CHAPTER 1

Introduction

Myanmar is located in Southeast Asia, bordering the Andaman Sea and the Bay of Bengal, between Bangladesh and Thailand. Myanmar is the largest country of the Southeast Asia mainland. It is geographically located between 9° 59' to 28° 31' North Latitudes and 92° 9' to 101° 11' East longitude. Myanmar has common boundary with Bangladesh, India, China, Laos and Thailand. Myanmar could be taken as a forest-clad mountain country. With plateaus, valley, plain, mountain ranges with varying altitude from 900 to 2,100 m a.m.s.l formed natural boundary between her neighbors. Myanmar is in AEZ (Agro-eco zone) two which characterized as warm sub humid tropics. It receives its annual rain mainly from the South-West monsoon from mid May to mid October. The precipitation varied depending on the locality, elevation and months. The leeward central plain or dry zone receives lower and erratic rainfall, ranging from 700 to 1,200 mm annually. The land area of Myanmar is 261,228 square miles or approximately over 68 million ha. The total cultivated area is 10 million ha, comprising 8 million ha of net cultivated area (Thet, 2003).

Myanmar has a predominantly agricultural economy based on rice production. The country is suited to a large variety of crops such as equatorial and temperate crops, oil seed crops, cereals, food legumes and industrial crops.

Yamethin district is considered under the intermediate dry zone (*Transition zone*), having only 3 months with rainfall exceeding monthly evapotranspiration. Soil moisture retention is low and vegetation cover is thin. Mostly drought resistant variety of crops such as cotton, pigeon pea, sesame, sorghum, maize are grown often inter-, mixed or relay cropping to make efficient use of soil moisture.

1.1 Statement and significance of the problem

In Myanmar, the development of national economy is highly reliant in Agriculture. Agriculture plays primary role for food self-sufficiency in national food requirement because the population of the country is estimated about 52 millions with annual growth rate 1.84% and raw material requirement for industry sector and export. Government has designated agriculture as the main pillar of the economy and dedicating tremendous efforts to get greater improvement for the sector. Three objectives are prioritized without jeopardizing the production of other crops in the country which are; to achieve surplus in paddy production, to be self-sufficient in edible oil production and to increase the production and export of pulses and industrial crops (MOAI, 2005).

Rice is the principal food of the entire nation and nearly 40% of total cultivated area is under rice. Promoting the income and crop production, rice-based cropping systems are prevailing in Myanmar.

The study area is about 1,088,289 ha of land area and situated at the central plain region of the country. Average annual rainfall of the study area is 1,140 mm and annual mean temperature is 27.2ºC. Prevailing Rice-based cropping systems of this area are Sesame-Rice-Legumes, Rice-Rice and Rice-Legumes. Within the study area, annual precipitation is less than 1,000 mm in Yamethin, Pyawbe, Tatkone townships and more than 1,000 mm in Pyinmana, Lewe townships. Based on the received precipitation, cropping systems are different in these areas. Rice production is being intensified by all means so as to meet the requirement of both local consumption and export. The problem in this area is depletion of soil nutrient and low productivity of farm because of poor nutrient management by unbalance fertilizer application, low fertilizer use efficiency and low availability of water.

1.2 Sustainability measurement

It is no doubt that there is a lot of complexity and fuzziness inherent in the sustainability concept. A possible reduction of this complexity, a pre-condition for

management and planning actions, introduces the problem of the descriptors used: indicators and indices (Munda, 2005).

Sustainability is the conceptual aspect of set of processes aimed to deliver desired services over long period of time. Study on sustainability requires an interdisciplinary approach over social, ecological and economic sciences. Measurement of such diverse states of systems is a difficult and complex process that requires dedicated researchers and creative research across many fields. Understanding, designing and managing these systems on a sustainable basis over an entire life cycle is a major challenge facing this generation. Though there is no measuring yardstick by which we can assess sustainability, by emulating human expertise and systematic approach, we can handle imprecise situations through fuzzy logic to give clear picture of reality (Jeganathan, 2003).

1.3 Research questions

In meeting the objective of this study, following questions are to be answered:

- What are the existing management practices of selected cropping systems in the study area?
- What is the sustainability level of three different rice-based cropping systems in the study area?
- What are the differences among assessment methods in sustainability?

1.4 Objectives

In order to answer above question, the objective of this study was determined as follow;

- To understand the existing management practices of selected cropping systems in the study area
- To evaluate the sustainability of three different rice-based cropping systems in the study area
- To compare the different assessment methods in sustainability: (Sustainability Assessment by Fuzzy Evaluation (SAFE), Multi-criteria Evaluation; Amoeba approach and Sustainability Indicator Analysis (SIA))

1.5 The scope of the study

This study can provide major direction for the development decision support system in agricultural sustainability. This study methodology can be applied to any non-spatial decision making processes and sustainability assessment apart from agricultural applications.