

THE DEVELOPMENT STUDY OF AGROPOLITAN REGION TO OPTIMIZE NATURAL RESOURCES POTENTIAL IN PADANG PARIAMAN

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Abstract: *One of the efforts to optimize the agriculture resources and to develop the economic growth in rural areas is through the concept of the agropolitan region development. Padang Pariaman Regency has potential to be developed as agropolitan region which is supported by superior agriculture commodities. In order to develop agropolitan region in Padang Pariaman, it is required to formulate a development concept. The objective of this study is to formulate the development concept of Sungai Geringging agropolitan region in Padang Pariaman Regency.*

The study has been conducted from July to October 2014 in Sungai Geringging District and its surrounding. The variables of study consist of the characteristics of (1) the internal region and (2) the external region. The collecting data methods used in this study are : field survey and literature studies. This study is carried out by using descriptive analysis method that consist of potential and superior commodities analysis, agribusiness system analysis, and analysis of spatial structure and land use pattern.

The results of this study showed that Sungai Geringging and its surrounding are potential to be developed as an agropolitan region in Padang Pariaman Regency. The results of the descriptive analysis will be used as a basis for the development concept of Sungai Geringging agropolitan region in Padang Pariaman Regency.

Keywords: *Agropolitan region, rural area, superior agriculture commodity, Padang Pariaman Regency.*

1. INTRODUCTION

To optimize the utilization of natural resources, especially agricultural development, it is necessary to have a regulation approach which would serve as guidelines in managing an area of agricultural production centers. The approach that can be applied here is agropolitan development approach. This approach

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needs to be carried out, so that the development stakeholder can utilize existing land for various agriculture activities. The management of agropolitan space is belongs to policy and strategy of space utilization that allocated for agriculture, plantation, animal husbandry, fisheries and other agriculture based businesses.

Padang Pariaman Regency is one of regencies in West Sumatra Province which has the potential of natural resources to be developed as agropolitan region supported by superior agriculture commodities. Based on RTRW Padang Pariaman 2010 - 2030, in Padang Pariaman Regency is planned to be developed as an agropolitan region located in Sungai Geringging areas. The Sungai Geringging agropolitan region covers 9 districts, namely : Sungai Geringging, V Koto Kampung Dalam, IV Koto Air Malintang, Sungai Limau Batang Gasan, V Koto Timur, Patamuan, Padang Sago and VII Koto Sungai Sarik.

In order to realize the plan, it is required a development study of Sungai Geringging agropolitan region concept, so that the application of the concept in Padang Pariaman Regency will be able to have a positive impact on natural resource management, especially in agriculture sector

2. LITERATURE REVIEW

Agropolitan concept was introduced firstly by Friedman (1975). He had stated that agropolitan model offers a spatial framework for rural development and it is based on the idea of accelerated rural development oriented to human needs with a more equitable distribution of economic benefits, the direct movement of local people in the process of development and growth based on the activation of rural people, agriculture and resources. There are various definitions of agropolitan. Combining the various definitions, Dardak (2007) concluded that the term agropolitan can be defined as follows:

- An Agropolitan region is a region based on a functional system that consists of one or more agricultural-based urban areas (agropolis) in a particular agricultural producing region, which is in turn characterized by the existence of a functional linkage system and a spatial hierarchy of settlements, productive units and agrobusiness systems. This region can be created with or without formal planning.
- An agropolis is a central location that serves the surrounding agricultural-based economic activities centers.
- Agropolitan development is a rural development approach that features the development of agricultural-based urban areas (Agropolis) as a part of an urban system, with the objective of creating a balanced regional development through a synergetic rural-urban linkage.

