

# Nutrient Sustainability in Swiss wood extraction<sup>†</sup>

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**Abstract:** We here present the approach to be implemented in the frame of a Swiss research project that recently started (July 2020). The overall aim is to protect the forest soil fertility and biodiversity. When choosing an extraction method, the nutrient storage of a respective forest stand should be considered in order to prevent the exploitation of the site-specific nutrient pool. This topic is timely because full-tree harvesting for energetic purposes increased continuously in the last years. In addition, summer logging in foliage state is under discussion due to the climate change that increasingly reduces the winter harvesting periods. We aim to determine the current nutrient pools of different Swiss forest sites by conducting comprehensive soil analyses considering pH-value, exchangeable nutrient cations (Ca, Mg, K, Na, Mn, Fe, Zn), as well as contents of nitrogen, sulfur, phosphorus and carbon<sub>(org)</sub>. Furthermore, nutrient fluxes like weathering rate, deposition and soil leaching are considered. Resulting site-specific data are combined with expected nutrient removals over one rotation period depending on tree species composition, forest stand development and extraction methods. In the frame of this project, two case studies will be implemented in beech woodland stands on sediments of the early and late Pleistocene serving as a data basis to calculate nutrient balances and to formulate management recommendations. In the long-term, we aim to apply this method to overall Switzerland and develop a software that allows an automatically calculation of site-specific nutrient-balances in order to support future forest management planning and decision-making processes.

**Keywords:** nutrient balance; soil fertility; weathering rate; deposition; soil leaching; full-tree harvesting; energy wood; nutrient removal; forest management planning.