

1. INTRODUCTION

The highlands of the upper northern Thailand comprise approximately 72% of the total area. Geographically, highland areas are known as the areas with more than 20° slope and above 700 m altitude. There are about 500,000 people of various ethnic groups scattered over, practicing agriculture in the valleys and on the sloping land. Rice is their major staple food, major part of this is upland rice under swidden cultivation system. It occupies more than 90% of the wet season cultivated land system (Somrith and Prommani, 1985).

In the past decades, utilization of steep land became more intensive due to rapid increase of population and shortage of arable land. Thus, food security situation for these people is questionable. Naturally, human can utilize the resources to meet their need up to some extent, at the human-resource equilibrium point (Mwalyosi, 1991). Hence, in particular area, a given resource can provide services to the limited number of population. Therefore, paddy rice and upland rice areas and their productivity greatly determine the food supporting capacity and security of such a highland community.

In order to assess rice sufficiency and security of the community, an integrated study is needed. This involves land use classification with emphasis on identifying rice fields, crop cutting to determine rice yield and farmers' interview to assess food consumption, production and their strategies to cope with food shortage.

The biophysical part of the study will depend largely on spatial and temporal information. Major spatial data sources are remote sensing data, aerial photograph and other geographical data sources which are now more available and accessible. However, in Thailand, aerial photograph is the only spatial data source that has been available over 40 years (the oldest aerial photograph that can be obtained from Royal Thai Survey Department) and has been used to study land cover and change over time. This media has one major disadvantage because aerial photographs are subject to tilt and relief displacement errors.

At present, digital aerial photograph mosaic and Geographic Information Systems (GIS) techniques have been developed and employed to eliminate tilt and relief displacement to produce an accurate land use map. However, these techniques and materials have not been fully utilized and integrated for resource inventory in the rugged terrain of northern Thailand. Therefore, integration of information interpreted from aerial photographs and GIS would enhance the understanding of status and uses of natural resource in the highland. Consequently, this will be used to examine food carrying capacity and food sufficiency level of the community. Moreover, adaptive strategies of highland community to cope with problem of rice deficit in the past should be studied to assess their adequacy and to determine whether alternative strategies should be explored to sustain future food demand.

In order to provide information necessary to analyze the current situation in the highland community. Four villages in Watchan subdistrict, Mae Chaem district in Chiangmai were selected as the study site. The objectives of the study are (1) to utilize and integrate aerial photos interpretation and GIS for land use change detection with emphasis on rice production areas in the highland area. (2) to assess rice sufficiency level of the community in the study area, and (3) to investigate on adaptive strategies of farmer towards rice sufficiency situation.