Abstract template for the conference "A century of national forest inventories – informing past, present and future decisions"

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On page two, you are asked to fill in your abstract in the format and font size indicated. Please remember to include authors affiliation information in the footer section of page two. The length of the abstract may not be more than one page including references.

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NFI data is a valuable basis for decision making in policy e.g. for steering investments in the Swiss forestry sector.</td></tr>
<tr><td>Presenter name:</td><td></td><td>Christoph Fischer</td></tr>
<tr><td>Presenter contact info:</td><td></td><td>Scientific Service NFI, Swiss Federal Research Institute WSL, Zürcherstrasse 111, 8903 Birmensdorf, Switzerland christoph.fischer@wsl.ch</td></tr>
<tr><td rowspan="3">General topic, see website:

(please double click on the check box and activate the relevant one)</td><td>☐</td><td>Improving future NFIs by learning from the past</td></tr>
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Defining near-optimal harvesting techniques using Swiss National Forest Inventory data.

Christoph Fischer, Leo Bont, Fritz Frutig, Christian Ginzler, Marielle Fraefel

Introduction:

In Switzerland, the competitiveness of the Swiss forestry sector is currently under discussion. The cost-effectiveness could be increased through the application of up-to-date harvesting and transportation techniques The Swiss National Forest Inventory (NFI) delivers a wide range of information on forests using a combination of field assessments and interview surveys. Through the interview survey, including all local foresters of Switzerland (about 830), the Swiss NFI is one among few NFIs able to assess the currently applied harvesting technique and calculate timber harvesting costs for each field plot. Using available NFI data and derived information, we can thus contribute to the current discussion.

Materials and methods:

In order to evaluate the suitability of the currently applied harvesting techniques, we developed a method to derive the technical feasibility of a variety of potential harvesting techniques. Additionally, we also compared their transportation routes for cost estimations. To identify the technically feasible harvesting techniques we used various wall-to-wall, spatially explicit (topography, forest map), as well as field (NFI plot) data (obstacles for harvesting operations, mean DBH, species composition) and interview data (applied harvesting techniques) from the NFI.

The optimal harvesting technique was allocated using expert-defined rules for each NFI field plot. For the allocation, the technical feasibility as well as the harvesting cost of each alternative was taken into account. We then compared the optimal harvesting technique with the currently implemented harvesting technique at each sample plot. The transportation cost on the forest road network was evaluated with regard to its geometrical dimensions (e.g. road width, bearing capacity).

Results:

Merging different data sources at varying scales, we have derived the near-optimal forest harvesting technique for each NFI sample plot. Using the network topology of the forest roads we were also able to consider transportation routes through the forest. Applying our results, we could show that cheaper, optimised, harvesting techniques could be applied in various parts of Switzerland, thus substantially reducing costs for forest owners. Using scenarios, we could show that transportation costs of the near-optimal harvesting technique could be reduced further through investments in the forest road infrastructure.

Conclusion:

We were able to show that near-optimal harvesting systems often differ from the applied ones and that substantial cost reductions for harvesting operations can be achieved by changing the applied technology. Additionally, well steered upgrades of the forest road infrastructure can reduce transportation costs. Our results can be used as a basis for decision making in policy for steering investments, creating the opportunity to increase the economic competitiveness of the Swiss forestry sector.

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