



EFORWOOD

Sustainability Impact Assessment
of the Forestry - Wood Chain



Project no. 518128

EFORWOOD

Tools for Sustainability Impact Assessment

Instrument: IP

Thematic Priority: 6.3 Global Change and Ecosystems

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RE	Restricted to a group specified by the consortium (including the Commission Services)	
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Organisation of lead contractor for this report: ALUFR

Partners involved: FVA Baden-Württemberg, FCBA, Skogforsk, Innventia, Forest Research

Periodic Activity Report Annual report 15 months

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Duration: 51 months

Project coordinator name: Kaj Rosén

Project coordinator organisation name: Skogforsk

Revision: [1]

1 Section 1 – Project objectives and major achievements during the reporting period

1.1.1 Module 3

The overall objective is to identify the structure of the Forest-Wood-Chain (FWC) including processes, products, process intercorrelations, split ratios etc., to provide ToSIA with data by data collection, calculation of relevant indicator values for different time horizons and providing additional supporting information for use in ToSIA for the part of the FWC from Forestry to Industry.

Module specific objectives are:

- To identify the existing (and future) FWCs with its specific regional structures (processes and products);
- to identify and localise (map) raw materials with different wood and fibre characteristics and their dependency on current and future forest management regimes (e.g. no harvest, longer rotations, higher shares of thinnings etc) in close cooperation with M2;
- to identify the interaction between the wood quality, process behaviour, and product quality for specific products (solid wood, fibre, bio-energy) in line with M4;
- to identify and evaluate existing and new methodologies and techniques to assess and measure raw material quality characteristics which are relevant for the further processing early in the process chain;
- to identify existing and future planning and production (harvesting) methods, and their effects on the economic, environmental and social levels of sustainability;
- to identify existing and future hauling operations in regional cases and Europe and their effects on the economic, environmental and social levels of sustainability;
- to identify existing and future transport methods and systems between forestry and processing industries and to analyse the impacts and benefits on sustainable development.
- to assess the effect and consequences in changes of the technological, economical social, legal and political framework to the impacts of sustainability along the forest to industry chain;
- to illustrate effects of wood allocation at the Forest to industry interface on the sustainability of total FWCs;
- to organize and synthesize the work for the Baden-Württemberg (regional) case study which is one of the Eforwood case studies.

Key objectives/milestones for this reporting period are:

- A set of chain specific criteria and indicators for sustainability were further developed and adapted for the EU level, in cooperation with M1;
- Stand and tree data from M2 and M1 about quantity, quality and location of the standing forest resource are converted into technical quality parameters regarding harvesting, hauling, transport in the EU-FWC case study;
- Key sustainability issues for M3 were identified for existing and future reference future and scenario chains;
- Partial models were prepared and tested at case study- and EU level which allow a detailed analysis of SI in the area of raw material allocation, harvesting and transport.
- A manual was created that supports researchers in the collection of data in the EU-FWC on the country specific technical timber production chain (TTPC) including harvesting and hauling processes that are required to develop ToSIA. Detailed calculation modes have been developed to calculate the required data, based on the example of Poland, which is a 'key country' for all other East European countries. These data comprise information on the TTPC structure (processes, products, process intercorrelation, and split ratios), on the quantity of material flows and indicator values;
- Module specific processes of chains for the case studies as well as chains for the EU25 + 2 studies were elaborated;
- Typical and relevant harvesting systems were selected and analysed according to the related sustainability impacts with social, economical and ecological dimension.
- Typical and relevant transport means and systems were evaluated according to their impact on levels of sustainability. A partial model for their calculation was developed for M3;
- Methods for the mapping of properties and volumes of available forest resources were developed and tested in four regional case studies, reflecting important aspects in different FWCs and European countries;
- Models for mapping of forests resources of important tree species in Europe were compiled and documented;
- Concepts of early assessment and measurement of product and process related wood quality characteristics in the FWC were illustrated;
- Interactions between wood quality and process behaviour and product quality for specific chains of solid wood, fibre and bio-energy products were modelled and quantified with focus on sustainability indicators for selected products.
- Effects of wood allocation at the Forest to industry interface on the sustainability of total FWCs were illustrated and alternatives compared based on selected sustainability indicators;
- Concepts for an optimised material allocation with regard to processing and product chains were identified as part of case studies (including EU study) and scenarios;
- The chain specific results of the sustainability impacts were aggregated, discussed with M1 and transferred to ToSIA Module;
- Relevant key scenarios in M3 were developed. In terms of the bio-energy scenario for the BW case study, M3 has taken over its coordination for all modules;
- A periodic case study report for BW had been written and updated twice a year;
- A methodology to analyze and calculate transport process integrating logistic concepts that leads to develop a tool. This tool estimates sustainable indicators shortlisted, and concerns freight transport by road, rail and inland waterway.

2 Section 2 – Work package progress of the period

Summary of Module work

2.1.1 Module 3

- 3 Module 3 – Forest to Industry Interactions – is lead by ALUFR and consists out of WP3.0 to 3.4 with partners from ALUFR, FCBA, FR, FVA, Skogforsk and Innventia (ex. STFI-Packforsk). It has worked according to the implementation plan and met the objectives that were announced on the following issues: WP3.0 ensured that the Module objectives were achieved; it further coordinated and controlled the proceedings of deliverables and other IP management issues. Additional input was given to the case study coordination of Case Study Baden-Württemberg and to the set up of the EU25+2 case study. In WP 3.1, Forest Resource Databases and other concepts for mapping of forest resources were further developed, tested and documented. Effects of wood allocation on the sustainability of total FWCs were illustrated. Some alternatives meeting product requirements were compared. In WP 3.2, production functions for harvesting work, different tree species, tree sizes and terrain conditions were applied. In WP 3.3 a set of existing and future transport modes for wood was identified and a partial model for all Modules was developed. In WP 3.4, both M3- specific parts of the case studies and FWCs at European level were defined; furthermore, calculation modes were developed. All WP's were involved in data collection, the definition of indicators for the case studies and EU level as well as the calculation of indicator values, shares, split ratios and providing of conversion factors.

