengthening production factors and using environmentally friendly technology towards economic growth in the region sustainably.

### 3.5. Regional Economic Productivity Based on Ecosystem Sustainability

Economic productivity that remained stable and the selling price of production which tended to increase due to high market and consumer demand simultaneously had a simultaneous impact on the economic growth of Gowa Regency and the economic growth of South Sulawesi Province. Capital accumulation, has an impact on economic growth and the fundamental factor that holds back economic growth is the reduced return on capital in the production process (Aoki and Yoshikawa, 2002). Furthermore, the argument is based on several considerations namely: (i) Government policy support and political stability, (ii) stability of production and ecosystem balance, and (iii) control of environmental pollution.

**Figure 8:** Development of agropolitan areas based on regional economic productivity and ecosystem sustainability



Source: Analysis results

Therefore, the results of this study illustrates that the stability of production and market demand that tends to increase followed by market stability will have an impact on the optimization of production and utilization of natural resources towards the sustainability of agropolitan areas based on rural agribusiness systems.

The implementation of complex agroforestry systems must be followed by developing basic and advanced industries to deal with leading commodities in the agropolitan area and setting a reasonable base price level for local commodities at the level of local producers, building a transportation network system, developing markets, and empowering local communities (Retnowati, 2003). Furthermore, the health status of regional soils and ecosystems has important theoretical and practical significance for maintaining similar regional ecological security and promoting social and economic sustainable development (Yang et al., 2020). Figure 8, shows agropolitan area developer in West Bajeng Barat Sub-district, Gowa Regency based on ecosystem sustainability.

The development of the agropolitan area of West Bajeng District is based on the increasing regional economic productivity and ecosystem sustainability (Figure 8), in the context of several key principles, namely: (i) Ensuring the existence of the production process through biodiversity and food oriented towards a global economy towards long-term economic growth, (ii) encouraging renewable energy based on sustainable agriculture followed by

land and water conservation, (iii) government policies directed at law enforcement and consistency in sustainable management of natural resources and ecosystems, (iv) creating a rural agribusiness system that is supported by investment and business capital towards improving welfare and opening employment, (v) developing technological innovations based on farming systems towards ecosystem management, and (vi) rotation of agricultural commodities based on conservation of natural resources and the environment. Policies that lead to effective training for entrepreneurs, by providing incentive support and opportunities to start a business (Van Praag, 1999). Furthermore, a person determined to become an entrepreneur must evaluate not only the external, but also personal circumstances (Startiene and Remeikiene, 2009). The six concepts, in their implementation, are directed at developing agropolitan areas based on ecosystem sustainability. Local level participation is very important to achieve global goals, i.e. sustainable development (Salazar, 2020).

#### 4. CONCLUSION

Regional growth supported by economic base sectors is positively associated with the development of agropolitan areas based on rural agribusiness systems. Agropolitan areas that are developed in the direction of economic production business, improvement of production quality and commodity price selling stability followed with the promotion of economic businesses, and infrastructure support have a significant effect on meeting market demand.

Regional development that is followed by accelerated development of the agropolitan area through the rural agribusiness system and followed with community empowerment and control of environmental pollution is positively correlated with the increasing economic business productivity and ecosystem sustainability. Furthermore, a well-managed and professional agropolitan area is positively correlated with the integration of regional development systems. In addition, the relationship between local, regional, national and global marketing towards the stability of the economic circulation of the community, the stability of the distribution of production marketing, strengthening of production factors and the use of environment-friendly technology have an impact on increasing regional economic growth and ecosystem sustainability.

The direction of the agrobusiness-based agropolitan area's sustainability will require government policy support in terms of political stability, production stability, product marketing, and environmental pollution control. Stability of production and market demand that tends to increase and followed by market stability will have an impact on optimizing the utilization of natural resources towards the sustainable development of the agropolitan area. The sustainability of the agropolitan area's ecosystem is in the context of guaranteeing the existence of the production process through the development of biodiversity and food, the use of renewable energy based on sustainable agriculture followed by land and water conservation and law enforcement. Consistency in natural resource management and integrated rural agribusiness systems supported by investment and business capital players and the development of technology-based farming systems, ecosystem management, and rotation of agricultural commodities based on the conservation of natural resources and the environment will encourage regional economic growth as a unified agropolitan area development system independent.

The results of this study have implications for the development of regional planning science, built environment science, regional economics, and rural sociology. This study explicitly has implications for the formulation of government policies and their implementation in developing agropolitan areas based on the rural agribusiness system going forward in order to maintain economic stability and environmental management sustainability. Regional development disparities in the context of cities and villages will be able to be addressed and improved going forward by considering several indicators including development of independent agropolitan areas, rural agribusiness systems, optimization and conservation of natural resources, strengthening government institutional capacity and community adaptation to global climate change based on data availability, spatial scale, regional scale, and time period.

#### 4.1. Funding

We would like to express our gratitude to the stakeholders for contributing ideas in carrying out this study. Thank you to the Ministry of Research and Technology of the Republic of Indonesia for their support and financial assistance in carrying out this research.

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