Ethiopia as many other developing countries faces currently environmental problems such as land degradation and lose of forest. The country has also experienced frequent drought resulting due to climate variability. These problems have impact on the food security of the country. These show the need for integrated land use management and monitoring of resources, which should be based on reliable information. The current land use information situation in the country can be characterized as week and needs improvement. The objectives of this study includes investigating experiences in implementation of Land Use Information System (LUIS); designing and implementing LUIS that can effectively and efficiently support the analysis of current land-use practices; analyzing the land-use history and change in context with the onset and duration of seasons; identifying farmers' adaptation strategies to climate variability; and evaluating the land-use potentials for environmental services. The expected outputs of the research includes guiding principles for LUIS development; models to supports the land use planning and monitoring at local level; methodology which integrates various data from different sources for analysis of land use history in context with onset and length of growing seasons; understanding of farmers' adaptation strategies to climate variability to ensure food security; and analysis models for evaluating the land-use potentials for environmental services taking C sequestration as a case study. The research is proposed to be undertaken in the Northern Part of Rift Valley Lake Basins of Ethiopia.