According to Dardak (2007) the objectives of Agropolitan development within the context of interregional development as follows:

- Creating balanced rural-urban development;
- Improving the synergetic rural-urban linkages;
- Developing the economy and environment of agricultural-based rural settlements;
- Growth and revitalization of small urban centers;
- Diversification and widening of income and welfare bases;
- Realizing an autonomous and self-reliant rural area;
- Filtering the excessive rural-urban migration (contributes to solving urban social problems);
- Recovering the natural resources and environment;
- Developing leading processed agricultural commodities;
- Providing adequate settlement' infrastructure and facilities to an urban standard;
- Providing adequate production infrastructure and facilities that are accessible to the local people.

Furthermore, Dardak (2007) wrote the list of the criteria in determining the characteristics of an Agropolitan development region as follows:

- Agropolitan regions should:
 - Possesses adequate carrying capacity including suitability of soil and agro-climate,
 - Have leading processed agricultural commodities,
 - The sizes of the area and population should meet the requirement for economic scale (ideally with a radius of up to 10 km and may consist of villages from one or up to three different sub-districts),
 - Urban settlement infrastructure and facilities,
 - Have production infrastructure and facilities that are accessible to the local people
 - Contain one or more small scale urban function centers that are integrated functionally with the surrounding agricultural producing areas,
 - Have management systems with adequate autonomy,

- Have a planned and controlled spatial arrangements system,
- Enable the development of secondary (manufacturing) and tertiary (services) sectors,
- Have strong local community economic institutions,
- Have adequate access to economic resources for the local people
- Criteria for an Agropolis (Agricultural-Based Urban Growth Center)
 - The center of settlements with the highest accessibility internally (with other areas within the Agropolitan region) and externally (with other urban centers),
 - The center of activities for processing and distribution of farm produce, which is characterized by the concentration of agro-business facilities and institutions.

Study on agropolitan development concept to foster rural area development and to cope with rural poverty has been conducted in developing countries, such as Indonesia (Pranoto, *et al.*, 2006; Prasetya *et al.*, 2014; Widodo & Safariah, 2014), and Malaysia (A. Buang *et al.*, 2011; Shaffril, *et al.*, 2010).

3. METHODOLOGY

Study Area

This study is conducted in Padang Pariaman Regency. Delineation of study area covers nine districts as is shown in Figure 1.

Framework

The Framework of this study is depicted in Figure 2. This framework developed as a guideline of analysis steps.

Analytical Method

The study has been conducted from July to October 2014 in Sungai Geringging District and its surrounding. The variables of study consist of the characteristics of (1) the internal region and (2) the external region. The collecting data methods used in this study are: field survey and literature studies. This study is carried out by using descriptive analysis method that consist of potential and superior commodities analysis, agribusiness system analysis, and analysis of spatial structure and land use pattern.

