



## The potential and sustainability of agricultural land use in a changing ecosystem in southern Greenland

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Southern Greenland currently experiences an increase in summer temperatures and a prolonged growing season (Masson-Delmotte et al. 2012), resulting in an increased potential regarding agricultural land use. Subsequently, the agricultural sector is expected to grow. Thereby, a higher hay production and grazing capacity is pursued by applying more efficient farming practices (Greenland Agriculture Advisory Board 2009). However, agricultural potential at borderline ecotones is not only influenced by factors like temperature and growing season but also by other ecologic parameters. In addition, the intensification of land use in the fragile boreal – tundra border ecotone has various environmental impacts (Perren et al. 2012; Normand et al. 2013).

Already the Norse settlers practiced animal husbandry in southern Greenland between 986-1450 AD. Several authors mention the unadapted land use as main reason for the demise of the Norse in Greenland, as grazing pressure exceeded the resilience of the landscape and pasture economy failed (Fredskild 1988; Perren et al. 2012). During the field work in summer 2014, we compared the pedologic properties of already used hay fields, grazed land, birch woodland and barren, unused land around Igaliku (South Greenland), in order to estimate the potential and the sustainability of the land use in southern Greenland. Beside physical soil properties, nutrient condition of the different land use types, the shrub woodland and barren areas was analyzed.

The results of the study show that the most suitable areas for intensive agricultural activity are mostly occupied. Further on, the fields, which were used by the Norse, seem to be the most productive sites nowadays. Less productive hay fields are characterized by a higher coarse fraction, leading to a reduced ability to store water and to an unfavorable nutrient status. An intensification of the agricultural land use by applying fertilizer would lead to an increased environmental impact.

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