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DEVELOPMENT OF AGROPOLITAN AREA IN PAPUA (CASE STUDY: AGROPOLITAN AREA IN THE CITY OF JAYAPURA)

Yannice Luma Marnala Sitorus, Normalia Ode Yanthy and Anggia Riani Nurmaningtyas
Faculty of Civil Engineering and Planning, University of Science and Technology Jayapura, Indonesia

Abstract

The agropolitan area in the eastern part of Indonesia to be not as developed as the western part of Indonesia. The city of Jayapura is an agropolitan area in the eastern part of Indonesia. This research was aimed at studying development of agropolitan area in the city of Jayapura. A qualitative approach with descriptive method was used to determine the superior potential of agricultural sector, to identify chain of production in agribusiness, and to identify service of infrastructure in each subsystem of agropolitan area. Contribution and rate of growth of agricultural sector towards GDP of the city of Jayapura decreased, Farmer Exchange Rate was under 100, decreased in micro loan of agricultural sector, and area of rice fields decreased, showing the stagnation of agropolitan area in that particular city. The superior products are rice, cash crops, vegetable, fruit, and livestock produce. Infrastructures on all agricultural subsystems are still limited and the most minimum is on subsystem infrastructure of downstream agribusiness. The majority of farmers there sell their produce directly to Youtefa market. Production chain is short thus it does not give much added value on the harvest. The local farmer group has a lack of critical attitude towards the existing development.

Keywords: Agropolitan area, production chain, subsystem infrastructure

1. INTRODUCTION

1.1. Background

The development of an agropolitan area actually originated from people centered development concept, in which one of the expectations from the development program is the presence of changes in farmers' life attitude from the tendency of being subsistent towards a more creative, innovative, and productive one, except in the implementation in Indonesia, it is emphasized more on territorial (area) development which is mainly in the form of physical aspect. The fact that there is a difference in area physical and social characteristics of the people between developed area in the western part of Indonesia and developing area in the eastern part has caused development in agropolitan area in the eastern part of Indonesia to be not as developed as the western part of Indonesia. Similar aim of policy has been applied in the city of Jayapura but it has not been able to increase the development of agropolitan area there.

Previous study (Labok, 2013) showed that a number of support facilities of agropolitan area development had been provided at Muara Tami district, in the city of Jayapura, province of Papua, but the agricultural activities taking place in the area was still individual in nature, it had not been

Corresponding author's
Name: Kouadio Koffi Patrice
Email address: *kkpatrice@hotmail.fr*

coordinated and integrated. In fact, the area is a model of agricultural sector development in the province of Papua because since 1982 Muara Tami district has been a transmigration destination in Papua. Muara Tami district, which are Kelurahan Koya Barat and Koya Timur, formerly were Transmigration Settlement Units, guided under the Department of Transmigration in 1982. The majority of the people are Javanese of transmigration program and work as 'palawija' (second crop/cash crops) farmers. Around the year 1986, still under the guidance of the Department of Transmigration, the areas were appointed as definitive village, and in the year 1988, they were inaugurated as villages headed by village heads. In the year 2002, the two villages were inaugurated as 'kelurahan' and headed by 'lurah'.

Since 2002, the central government (Minister of Public Works and Minister of Agriculture) has started to introduce the concept of agropolitan development in Indonesia. Not all countryside area received aid in the development of its agropolitan area, aside from only certain area developed to become model. In the master plan of the province of Papua, the guideline of policy which supports development of the concept of agropolitan has not been firmly explained.

1.2. Problem formulation

The city of Jayapura has natural resources in the sector of agriculture which is quite significant whose development has also been supported by by the policy of the local government but the development in the area showed that it has not been developed as an agropolitan area should.

1.3. Aim of study

1. Learning and understanding the characteristics of Muara Tami agricultural area
2. Identifying superior potential in agricultural sector
3. Identifying chain of agribusiness from upstream to downstream
4. Identifying service level of agricultural system infrastructure facilities in agropolitan area in the city of Jayapura
5. Giving recomendations to the regional government so they can prioritize economic policy through development of certain superior commodity to create job fields, absorption of manpower, increase in regional/product competitiveness, so that it can increase local economic growth and decrease poverty rate in regional area.

2. LITERATURE STUDY

2.2.1. General definition

Agropolitan consists of the word 'agro', which means agriculture, and 'politan' which means city. Agropolitan can be defined as agricultural city which grows and develops from the activity of agriculture and contributes in agricultural activities in the surrounding areas. As for the concept of agropolitan, it was first introduced by Friedman and Douglas in the year 1975 after observing the presence of gap in development between city and countryside at the time. This concept is influenced by development paradigm which developed at the time, namely *people-centered development* (Agusta, 2008).