Figure 1: Map of Study Area

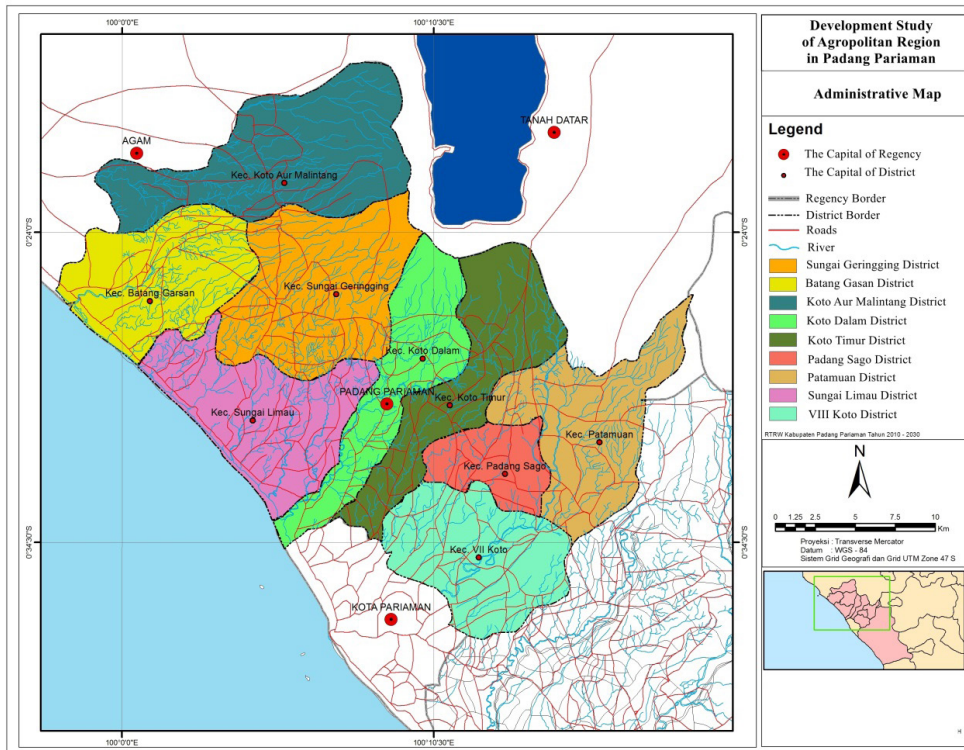
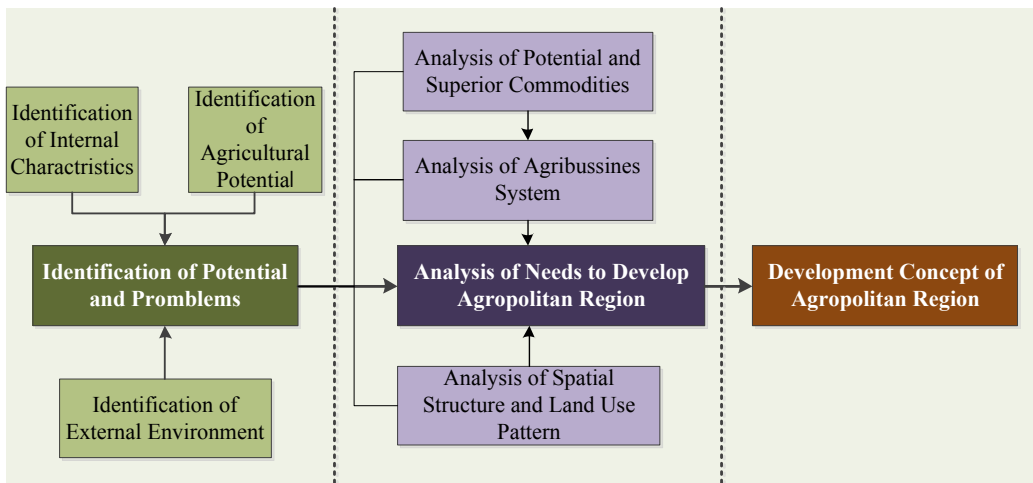


Figure 2: Framework



4. RESULT AND DISCUSSION

Identification of Potentials and Problems

Based on the identification of internal characteristics, external environment, and agricultural potential, it can be identified the potential and problem aspects in order to develop Agropolitan region in Sungai Geringging and its surrounding. The potential and problem aspects can be shown in Table 1-2.

Table 1
The Potential Aspects

<i>No</i>	<i>Aspect</i>	<i>Description</i>
1	Land	<ul style="list-style-type: none"> • Agro-ecosystem suitability for food crop, cacao, coconut and beef cattle • Land availability for cacao • Land for cacao plantation can be extended
2	Product and production	<ul style="list-style-type: none"> • Has potential for cacao diversification product • Has potential for cacao processing industry
3	Human resources	<ul style="list-style-type: none"> • Labor from farmer family still available
4	Technology	<ul style="list-style-type: none"> • Intercropping cacao and coconut needs to be developed • Mixed farming between beef and cacao plant • Demonstration plot for speeding up technology transfer to farmers.
5	Marketing	<ul style="list-style-type: none"> • Marketing cacao is guaranteed • The scope of local and regional cacao marketing
6	Infrastructure	<ul style="list-style-type: none"> • Good transportation will support the marketing
7	Policy	<ul style="list-style-type: none"> • There are some supports from district, provincial and even national level.

