**Land Cover Classification and Forest Change Analysis,**

**Using Satellite Imagery - A Case Study Chamoli District, Uttarakhand, India**

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The importance of accurate and timely information describing the nature and extent of land resources and changes over time is increasing, especially in mountainous areas. We have developed a methodology to map and monitor land cover change using multi-temporal Landsat Thematic Mapper (TM) data in Himalayas of Chamoli, Uttarakhand in India for 1990 and 2011. Land-use/cover mapping is achieved through interpretation of Landsat TM satellite images of 1990, and image of 2011 using Erdas Imagine 10.0. Based on the Anderson land-use/cover classification system, the land-use and land-covers are classified as forest land, rangeland, water bodies, agricultural land and residential land. The unsupervised image classification method carried out prior to field visit, in order to determine strata for ground truth. Fieldwork carried out to collect data for training and validating land-use/cover interpretation from satellite image of 2011, and for qualitative description of the characteristics of each land-use/cover class. The land-use/cover maps of 1990, and 2011 were produced by using supervised image classification technique based on the Maximum Likelihood Classifier (MLC) and 132 training samples. Error matrices as cross-tabulations of the mapped class vs. the reference class were used to assess classification accuracy. Overall accuracy, user’s and producer’s accuracies, and the Kappa statistic were then derived from the error matrices. A multi-date post-classification comparison change detection algorithm was used to determine changes in land cover in 1990-2011. To evaluate the change maps for the 1990 to 2011 interval, we randomly sampled the areas that classified as change and no-change and determined whether they were correctly classified. The overall accuracy of land cover change maps, generated from post-classification change detection methods and evaluated using several approaches, reached to 80.1%. The results quantify the land cover change patterns in the Himalayas of Chamoli, Uttarakhand and demonstrate the potential of multi-temporal Landsat data to provide an accurate, economical means to map and analyze changes in land cover over time that can be used as inputs to land management and policy decisions.