In the Decree No.26 Year 2007 about Spatial Management, it is mentioned that Agropolitan Area as one consisting of one or more activity centers in rural area as a system of agricultural production and management of certain natural resources shown by the presence of functional links and spatial hierarchy of settlement and agribusiness system unit.

Agropolitan area or usually called food production center area is agricultural towns which developed and grew because of the presence of system and agribusiness which support agricultural development activities in the surrounding area. This area consists of agricultural towns and agricultural production center villages in the surrounding area without considering governmental administrative area borders. Rural areas are developed as one unit of area development based on

economic link between countryside-city with relationship which is mutual and dynamic in character. Agricultural typologies which generally exist in an agropolitan area are business sectors in crops, horticulture, plantation, stock breeding, inland fishery, marine fishery, agro-tourism, and natural conservation forest area.

2.2. Characteristics of agropolitan area (Kimpraswil, 2000, Adisasmita, 2006)

1. The majority of people (40-50%) work in the sector of agriculture or agribusiness in a system which is integrated from :
   a. Upstream agribusiness subsystem, consisting of machinery, agricultural tools, fertilizer, etc.
   b. Primary farming business subsystem, consisting of establishments in crops, horticulture, plantation, fishery, stock breeding and forestry.
   c. Downstream agribusiness subsystem, consisting of processing industries and marketing, including trade for exporting activity.
   d. Support services subsystem consisting of loans, insurance, transportation, research and development, education, information, infrastructure, and governmental policy.
2. The presence of link between cities and countrysides which are interdependent/mutual and relying on each other, in which the agricultural area in rural area develops establishments in cultivation and processed products at household scale. On the other hand, urban area provides facilities for the development of cultivation and agribusiness establishments such as the provision of agribusiness facility, capital, technology, information, etc.
3. The majority of the people work in agriculture or agribusiness sectors, which consist of establishment of agricultural produce processing industry, upstream agribusiness trade, (means of agriculture and capital), agrotourism and services.
4. The life of people in an agropolitan area is similar to that of the urban area since the existing facilities and infrastructure in the area are made as much as possible to be as similar as in the city.
5. Basic infrastructure of agricultural area is irrigation and local roads. In agropolitan area, there are collector roads which connect the capital city of regency or the capital city of province.
6. Post harvest facilities in agricultural area are processing machine in early stage of post harvest, such as paddy thresher machine and paddy drying floor, while in agropolitan area there are rice mill, packaging in sacks, trading facilities (marketing), as well as delivery company or institution (marketing).
7. From available irrigation infrastructure, water catchment area can be determined, and the higher the capacity of irrigation the wider the water catchment area, and the greater the agropolitan, and vice versa.
8. Distance and total agricultural area to the magnitude of agropolitan, which is related to rural infrastructure (such as roads) which are already available and which are still needed to be constructed in the future. Agropolitan has a radius to its affecting area as far as approximately 15 kilometers.
9. The types of agricultural commodity produced need to be identified, which become a reliable factor in formulating the developmental strategy regarding basic infrastructure and facilities needed.
10. Determination of hierarchy, subordination, and orientation. Agropolitan to be determined is the result of options based on figures from centers of rural settlements being observed. Related centers are determined the hierarchy based on the hierarchy of these centers, then identified the subordination (central system) and orientation of marketing in terms of space thus forming configuration of effective centers.

2.3. System of agropolitan area

In accordance to RTRWN, development of agropolitan area must support reliable area development. The development of this area must still consider the development of system of activity centers at national, provincial and regional levels. Based on its structure, Agropolitan Area

is distinguished by First Order (Main Farming City), Second Order (Agropolitan District Center or Growth Center), and Third Order (Agricultural Area Unit Center). Each order functions as nodes of collection and distribution services with varying and hierarchical scale also settlement service center. The inter nodes are connected by appropriate transportation network. The First and Second Orders are separated by distance of approximately 35–60 km in accordance to condition of area geography, while the Second and Third Orders are situated in one agropolitan district located approximately 15–35 km from one another (Kimpraswil, 2000).

The existence of settlement centers or cities around an agropolitan area could become alternative area of agricultural product marketing if there is an increase or surplus in agricultural produce and therefore it could increase activity of upstream agribusiness, while in agropolitan area where interactions between cities are limited among others due to restriction in land transportation or the presence of competition of similar commodities from other agropolitan areas, so reinforcement in downstream agribusiness activity (processing of harvest) by extending the production chain of the commodity could be one of the strategies in the development of agropolitan area.