Table 2
The Problem Aspects

<i>No</i>	<i>Aspect</i>	<i>Description</i>
1	Product and production	<ul style="list-style-type: none"> • Low productivity of cacao • Low quality of cacao production • Pest and diseases problem • Some agricultural products still cultivated by the household scale business-oriented.

<i>No</i>	<i>Aspect</i>	<i>Description</i>
3	Human resources	<ul style="list-style-type: none"> • Low motivation of the farmer to look after the plantation and low product diversification. • To master and apply the technology is low.
4	Technology	<ul style="list-style-type: none"> • Low used of high yield variety • Lack of farming technology (less of fertilizer, less control of pest and diseases and less pruning).
5	Marketing	<ul style="list-style-type: none"> • Consumer need high quality of products • In order to compete with other producer, need to increase both productivity and also quality. • There is no agro-business terminal yet.
6	Infra-structure	<ul style="list-style-type: none"> • The irrigation facility is still limited.
7	Institution and capital	<ul style="list-style-type: none"> • Lack of capital to buy fertilizer and other agriculture inputs. • Finance institution is still inadequate

Analysis of Potential And Superior Commodities

Recently, the main programme of agriculture development in Padang Pariaman Regency is to develop plantation crops. In year 2013, there was a research cooperation that carried out by Regional Development Planning Board of Padang Pariaman Regency and Assessment Institute for Agricultural Technology of West Sumatera Province about agricultural superior commodities in West Sumatera. The results showed that the agricultural superior commodities which will be developed were coconut, cacao, cinnamon, and rubber. Planting area and production of those commodities is shown in Table 3.

Table 3
Planting Area And Production of Coconut, Cacao, Cinnamon and Rubber

<i>No</i>	<i>Commodity</i>	<i>Area (Ha)</i>	<i>Production (Ton)</i>
1	Coconut	41.554	36.446
2	Cacao	17.894	15.539
3	Cinnamon	4.528	5.783
4	Rubber	3.088	2.670

In an effort to develop Sungai Geringging agropolitan region, an analysis to determine which commodities that will be developed is needed to be conducted.

There are two types of commodity that must be determined, potential commodity and superior commodity. The aspects that are considered in this determination are the LQ analysis result, the amount of farm households for each commodity, and the production of commodity. Based on those three aspects, the potential commodity and superior commodity in each district can be determined as shown in Table 4.

Table 4
Potential and Superior Commodity

No	District	Commodity	
		Superior	Potential
1	VII Koto Sungai Sariak	Paddy, Beef Cattle, Cacao	Coconut, Goat, Broiler Chicken, Free-range Chicken, Papaya, Cassava, Corn, Freshwater Fish, Saltwater Fish
2	Patamuian	Cacao, Beef Cattle, Rubber	Horticulture (papaya, jackfruit), Freshwater Fish, Saltwater Fish
3	Padang Sago	Cow, Rubber	Corn, Cassava, Free-range Chicken
4	V Koto Kp. Dalam	Paddy, Cacao, Coconut, Beef Cattle	Free-range Chicken, Corn, Saltwater Fish, Horticulture, Broiler Chicken, Goat, and Freshwater Fish
5	V Koto Timur	Beef Cattle	Goat, Horticulture (Banana, Durian, Jackfruit)
6	Sungai Limau	Cacao, Coconut, Beef Cattle	Cassava, Saltwater Fish, Banana, Broiler Chicken, Goat
7	BatangGasari	Coconut	Horticulture, Free-range Chicken, Cassava
8	Sungai Geringging	Paddy, Cacao, Coconut, Beef Cattle	Free-range Chicken, Goat, Freshwater Fish, Rubber, Corn, Holtikultura, Areca Nut
9	IV Koto AurMalintang	Paddy, Cacao, Coconut, Rubber, Beef Cattle	Free-range Chicken, Corn, Freshwater Fish

