I. INTRODUCTION

1.1 Background

Indonesia has a wide range of climate, from wet tropical to semi-arid. Rainfall varies according to time and place, while air temperature and radiation are relatively constant throughout the year because Indonesia is located on the equator. Air temperature variations are caused by differences in altitude.

Rubber plants originated from tropical areas in the Amazon Basin, Brazil with rainfall 2000-3000 mm/year and the rainy days of 120-170 days/year (Sutardi, 1981). Rubber trees grow in areas between 10° North and 10° South (Moraes, 1977). Most of Indonesian rubber plantations are located in Sumatera and Kalimantan, with rainfall ranging from 1500-4000 mm/year with an average of 0-4 months in dry months per year.

Potential land for the development of rubber could be determined if soil and climate conditions are known. The soil and climate condition are linked to characteristics of rubber plantation. These relationships can produce a land suitability classification system, which aims at assessing how far the level of suitability of the land to plant rubber (Thomas, 1995).

Land condition in Banyuasin Regency consists of majority wetlands and swamps, while rubber plants are suitable to be grown on dry land. However, many wetlands have been converted to rubber plantations, because the soil has become dry or wet land and dry land is not submerged in water (Media Perkebunan, 2008).

Banyuasin area has the potential for agriculture and plantation. From the total area of 11.832,99 km², about 47 percent is agricultural and plantation areas. Contributions to local income of Banyuasin Regency are 35 percent from the agricultural sector, 21% from industrial sector, and 15% from trading. Agriculture of this regency has paddy field of 596,303.36 tons. The productions of oil palm and rubber are 130,228.11 tons and 89,640.50 tones, respectively. Rubber plants
are very potential to be developed in this area. Rubber plantations in Indonesia are generally composed of smallholder rubber (85%) and the rest (15%) are state and private plantations. (Bappeda and BPS Statistic of Banyuasin, 2008).

Since 2003, the program on replanting the old rubber plantations was carried out covering a target area of 10,000 ha, because, about 10% of 84,000 ha of rubber plantation consists of old trees whose production is not optimal anymore and must be replanted. In 2003, Banyuasin government provided seeds for replanting an area of 400 hectares. The seeds for replanting aid program in 2004 covers an area of 400 ha (Bappeda and BPS Statistic of Banyuasin, 2008).

In general, GIS (Geographical Information System) is a computer-based information system that combines elements of the map (geographical) and information about the map (data attributes) that are designed to obtain, process, manipulate, analyze, demonstrate and display spatial data to complete the planning, process and investigation of the problem.

Based on the potential of rubber plantations in Banyuasin Regency, it is necessary to do data processing and analyzing the potential of rubber plantation areas using GIS and multi criteria method. This is very helpful for policy makers of local governments for the development and production increase of rubber.

### 1.2 Problems Statement

Plantation sectors consisted of the smallholders, government plantation and private plantations. Among the potential commodities to be developed are rubber and oil palm.

The Regional Spatial Planning (RTRW) of Banyuasin Regency are policy, approach and spatial development strategy to achieve the goals of qualified spatial land utilization. The current land use development in Banyuasin Regency needs evaluation and consideration about rubber plantation development in suitable land. Based on this perspective in mind, we conducted evaluation of rubber plantation development to support land use planning of Banyuasin Regency. This
study is focused on land suitability analysis, productivities analysis, and social-economic analysis using multi criteria method.

1.3 Objectives

The objectives of this study are: to evaluate the suitability of rubber plantation development in Banyuasin Regency using Geographic Information System and multi criteria method. The additional objective is to evaluate priority development of sub regency for rubber plantation using Analytical Hierarchy Process (AHP).

1.4 Study Question

To achieve the aforementioned study objectives in the previous section, the research questions of this study are:

1. What was done if the land is not suitable but planted with rubber?
2. What was done if the land is suitable but planted with rubber?
3. What was done if the land is suitable but not planted with rubber?
4. Where is the priority of areas for rubber plantation development?
5. How many sub regency belong to priority areas for rubber plantation development?

1.5 Scope of the Research

1. The study area is in Banyuasin Regency area located in South Sumatra.
2. This study analyzed rubber plantation development.
3. This study analyzed the priority of development area for rubber plantation using multi criteria method.

1.6 Study Output

The main output this study is; (1) Land suitability for rubber plantation map based on physical factors; (2) The table and map of productivity of rubber plantation based on the statistic data; (3) The priority map of sub regency for rubber plantation development based on multi criteria analysis.