Supporting infrastructure in agropolitan area is generally as follows:

1. Subsystem of upstream agribusiness, infrastructure and facilities provided can be in these forms: kiosks of agricultural production facilities, storage, parking area, and loading area.
2. Subsystem of farming establishment, facilities and infrastructure provided can be in these forms: the provision of raw water (with the availability of irrigation network, retention basin, and artesian well), the provision of clean water (with the availability of piping network and deep well, to cleanse agricultural produce).
3. Subsystem of harvest processing, facilities and infrastructure provided can be in the form of drying area for agricultural produce, storage equipped with preservatives/cooling facilities, and *packing house* for sorting and packaging, including *food service*, also slaughterhouse.
4. Subsystem of produce marketing, facilities and infrastructure provided can be in the form of traditional markets consisting of kiosks, stands, parking area, and loading area, Agribusiness Sub Stations, livestock market, rural-city inter roads, as well as bridges.
5. Subsystem of supporting services, facilities and infrastructure provided can be in the form of public utilities (clean water network, sanitation, waste, drainage, electricity, telephone and internet), public facilities (facilities for health, education, office, worship, recreation and sports, economy such as shopping centers, and green open spaces), institutions (Agropolitan Management Agency, Banking Office, Cooperatives, Agropolitan Business Units), Kasiba and Lisiba (ready to be built area and environment) including supporting facilities, Agropolitan Area Development Policy, and Agropolitan Area Masterplan.

3. RESEARCH METHOD

The study was conducted at Muara Tami District as the agropolitan area of the city of Jayapura. A qualitative approach using descriptive method was conducted to show development of agropolitan area in Muara Tami.

Based on GDRP data, it could be seen whether agriculture sector still gave the highest contribution in the economic development in each area and whether there has been a shift of roles of primary economic sectors into secondary and tertiary which indirectly showed an increase in downstream agribusiness activities in each region. By analyzing data in agricultural sector, potential agricultural product information from each district in the city of Jayapura could be obtained.

After obtaining some idea on agricultural activity profile, identifying infrastructure on each agribusiness subsystem, analyzing questionnaire from each respondent, ideas on level of service of infrastructure in each agribusiness subsystem which affected development of agricultural activities in the area could be obtained.

Analysis of agricultural production was conducted to obtain ideas on chain of agricultural activities from upstream to downstream. The longer the chain could mean the more the number of agribusiness establishments and the more people involved in it also the economic benefit from an agricultural commodity produce would be returned more to the region.

With the estimation of agricultural household population in Muara Tami district in 2013 of around 1293 or approximately 55% from the total number of households in the area (Labok, 2013) so the sample taken was around 130 households (10% of the population).

4. RESULTS AND DISCUSSION

4.1. Agricultural potential of the city of Jayapura

The city of Jayapura has 5 districts, with Muara Tami district as the largest district (626,7 km^2) . According to the data of GDP of the city of Jayapura, the contribution of agricultural sector and processing industrial sector experienced a decrease of contribution towards GDP of the city of Jayapura from 2009 to 2012, and gave a small contribution of under 1% (0,4% and 0,12%) towards the economic growth of the city of Jayapura. The growth of both sectors above would relate directly to the growth of agropolitan area in a certain region.

Table 1: Economic Growth & Contribution of Agricultural Sector and Processing Industry in the City of Jayapura Year 2011-2012 (%)

Sector	Economic Growth		Sector Contribution	
	2011*	2012**	2011*	2012**
Agriculture	7.44	6.31	4.21	3.91
- Crops	2.78	2.62	0.71	0.62
- Plantation crops	2.72	4.83	0.21	0.19
- Livestock farming & produce	3.62	5.73	0.45	0.41
- Forestry	2.54	2.08	0.12	0.11
- Fishery	9.71	7.56	2.73	2.59
Processing Industry	5.29	3.37	3.01	2.75
- Large/medium scale industry	2.15	2.34	1.79	1.64
- Small scale industry / home industry	8.37	4.32	1.23	1.11

Notes: *) number of repairs, **) temporary number
Source: GDP of the city of Jayapura 2013, (BPS, 2013) of the city of Jayapura

Like in any urban area in general, in which the role of tertiary sector is more dominant, GDP of the city of Jayapura also receive the greatest contribution from tertiary sectors also gained the largest contribution from tertiary sector and the smallest contribution from primary sector. If we see the primary sector growth (agriculture) in the city of Jayapura, it could be stated that the development of agropolitan area there decreased.

NTP or Nilai Tukar Petani (Exchange Rate of Farmers) is an indicator used to determine farmers' level of welfare, shown in index ratio received by farmers to the index paid by farmers in percentage. If NTP > 100, it means farmers experience surplus (increase in welfare), NTP = 100, means farmers experience a draw, and NTP < 100 means farmers experience a deficit (decrease in welfare). NTP of Papua in the period of January-December 2014 (base year 2012=100) between 97,43 and 97,83, while the national NTP is in the range of 101,32 to 102,87 (BPS of Papua Province, 2014, 2015). NTP of Papua below 100 showed the lack of welfare of farmers in Papua.