Analysis of Agribusiness System

Agropolitan is a farming region that grew and developed as the system through agribusiness and able to serve and support agricultural development activities (agribusiness) in surrounding area (Prasetya *et al.*, 2014). Analysis of agribusiness system is needed in the process to formulate the agropolitan development concept

of Sungai Geringgong region. This analysis will be described in five sub-system analysis:

- Upstream agribusiness sub-system
- Sub-system of farming system
- Processing sub-system
- Sub-system of marketing
- Sub-system of support services.

Upstream Agribusiness Sub-system

Upstream agribusiness sub-system or supply sub-system of agriculture input/production facilities, covers all economic activities to produce and distribute production facilities required in the process of farming. The supply condition of Sungai Geringgong agropolitan region is still inadequate, such as:

- Availability of seeds, especially seeds of rice, corn, and cacao are still limited
- Lack of information on seed technology
- Provision of agricultural inputs such as fertilizer, pesticides and tools and agriculture machinery are still limited, due to lack of capital to run the business.

Sub-system of Farming System

Sub-systems on farm or plant culture is production activities using the production inputs supplied by upstream agribusiness sub-system and specific technology that match with local condition to generate competitive primary commodities. Based on productivity rate, the productivity of paddy, corn, coconut, and cacao are still relatively low.

Cacao plants is suitable to be planted in the regency of Padang Pariaman because based on the agro-ecosystem is appropriate. Cacao crop is mostly grown intercropped with coconut plants, while the rest is cultivated as monoculture or mixed farming. The Opportunities to expand cacao plantation is still very high, especially in the existing coconut plantations. However, the productivity of the cacao plant is still low.

Processing Sub-system

Processing sub-system is the whole process of economic activity to process all of on-farm activities to produce among processed products and the final processed

product. In the processing system, both potential and excellent commodities have not been supported by the efforts of post-harvest processing. For example the superior commodity of cacao is still sold in the form of dry cacao beans. In addition, the efforts to make fermentation of cacao beans are still very low. To create adding value of cacao can be done through the post-harvest processing technique.

Sub-system of Marketing

Sub-system of marketing includes about distribution, promotional, market information, trade policy, market structure, and marketing of primary commodities produced by farmers. Coconut and cacao marketing is still carried out simply, such as:

- marketing is carried out by traders who come to the farms directly then sold to the wholesalers in the capital of Sungai Geringging District,
- farmers directly sell their products to wholesalers in the capital of Sungai Geringging District.

Sub-system of Support Services

Sub-system of support services covers all activities to optimize the operation of the four sub-systems. A few support activities are already available in Sungai Geringging agropolitan region, however, there are many support services that should be provided in order to the develop agropolitan region.

Analysis of Spatial Structure And Land Use Pattern

Analysis of spatial structure and land use pattern are required to be conducted in order to determine the center of agropolitan region and development area units. Based on agropolitan concept, the determination of Sungai Geringging agropolitan region is directed to optimize its natural resources potential, especially agriculture resources.

There are five variabels that used in spatial structure analysis, they are:

- a. Number and density of population
- b. Accesibility
- c. Economic facilities
- d. Sosial facilities
- e. Farm households.

Each district in Sungai Geringging agropolitan region is assessed by giving score to those variable respectively. The scoring of those variables for each district can be shown in Table 5.

