Abstract
In this thesis I synthesized different aspects related to diversity, distribution, uses and conservation of medicinal plants in Nepal and also have attempted to recommend guidelines for sustainability of two highly used alpine plant species. The over-harvesting or human induced activities are not the only problem for biodiversity but recently invasion of alien species has also emerged as serious problem in Nepal. I thus also attempted to analyze the effect of invasive species on community composition in the last paper.
The first two papers deal with diversity, distribution, uses and harvesting. Paper I showed that medicinal plants in Nepal have unimodal relationship with elevation and the maximum total species richness is at 1000 m. Paper II which deals with the uses of medicinal plants in the Humla region, west Nepal showed that there are 161 medicinal plant species belonging to 61 families and 106 genera used for treating 72 human and 7 veterinary ailments. Medicinal plants in Humla were mostly collected in wild. This induces a serious threat to diversity of the medicinal plants and it is therefore necessary to develop proper management guidelines for their harvesting in wild and/or their domestication.
Rheum australe, an endemic plant to west Himalayan region, is widely used plant in traditional medicine for various diseases in Nepal, China, India and Pakistan and has a wide range of medical properties (Paper III). To understand possibilities of its domestication, I observed the effects of temperatures and light on germination of seeds for *Rheum australe* and its substitute, *Rheum acuminatum* (Paper IV). The results showed that both species germinated better in light than in complete darkness and showed higher germination rates in higher temperature. This suggests that cultivation of the species in lower altitudes should be possible.
To see if there exist any differences in available chemical contents of cultivated and naturally growing species of *Rheum* (*R. acuminatum* and *R. australe*), I collected roots from natural habitats, Nepal and plants grown in experiment garden (Paper V). Content of phytochemicals in the two species was comparable and naturally growing plants were better than cultivated plants in their available chemical contents. Some important chemical were, however, equally common in naturally grown and cultivated plants.
In order to develop the proper harvesting strategies of two highly used medicinal plants (*R. acuminatum* and *R. australe*), populations in various habitats were studied over four years time (Paper VI). It has been found that *R. acuminatum* growing in open habitat was more sensitive to different harvesting intensities compared to forest habitat and *R. australe* growing in open habitat. Therefore selective or rotational (at least 5 years) harvesting strategies should be adopted. Management plans should be formulated in accordance to local prospective. This conclusion could also be applied to many other alpine perennial medicinal plants.
Finally (Paper VII), I evaluated the impact of invasive species (*Parthenium hysterophorus*) on the composition plant community and soil properties. The results showed that due to *P. hysterophorus* there was significant changes in above ground vegetation composition and below ground soil properties in there different study sites in central Nepal and thus represent serious threat to native diversity.