There are a number of financial institutions which supported agricultural activities in Papua, which was considered in the category of micro small, could be small industry in nature, establishments in cultivation fishery and catch fishery were household in nature using equipment ranging from nets to outboard boats, agriculture and plantation of the people established by households with several

hectares of land, and trade with turnovers starting from Rp 100.000 to no more than Rp 7 million per day or 210 million per month (ILO and Bina, 2012).

The position of micro loan according to economic sector, based on Papua in Numbers 2011, year 2010 from total micro loan Rp. 1,6 trillion for 4 economic sectors which gained micro loan in the highest order is trade sector reaching Rp. 427.8 billion (26.1%). The next sector was construction/building reaching Rp. 109.5 billion (6.7%), followed by industrial sector reaching Rp. 48.4 billion (3%) and in the fourth order was service sector reaching Rp. 40.3 billion (2.5%). Micro loan for agricultural sector in the period of 2007 - 2010 experienced a decrease, year 2010 with only Rp. 19.1 billion experienced a decrease to 71.2% compared to year 2009 whose position was Rp. 68.9 billion (ILO and Bina, 2012).

The following tables show data of types and total production of agricultural produce in the city of Jayapura.

Table 2: Total Production according to types of agricultural establishments in the city of Jayapura

No.	Types of Agricultural Establishments	Total Production
1.	Crops*	
	- Cassava	- 8 tons
	- Sweet potatoes	- 7 tons
	- Rice	- 6,52 tons
2.	Horticulture*	
	- Spinach	- 1.400 tons
	- Mustard leaves	- 1.280 tons
	- Kangkung(Ipomoea Aquatica)	- 861 tons
	- Banana	- 1.076 tons
	- Papaya	- 676 tons
3.	Livestock Farming**	
	- Poultry	- 1.611.554 tons
	- Beef cattle	- 668.665 tons
	- Pig	- 107.690 tons
	- Sheep	- 6.299 tons
4.	Fishery**	
	- Marine fishery	- 60.186 tons
	- Freshwater fishery	- 4.325 tons
5.	Forestry**	
	- Sawnwood	- 4.849,5033 m^3
	- Roundwood/Log	- 4.650,797 m^3

Notes: * 2011, **2012
Source: BPS of the city of Jayapura

The following data will show that the District of Muara Tami has superiority in the sector of agriculture compared to the other districts in the city of Jayapura, shown with the total area and result of harvest which was relatively greater compared to the other districts for a number of types of agricultural commodity.

For rice fields, only Muara Tami district has them in the city of Jayapura. The area of rice fields there in the year 2011 was 1.150 Ha, production was 7.489 ton with an average production of 6, 5 ton/Ha. There had been a decline in the area of rice fields because in the year 2010, area of rice fields was 1.349 Ha with a total production of 8.795 ton (BPS of the city of Jayapura, 2013).

Table 3: Area of harvest and production of cassava and sweet potato in the city of Jayapura, year 2011

No.	District	Cassava		Sweet Potato	
		Area of Harvest (Ha)	Production (ton)	Area of Harvest (Ha)	Production (ton)
1.	Abepura	30	240	32	224
2.	Jayapura Selatan	23	184	29	203
3.	Jayapura Utara	25	200	25	175
4.	Muara Tami	37	296	48	336
5.	Heram	26	208	15	105
Total 2011		141	1.128	149	1.043
Total 2010		122	976	135	945

Source: BPS of the city of Jayapura

Table 4: Area of harvest and production of corn and peanut in the city of Jayapura, year 2011

No.	District	Corn		Peanut	
		Area of Harvest (Ha)	Production (ton)	Area of Harvest (Ha)	Production (ton)
1.	Abepura	9	27.9	5	10
2.	Jayapura Selatan	0.5	4.65	-	-
3.	Jayapura Utara	-	-	-	-
4.	Muara Tami	110	341	7	14
5.	Heram	7	21.7	-	-
Total 2011		126.5	395.25	12	24
Total 2010		381	1.180	92	124

Source: BPS of the city of Jayapura

Table 5: Area of harvest and production of Soybean and Mungbean in the city of Jayapura, year 2011

No.	District	Soybean		Mungbean	
		Area of Harvest (Ha)	Production (ton)	Area of Harvest (Ha)	Production (ton)
1.	Abepura	1	1.5	0.2	0.75
2.	Jayapura Selatan	-	-	-	-
3.	Jayapura Utara	-	-	-	-
4.	Muara Tami	2.1	3	1.0	1.5
5.	Heram	-	-	-	-
	Total 2011	3.1	4.5	1.2	2.25
	Total 2010	27	40	30	45