Table 5
Scoring

No	District	Score of Each Variable					Total Score
		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	
1	VII Koto Sungai Sariaak	5	5	3	5	4	22
2	Patamuan	3	2	2	2	3	12
3	Padang Sago	2	1	1	2	2	8
4	V Koto Kp. Dalam	4	3	2	4	4	17
5	V Koto Timur	3	4	4	4	2	17
6	Sungai Limau	5	3	2	4	4	18
7	BatangGasan	2	2	1	2	2	9
8	Sungai Geringging	5	5	5	5	5	25
9	IV Koto AurMalintang	4	4	1	3	3	15

The result of this scoring is used as basis to formulate the spatial structure in Sungai Geringging agropolitan region. Further, to formulate spatial structure, transportation network analysis is also needed to be conducted, because it is related to agropolitan region accesibility. Prasetya, et. al. (2014) stated that one of the crucial factor for agropolitan function of an area is accesibility. The better accessibility in Agropolitan area will improve the welfare of farmers and increase production of the Agropolitan area (Rodrigue, 2004, in Prasetya et al., 2014).

In Sungai Geringging agropolitan region, the transportation network has been supported by adequate local public transportation, even the capital of Sungai Geringging District has been passed by regional public transportation. Although all of areas in Sungai Geringging have already connected by network roads, however there are some areasthat still have damaged roads. There is also lack of vehicles to support people mobility and to support distribution of agricultural products. It is certainly hamper the efforts to develop Sungai Geringging agropolitan region, so there needs to do many improvements.

Based on land use pattern aspect, Sungai Geringging agropolitan region is dominated by agricultural land use. The settlement land use is still rural settlements. They spread to all nagari (villages) in Sungai Geringging agropolitan region. The settlements located along regional roads have a higher intensity of activity than others.

The Development Concept of Sungai Geringging Agropolitan Region

Agropolitan region is characterized by an agriculture region that grows and develops with agribusiness system. This agribusiness system is expected to serve and foster the agricultural development activities in agropolitan region and its surrounding area.

Agribusiness Development Plan System

Development Plan of Upstream Agribusiness Sub-system

The development plan of upstream agribusiness sub-system in Sungai Geringging agropolitan region includes planning the provision of excellent seeds, seeding, fertilizing, as well as planning the provision of tools and agricultural machinery. Some efforts to strengthen the agribusiness upstream sub-system is planned by procurement and distribution of the production inputs: seeds, fertilizers, pesticide, tools and agriculture machinery. Efforts of procurement and distribution of production inputs should be supported by improving the accessibility of farmers to get the production facilities.

Development Plan of Sub-system of Farming Systems

In general the development plan of sub-system of farming systems is related to the plan of:

- Farmers empowerment both from the aspect of technology and increased motivation
- The development of technology in the form of demonstration plots to accelerate technology transfer to farmers.
- Development of infrastructure.

Development Plan of Processing Sub-system

In order to increase the added value of the yield from agricultural cultivation, post-harvest processing is required. Post-harvest development includes:

- Promote the use tools and agriculture machinery for harvest and post-harvest to speed up the process of harvest and post-harvest; and to lower the yield loss at harvest and post-harvest
- Use of foodbarn
- Diversification of post-harvest products
- To conduct of fermented cacao beans

- Built infrastructure to support agro-processing
- Built post-harvest industry of cacao
- The development of the coconut processing industry

Spatial Planning of Sungai Geringging Agropolitan Region

To develop the integrated agropolitan region, an appropriate of spatial planning is needed. This consists of spatial structure planning and land use pattern planning.

Spatial Structure Planning of Sungai Geringging Agropolitan Region

Spatial structure planning of Sungai Geringging agropolitan region consists of planning for agropolitan center, secondary agropolitan centers, hinterland, and transportation network. Spatial structure of agropolitan region in Sungai Geringging is integrated within spatial structure plan of Padang Pariaman Regency. The spatial structure plan of agropolitan region in Sungai Geringging is as follows:

- The agropolitan center is pointed in capital of Sungai Geringging District.
- The secondary agropolitan centers are pointed in capital of Sungai Limau District and in capital of V Koto Kampung Dalam District.
- The hinterland areas of agropolitan region are comprised of V Koto Timur District, VII Koto Sungai Sariak District, IV Aur Malintang District, Batang Gasan District, Padang Sago District, and Patamuan District.

