

CHAPTER I

INTRODUCTION

Inappropriate land use leads to inefficient exploitation of natural resources, destruction of the land resource, poverty and other social problems. The land is the ultimate source of wealth and the foundation on which many civilizations are constructed. Society must ensure that land is not degraded and that it is used according to its capacity to satisfy human needs for present and future generations while also maintaining the earth's ecosystems (Rossiter, 1996). So land suitability assessment is required for land used planning with the maximization of profit for the producer, along with the land preservation. Assessment of land for alternative land use considering economic and social conditions in order to select and adopt the best land use options. Its purpose is to select and put into practice those land uses that will best meet the current needs of the people, while safeguarding resources for the future (Verheye,1997). Farmers have made plans, season after season, deciding what to grow and where to grow it. Their plans have been made according to their needs, their knowledge and the technology, labor and capital available. As the size of the cultivated area increase, the number of people involved and the complexity of the problems increase, so does the need for information and rigorous methods of analysis and planning. Thus the FAO (1993) pointed out the need for comprehensive new approaches in land use and development planning: "How people or nations use their land depends on complex, interrelated factors which include the characteristics of the land itself, economic factors, social, legal and political constraints and the needs and objectives of the land users. In order to make rational decisions, it is necessary to collect the right information about the physical, social and economic aspects of the land area in question; and to assess the land's relative

suitability for different uses in the light of the needs and objectives of the land user and the community”.

Vietnam has total land area of about 32,899,300 ha, and has a tropical monsoon climate (Vietnamese General Statistic Office, 2005). The lowlands are concentrated in two deltas, where rice is extensively grown with up to three crops per year. Rice production essentially contributes to the food requirements and the national economic growth (due to the larger amounts of grain export). Owing to intensive pressure on land due to a steadily growing population, all the suitable land for rice production is under cultivation. Therefore, a larger emphasis has been placed on the use of uplands for food production during the recent years. The upland and mountains area cover three-fourths of natural area (Vietnamese General Statistic Office, 2005). Among the seven agro-ecological zones of Vietnam, the mountains area of the Central Vietnam is the long, narrow part, which makes important contributions to the agricultural production of the upland.

Nam Dong is a mountainous district. It is located in the South of Thua Thien Hue Province, in Central Vietnam. It covers an area of 65,051.8 ha. Nam Dong is one of poorest district in Thua Thien Hue province. Most households in this district earn income for their living from agricultural production (People Committee of Nam Dong, 2005). According to the plan of the district from 2005-2015, long term programs for economic growth based on the potential of the district focus on agriculture, and family handicraft is emphasized (People Committee of Nam Dong, 2005).

The problem of selecting the suitable land for cultivation of a certain type of agriculture production in the district is mainly empirical issue. It is believed that much agricultural land is used at below its optimal capability. The economic growth and urban expansion exert pressure on land resource, land use in district have been changed in recent years, for instance agricultural area is expanded from 2,876 ha in 2001 to 4,011 ha in 2005. A large area of Nam Dong is fallow land 16,747.6 ha (25.75 %) (Nam Dong

statistical Department, 2006). The critical question in the district is whether the change of land use types is suitable and which is suitable crop should be grown on the fallow land. This is brought forward by local land users and administrator who need to have scientific support for their decision on the future land use systems. Hence, land suitability assessment is essential to support land use policy in order to meet the increased demand for food production with shortage of resources. Environment conservation is then required for land suitability assessment to aid decision makers in their role to select suitable lands to satisfy producers' demand without enhancing environmental degradation.

The aims of this study, first is to evaluate land suitability by using Multicriteria analysis based on crop and environmental suitability that will help policy makers in their decision making for suitable land use planning that meet the increased need for food production, satisfy producers' demand, and reduce environmental degradation, and second is to create geoprocessing models for multicriteria land suitability assessment to execute series of operations in sequence to create final map. Once a model is built, it can be run and easy to update any parameters or the functions in the model diagram with short time consuming, and without human errors. So the objectives of the study are to evaluate land suitability based on crop and environmental suitability in the study area by using multi-criteria decision making and GIS approach. And to develop geoprocessing models that facilitates multicriteria land evaluation procedures.