Source: BPS of the city of Jayapura

Table 6: Total population of fowls in the city of Jayapura, year 2012 (in number)

No.	District	Ras chicken	Non ras chicken	Duck
1.	Abepura	348.565	6.685	62
2.	Jayapura Selatan	23.237	446	16
3.	Jayapura Utara	11.619	668	10
4.	Muara Tami	679.131	8.913	126
5.	Heram	81.332	5.571	22
Total 2012		1161.884	22.282	236
Total 2011		25.589	12.653	250

Total 2010	18.349	14.440	152

Source: BPS of the city of Jayapura

Table 7: Total population of livestock in the city of Jayapura, Year 2012 (in number)

No.	District	Cow	Goat	Pig
1.	Abepura	453	434	3.819
2.	Jayapura Selatan	3	73	170
3.	Jayapura Utara	-	30	679
4.	Muara Tami	4.529	651	2.122
5.	Heram	102	260	1.696
Jumlah Total 2012		5.087	1.447	8.486
Jumlah Total 2011		5.021	1.396	4.362
Jumlah Total 2010		3.663	931	5.564

Source: BPS of the city of Jayapura

Table 8: The total fishery household in the city of Jayapura, Year 2012

No.	District	Marine	Inland	Total
1.	Abepura	99	116	215
2.	Jayapura Selatan	378	42	420
3.	Jayapura Utara	504	26	530
4.	Muara Tami	67	715	782
5.	Heram	-	72	72
Total 2012		1.048	971	2.019
Total 2011		62	278	340
Total 2010		524	694	1.218

Source: BPS of the city of Jayapura

The number of agricultural business households in the city Jayapura is 6.507 households (Agricultural Census 2013) and the majority of the people of Muara Tami district are farmers. With this characteristic, villages and sub districts in Muara Tami district are areas of centers for agricultural produce (agropolitan area) with Kelurahan West Koya which has relatively more complete infrastructure to become production centers, while Abepura district, where Youtefa Market is located, is a big city, and other districts in the city of Jayapura are the marketing area.

Area scope of Muara Tami district which consists of 8 administrative areas, i.e. 2 (two) sub districts and 6 (six) villages, based on each area characteristics compared to the characteristics of division of area spatial function according to Agropolitan concept, is divided into several spatial functions as follows:

a. Area of Order 3 (Agricultural Area Unit Center) covering Kelurahan Koya Timur and Koya Barat. Only this two sub district that has irrigation service so far so that agricultural activities in the area are higher than other villages.
b. Area of Order 2 (Main Village/Agropolitan Center) is Kelurahan Koya Barat.
c. Area of Order 1 (Center of Agropolitant/Agropolis Area) is Abepura district, especially Youtefa Market. It is a regional scale market whose area reaches is not only to serve people in the city of Jayapura, but also serving people from the surrounding regencies (Keerom Regency and Jayapura Regency). The distant of area of order 1 to the area of order 3 is quite near, which is approximately 18, 6 km.

There have not been many urban areas around the city of Jayapura while this city is the main city in Papua Province with the highest total population. The city of Jayapura is the main marketing area of agricultural produce from Muara Tami district but it is also available for trade from out of town so that there is a competition between local products and products from other places. In rice product for instance, where there is a decrease in production in Muara Tami, while the need for rice

for the people of the city of Jayapura is quite high so that it still needs to be bought from outside of Papua, showing that local products are not as competitive as product from outside of the area.

4.2. The Condition of infrastructure supporting agricultural sector

Muara Tami district which is within the administrative area of the city of Jayapura is one of the areas included in the strategic plan of the Department of Public Works regarding the provision of physical infrastructure supporting agricultural activities, such as roads and irrigation network. Irrigation area in Muara Tami district is known as Koya Irrigation Area. The activity of development plan of irrigation network and irrigation area was started in the budget year of 1992/1993 and is still in progress at present. One of aims of the construction of Koya Irrigation Area is to support agricultural program with an area of 5000 Ha and at present there is only around 20% of land that is watered. Koya Irrigation Area located in the administration borders of Muara Tami district of the city of Jayapura geographically situated between $2^0$41'-$2^0$46' South Latitude and $145^0$21'-$145^0$33' East Longitude.