As the center of agropolitan region, the spatial function of the capital of Sungai Geringging District is as follows:

- Agriculture production center
- Center of trade and transportation facilities
- Agricultural products outlet
- Storage of agricultural products
- Provision of agricultural input such as fertilizer, pesticides, and tools and agriculture machinery
- Center of promotion and information
- Provision of financial institutions

In addition, improving the service of transportation network is needed to develop Sungai Geringging agropolitan region. To improve it, there are things that must be provided, such as:

- Provision of public transportation terminal (C class terminal)
- Enhancement the service of regional roads network and local roads network. It is needed to open the access between regions, so that the distribution and marketing of agriculture productions could be better. The spatial plan of Sungai Geringging agropolitan region is shown in Figure 3.

Land Use Pattern Planning of Sungai Geringging Agropolitan Region

Land use pattern in Sungai Geringging agropolitan region is mostly directed to be agricultural land and settlements. The agricultural land use covers land use for food agricultural, plantations, horticulture, fisheries, and animal husbandary. Zoning maps for food agricultural land and for plantations are shown in Figure 4-5. Besides land use for agriculture and settlements, there is also land use for industries. The activities of industry that to be developed in Sungai Geringging Region aim to increase the added value of cacao and coconut, as well as to create various forms of economic activity.

Figure 3: Map of Spatial Structure Plan

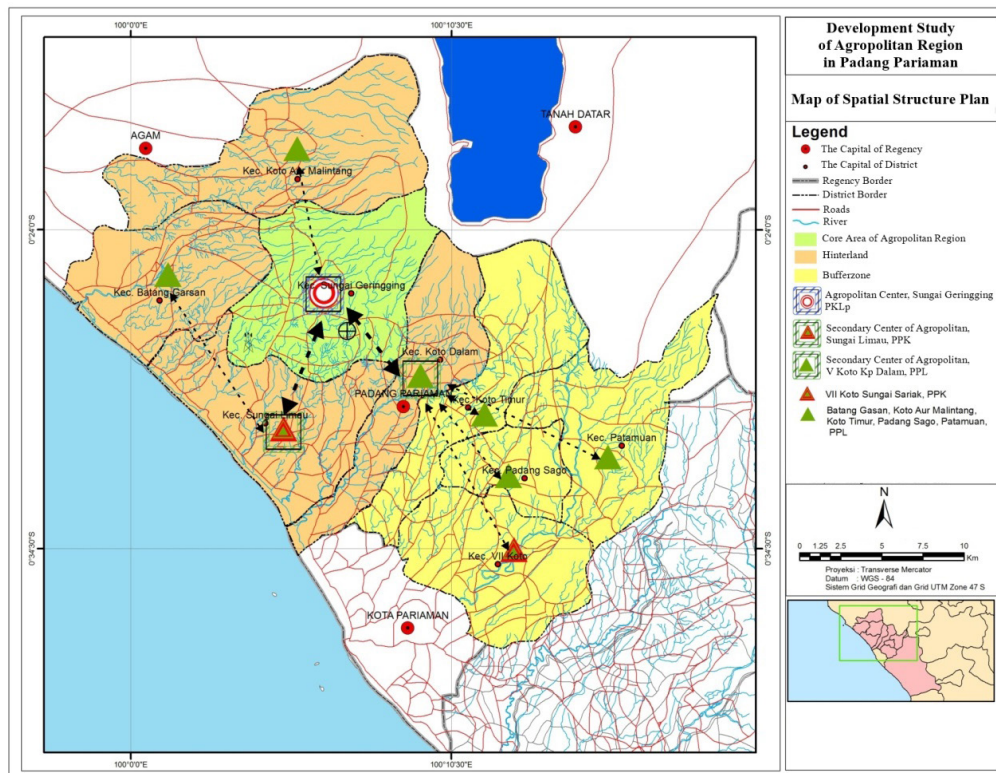


Figure 4: Zoning Map of Food Agricultural Land

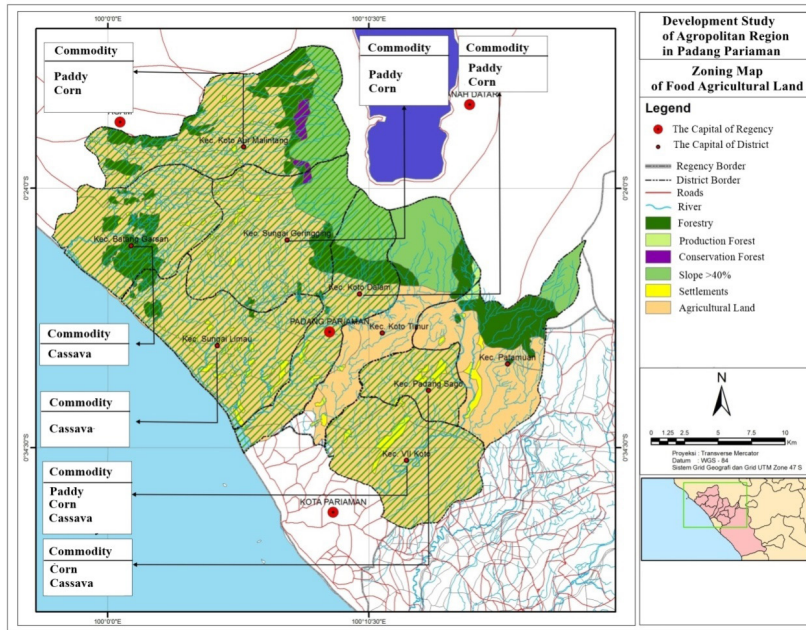
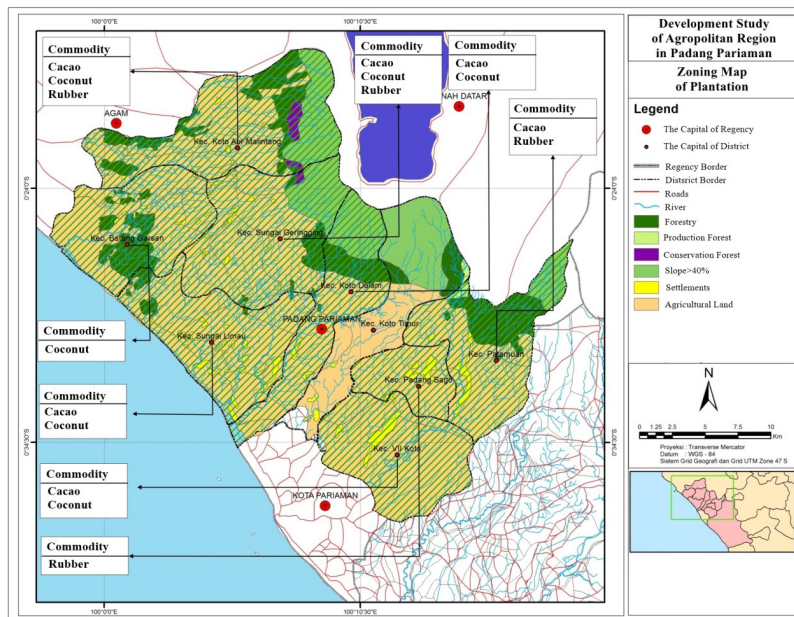


Figure 5: Zoning Map of Plantation



5. CONCLUSION

Based on identification of internal characteristics, external environment, and agricultural potential, it showed that Sungai Geringging and its surrounding are potential to be developed as an agropolitan region in Padang Pariaman Regency. The superior commodities that can be developed in Sungai Geringging Agropolitan Region are cacao and coconut. The results of the potential and superior commodities analysis, agrobusiness system analysis, and spatial analysis will be used as basis for the development concept of Sungai Geringging agropolitan region in Padang Pariaman Regency.

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