

Title: Sustainability Impact Assessment of Harvesting and Transport through System Analysis - an example from the European Forestry-Wood Chain

Authors: Diana Vötter, Gero Becker

Referee: Prof.Dr. Dr. Gero Becker

Albert-Ludwigs-Universität Freiburg
Institute of Forest Utilization and Work Science
Werthmannstr. 6
D - 79085 Freiburg

Tel. (+49) 761-203 3764

Mail: fobawi@fobawi.uni-freiburg.
diana.voetter@fobawi.uni-freiburg.de

(1) statement of the problem

The Brundtland report (1987) describes sustainable developments as such that "meet the needs of the present without compromising the ability of future generations to meet their own needs"¹ and the European Union pledged itself to transfer this principle of sustainability to all economic sectors. Europe's forestry's growth chances and competitiveness are particularly linked to the aspect of sustainability: only if forests, which are a natural and renewable resource, are managed sustainably at all levels (ecologic, economic and social), they yield great future chances in a regional perspective as well as in a global context.

Therefore, sustainability issues within

- ❖ Harvesting methods
- ❖ Transport and Logistics systems
- ❖ Wood quality and Allocation

Are of particular interest, and will be determined in this work by means of system analysis and (business) process modelling, calculating indicators for economic, environmental and social aspects

(2) scientific approach

Firstly, today's present situation, the aim as well as the corresponding processes are determined. Secondly, for the modelling and calculation of the processes of the European FWC a professional modelling software is used, in this case ARIS Architect. Consequently, the individual processes of the from tree harvesting and wood transport to the provision of pre-processed materials fed into industrial processes are described as value-added process chains and event-driven process chains (EPCs). Loops, decision points and variants are described as they are. For a later point in time, modelling of scenarios is planned.

Within the EPCs it is possible to link the individual activities (sometimes also called "functions") with economic, environmental and social indicators, such as production cost, energy consumption, employment, GHG, Those indicators represent a selected and balanced set from IPCC and MCPFE indicators. Values for these individual indicators are either calculated within this model itself, or by already existing partial models for allocation, wood quality, transport and harvesting.

In the consequence, all processes and activities are linked with numeric values (eg m³ sub, tkm, €/m³, ...) for each indicator, which assess the process's sustainability. Those can be summed up per chain alternative, thus comparing the sustainability of different alternatives on basis of hard figures for all three levels of sustainability.

(3) the main findings

shall be found in the determination, calculation, modelling, and subsequent optimisation of

- ❖ Timber and fibre characteristics

¹ UN, General Assembly, A/RES/38/161, 1983

- ❖ Interaction between wood quality, processing and product quality (sawlogs, pulpwood, bio-energy)
- ❖ Quality characteristics of raw timber
- ❖ Methods of planning and production (harvesting methods)
- ❖ Transport methods and systems

Overall target: Analysis of effects and consequences of changing framework conditions

(4) implications for further research or for practical use:

More information about product as well as process characteristics will strive towards a better - and more sustainable - choice of methods applied. This will have an economic, as well as an environmental and social output.