Table 9: Technical data of koya irrigation

Area of Land	± 3.800 Ha
Total of Tertiary Lot	86 Blok
Length of Primary Channel	2.400 m
Length of Secondary Channel	51.314 m
Length of Tertiary Channel	156.472 m
Length of Disposal Channel	69.442 m
Building for Sections/Tapping	43 bh
Gutter	4 bh
Culverts	21 bh
Other Water Constructions	3 bh
Complementary Buildings	22 bh
Inspection Road	61.124 m

Source: River Area Office of Papua

For the achievement of the use of infrastructure in Irrigation Area in the city of Jayapura until the year 2014, it can be seen in the following table.

Table 10: Achievement of the use of infrastructure in Irrigation Area in the city of Jayapura

No.	Name of area irrigation	Activities	Location (Regency, District, & Village)	Output		Outcome	
				Vol.	Unit (m)	Vol.	Unit (Ha)
1	DI Koya (5.000 Ha)	Rehabilitation of Irrigation Channel DL. Koya Paket I	Jayapura, Muara Tami, Kp. Koya Timur	6.000	M	525	Ha
2	DI Koya (5.000 Ha)	Rehabilitation of Irrigtaion Channel DL. Koya Paket II	Jayapura, Muara Tami, Kp. Koya Timur	6.000	M	525	Ha
3	DI Koya (5.000 Ha)	Rehabilitation of Irrigation Channel DL. Koya Paket III	Jayapura, Muara Tami, Kp. Koya Timur	1.500	M	525	Ha
4	DI Koya (5.000 Ha)	Rehabilitation of Irrigation Channel DL.	Jayapura, Muara Tami, Kp. Koya Barat	1.500	M	551	Ha

		Koya Paket IV					
5	DI Koya (5.000 Ha)	Rehabilitation of Irrigation Channel DL. Koya Paket V	Jayapura, Muara Tami, Kp. Koya Barat	1.500	M	551	Ha

Source: The department of Public Works of the province of Papua

In table 10. It can be seen that the road condition in Muara Tami district is generally considered extremely bad and not so bad (86,5%), while the rest at only 13,5 % are considered to be still in good condition, in which only in 5 road segments(13,5%), covering Nabire St. (Koya Barat St.), Paniai St. (Koya Barat St.), Transad St. (Village Hall/Community Health Center), Skouw Mabo St. (District's Office), dan Skouw Mabo St. (Military guard post).

Table 11: Road infrastructure condition in muara tami district

No.	Name of the road	Name of the end of the road	Start node	End node	Length of the road (Km)	Width (m)	Condition
1.	Koya Barat St.		Koya Tengah	Koya Tengah	7.50	4.00	S
2.	Wamena St.		Koya Barat St.		0.73	3.50	RB
3.	Jayapura St.		Koya Barat St.		0.59	3.50	S
4.	Merauke St.		Koya Barat St.		1.32	3.50	S
5.	Nabire St.		Koya Barat St.		0.72	3.50	B
6.	Nabire I St.		Nabire St.	Demba St.	0.28	3.50	S
7.	Nabire II St.		Nabire St.	Fakfak St.	0.54	3.50	S
8.	Paniai St.		Koya Barat St.		0.60	3.50	B
9.	Demba St.		Koya Barat St.		0.71	3.50	S
10.	Yapen St.		Koya Barat St.		0.59	3.50	RB
11.	Fakfak St.		Koya Barat St.		0.74	3.50	RB
12.	Timika St.		Koya Barat St.		0.58	3.50	RB
13.	Biak St.		Koya Barat St.		0.71	3.50	S
14.	Sorong St.		Koya Barat St.		0.60	3.50	S
15.	Koya Timur St.		Poros Koya Timur St.	Poros Koya Timur St.	12.00	3.50	S
16.	Cimpedak 1 St.		Poros Koya Timur St.		0.91	3.50	RB
17.	Cimpedak 2 St.		Poros Koya Timur St.		0.47	3.50	S
18.	Cimpedak 3 St.		Koya Timur I St.		0.61	3.50	S
19.	Durian 1 St.		Poros Koya Timur St.		0.79	3.50	RB
20.	Durian 2 St.		Poros Koya Timur St.		0.59	3.50	RB
21.	Durian 3 St.		Koya Timur I St.		0.61	3.50	S
22.	Jambu 1 St.		Poros Koya Timur St.		0.67	3.50	RB
23.	Matoa St.		Koya Timur I St.		0.69	3.50	RB
24.	Sawo St.		Poros Koya Timur St.	The Tehupa Curch	1.97	3.50	S
25.	Transad St.	Souw Sae	Village hall/Community Health Centre		2.30	5.00	B

26.	Skouw Mabo St.	Skouw Yambe	District's Office	Skouw Cemetery	5.60	6.00	B
27.	Muara Tami St.		Nasional St.	Muara Tami Dam	3.00	6.00	RB
28.	TPU Koya Barat St.		Nasional St.	TPU Koya Barat	3.50	6.00	S/R
29.	Koya Koso St.	Koya Barat	Military guard post Km.9	Koya Barat	4.50	6.00	S/R
30.	Skouw Mabo St.	Skouw Sae	Pos TNI Kopassus	Kampung Skouw Sae	2.30	6.00	B
31.	Penghubung Koya Barat St.	Koya Timur	Poros Koya Barat	Poros Koya Timur	5.00	6.00	S/R
32.	Koya Tengah St.		Gateway	SMP 3 Koya	5.00	6.00	S/R
33.	Holtekamp St.		SMP 3 Koya	Military guard post	10.6	6.00	RB
34.	Holtekamp I St.		Jl. Holtekamp	Dead end	0.71	3.50	S/R
35.	Holtekamp II St.		Holtekamp I St.	Holtekamp St.	0.80	3.50	S/R
36.	Holtekamp III St.		Holtekamp I St.	Holtekamp II St.	0.56	3.50	S/R
37.	Moso St.		Perbatasan RI-PNG St.	Kampung Moso	0.50	4.5	S/R

Keterangan: Condition B = Good, S = Medium, R = Damaged, RB = Heavily Damaged, S/R =Medium/Light Damaged
Note: The condition of the road can change from medium to heavily damaged if the road repairs come lately
Source: The department of Public Works of the city of Jayapura

Types, total number, and condition of infrastructure supporting agricultural sector in Muara Tami district can be seen in the following table. The level of services is the average opinion of respondents in the area.

Table 12: Condition of infrastructure supporting agricultural sector in muara tami district agropolitan area

No.	Type of infrastructure	Location	Level of service
A.	Upstream Agribusiness		
1.	Kiosks of agricultural production facilities sellers (seeds, fertilizers, hoes, etc)	Abepura district	Good
2.	Storage house of seeds/seedlings		Good
3.	Parking area		Good
B.	Primary Farming Business		
1.	Irrigation network	West Koya & East Koya	Quite good
2.	Raw water source & network	Tami River	Good
C.	Downstream Agribusiness Harvest Processing		
1.	Drying area of harvest	Koya Area	Quite good
	Marketing of Produce		
1.	Agribusiness sub station	West Koya	Not Functioning
2.	Rural-city transportation		Good
3.	Rural-city roads/bridges	Youtefa-West Koya	Good
4.	Regional markets	Youtefa Market	Good

D.	Settlement/Supporting Facilities	
1.	Clean water	Quite Good
2.	Sanitation	Good
3.	Waste disposal	Quite Good
4.	Telecommunication	Good
5.	Drainage	Good
6.	Electricity	Baik
7.	Internet	Quite Good
8.	Health facilities	Good
9.	Educational facilities	Good
10.	Worshipping facilities	Good
11.	Economic facilities	Good
12.	Recreation & sports facilities	Good
13.	Cooperatives	Good
14.	Banking/loans	Good
15.	Information institution	Good
16.	Farmers society	Good

Source: Survey result, 2015

Referring to the table above, except for supporting services infrastructure which are relatively more complete, the average agricultural subsystem in location of study are not yet equipped with complete infrastructure, especially downstream agribusiness subsystem which has very limited infrastructure. Visually, the conditions of settlements in Muara Tami district are still very much different compared to the condition of settlement in urban area. The physical differences between Muarara Tami and other districts in the city of Jayapura are quite clear, in which Muara Tami is still considered rural while other districts are urban area with relatively better and more complete facilities. The rate of service of several basic facilities to support the people's lives in Muara Tami still has to be improved, among others, road network, clean water network and waste. However the majority of respondents who are residents of Koya think that the average rate of infrastructure service in the area has been satisfactory so that they are considered to be able to live in this kind of settlement condition or it can be said that they are less critical in attitude towards development in their own region.

The existing irrigation network is still functioning and there is an irrigation rehabilitation program from related agency. The performance of farmers in the area is very much depended on the performance of the government, one of which in conducting irrigation network rehabilitation. Land of 500 hectares in West Koya experienced delay in planting from January to March 2014 due to secondary irrigation channel which suffered from becoming shallow (government of kelurahankoyabarat/26-03-2014).

Agribusiness Sub Station in Kelurahan Koya Barat was not functioning because generally buyers buy directly from farmers and transport them directly to cities or farmers take their harvest directly to Youtefa Market in which the distance between area of order 3 and 1 is quite near or can be travelled in approximately 30 minutes.

One of the institutional organizations supporting development of agricultural sector in Muara Tami district is organization of Perkumpulan Petani Pemakai Air (P3A)/Society of Water User Farmers. The number of P3A societies in Muara Tami district is 28 units. From the quantity, the total number of farmer societies in Muara Tami district can support development of agricultural sector in the area; however, what is actually more important is in the quality of the societies. What have been done by each farmer society in the area to improve the agricultural activities has not yet been significant.

Other organizations which are also involved in agricultural activity is financial institution. Result of survey showed that approximately 41.79% of farmers in Muara Tami district obtained capital through loan from cooperatives/bank/KPR/other financial institutions/other parties, and 58.21% of farmers use family savings.

4.3. Agribusiness chain

Result of survey showed that the majority of farmers (46.91%) in Muara Tami district sell their harvest to buyers who come to their place, around 38.27% of farmers sell their harvest by themselves to the market, and 14.81% of farmers sell to collectors in the markets. Approximately 84% of farmers in Muara Tami district sell their harvest produce directly without giving any special processes first and only 1.45% of farmers process or pack beforehand, other harvest produce is sold through business units and for own consumption.

Agricultural product processed still implements simple processing technology. After harvest, generally rice is sun-dried to reduce water content so it can keep longer to be sold afterward. Cassava and sweet potatoes are usually directly sold to markets or to collectors coming to their villages. A number of other types of horticulture are generally directly sold to markets or to collectors.

Besides the potential of crops, Muara Tami district also has fishery potential, especially freshwater fishery. Fish cultivation ponds can be found in Koya Barat dan Koya Timur with main source of water from irrigation flow of Tami Dam as well as Central Koya which rely on rainwater since irrigation water is not flowed into the area any longer. Besides direct marketing, a number of processing establishments are appearing in West Koya and East Koya, in the form of ponds for fishing recreation at the same time functioning as restaurants, some are even equipped with accommodation. These recreational fishing ponds are visited by many tourists from the surrounding areas (other districts in the city of Jayapura) on holidays.

Based on the result of Agricultural Census, 2013, there were 165 households in the city of Jayapura which carry out agricultural produce processing establishments. One household is simply able to process more than one type of agricultural produce. Most of the households obtain source of main raw materials of their production not from Muara Tami district, due to the consideration of quality, quantity, and price. For example, business owners of cassava processing (cassava chips) in the city of Jayapura obtain their raw materials from Sentani area because of its better quality. Business owners of ‘mujair’ fish and salad restaurants in the city of Jayapura get fish from the cities of Makassar and Surabaya because of its reliability on shipment with certain quality.

Table 13: Number of agricultural establishment households conducting processing of agricultural produce in the city of Jayapura

No.	Types of Agricultural Produce	Number of Households
1	Crops	28
2	Horticulture	51
3	Plantation	44
4	Livestock Farming	30
5	Fisheries	17
6	Forestry	10

Source: Agricultural Census, 2013

5. CONCLUSIONS

Various data show that there has been a decrease in agricultural activities in the city of Jayapura. The rate of growth and contribution from agricultural sector decreased towards PDRB, NTP of Papua which is below 100, a decrease in micro loan in agricultural sector, and the area of rice fields

which is actually decreasing, showed the decrease in the development of agropolitan area in the city of Jayapura.

The hierarchy of functional space of agropolitan area in the city of Jayapura covers Kelurahan Koya Barat and Koya Timur in Muara Tami district as order 3 area, Kelurahan Koya Barat as order 2 areas, and Youtefa Market in Abepura district as order 1 area. The city of Jayapura is the main marketing area but it is also open for trading of agricultural produce from out of town. Superior agricultural commodities from Muara Tami district are rice, cash crops/second crops, vegetables, fruit and livestock produce.

Except in supporting sector infrastructure, the agropolitan area agricultural subsystem one in Muara Tami district is not yet complete, especially in downstream agribusiness subsystem, and in order to improve this, great efforts from the government and local people are needed, in the form of policies and continuous community empowerment program. If downstream agribusiness subsystem is improved for instance, agricultural activities in Muara Tami can form a long agribusiness chain so it can also increase the agricultural activities in the upstream part. This length of agribusiness chain also shows the level of creative and innovative initiatives of the farmers so that indirectly it shows the level of empowerment of people. Reinforcement in downstream agribusiness activities is important considering how limited the marketing area of agricultural commodities in the province of Papua is and also the presence of competition between local products and products from outside of the city of Jayapura.

One thing to be considered by the government is that the concept of agropolitan area is emphasized on the interrelation of activities in agricultural sector between regions within certain area (territorial interaction), not only in the physical development (irrigation and roads for instance), and this interaction will depend on the quality of its human resources. Policies to be taken by the government is to intersect the needs of local markets with ability to support area of local agricultural produce through development programs based on farmers empowerment.

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