4 Summary per Work package

WP3.0 Coordination/ Management:

WP3.0 “Coordination” took care both of fulfilling the objectives promised in the DOW and of answering to requests from the coordinator or other modules. It ensured the quality control of deliverables by using the cross-checking system for PDs and Ds within M3, as well as by an external evaluator. The interaction with IP management and other modules ran also smoothly and close to timetable; the same applies to the annual reporting of year 4.

The Case Study Baden-Württemberg was organised. ALUFR provided together with FVA and in close cooperation with M2 drivers for the case study and the bio-energy scenario and passed them on to M4 and M5. Therefore, several inter- and intra- module meetings were organised. Furthermore, a calculation tool was developed which allows the calculation of reference futures including possible impacts of drivers from EFI-GTM, which were provided by M1 and of M3's module specific drivers. These data were provided to M1 as well as to the other Modules and can be found at the Portal.

The M3-part of the EU 25+2 case study was organised. The topology was built up, key processes, specific processes and products were identified and connected to the neighbouring modules. The “nature protection scenario” was implemented and it was ensured that all partners deliver the required data. Therefore, meetings (physical and via telephone) were organised, for example a work shop on data entry. Additionally, EFORWOOD's annual meeting in Mai 2009, the “EFORWOOD-week”, was organised by ALUFR and hosted in Freiburg.

WP 3.1 Quality Assessment and Allocation

Methods were developed for the mapping of properties and volumes of available forest resources, based on combined use of inventory and measurement data, integrated sets of models and simulation. The methods were tested in four regional case studies, reflect important aspects in different forestry wood chains and European countries, and have shown to be useful: Two applications were performed in Västerbotten, (Sweden), one in Baden-

Württemberg and one in South Scotland. Sets of such integrated models for important tree species in Europe were compiled and documented.

Sustainability effects of wood raw material allocation were illustrated by simulating the impact of allocation on selected sets of relevant ToSIA sustainability indicators in different forestry wood chains and European countries. Different allocation alternatives were compared 1) for fibre-based products in two case study starting with trees in Västerbotten and ending with used and recycled boxes for packaging in Germany, and 2) for solid wood products and bio energy in a study on allocation of wood from a forest resource in Scotland to sawmills with different end-products and to a power plant.

Proper alternatives for allocation of raw materials, meeting the requirements of relevant production lines, were defined and compared to provide a basis for these and other EFORWOOD case studies. Methods for early assessment of properties to support proper allocation were identified and their usefulness illustrated.

WP 3.2 Harvesting systems

In WP3.2 efforts were spent in identification operational processes in harvesting and hauling to roadside to be used in Regional case studies and European Forest Wood Chain. The calculation routines brought forward in WP3.4 were used to update Reference futures and Scenarios. Data collection and estimation of roundwood flows have been finalized for Case studies. Changes in Flows and indicator values for different scenarios, Technical (Scandinavian Case) and Biofuel and slope (Baden-Württemberg Case) have been calculated. Due to imperfect statistics for forest operations extensive work assignments have been spent on the European Forest Wood Chain (EU 27), especially for several Eastern and Southern countries. Changes due to applied reference futures and scenarios (Natura 2000 levels) have been performed as well as evaluation of sustainability impact. In general efforts were made to design the interaction between harvesting system and allocation of roundwood to different product lines, N.B. sawn wood, pulpwood and energy assortments

WP 3.3 Transport systems

Besides collection of data, two actions can be highlighted: 1/an updated outlook of the wood transport systems, 2/ the transport tool. A major effort was made on the tool allowing the measurement of indicators related to transport processes of each FWC (from regional case to EU). The tool provides a detailed “photography” of the transport defined as the movement of goods from one place to another, integrating major logistics variables. The tool estimates sustainable indicators of freight transport by road, rail and inland waterway for 2005, 2015 and 2025. Users provided feedbacks to improve the tool and used either the tool results or their own data for feeding ToSIA.

WP 3.4 Process modelling:

In WP3.4 “Partial modelling” a lot of effort was put into providing calculation routines. Two module specific models were tested and developed within the framework of the case- and/or EU 25+2 study.

The first tool is a concept of calculating case- and EU 25+2 study data. Possible impact of M1 general drivers on M3 forest operations and transport specific issues were determined and quantified for 2015 and 2025 for an A1 and a B2 reference future; the results were integrated in the model called “calculation of reference futures in M3 26.01.2009.xls”.

Required data for M3 were collected; indicator values, shares and split ratios were calculated and imported into the Client. Therefore, the second specific model was created. It supports

researchers in the collection of data in the EU-FWC for harvesting and hauling processes. Calculation modes were developed to calculate the required data, based on the example of Poland, which is a ‘key country’ for all other East European countries.

	Title		
WP X.X	Title		
WP Y.Y	"		
WP Z.Z	"		
Subproject 1	Title		
WP 1.0	"		
WP 1.1	"		
WP 1.2	"		
Subproject 2	Title		
WP 2.0	Title		
WP 2.1	"		
WP 2.2	"		
WP 2.3	"		
Subproject 3	Title		
WP 3.0	WP 3.0		
WP 3.1	WP 3.1		
WP 3.2	WP 3.2		
WP 3.3	WP 3.3		
WP 3.4	WP 3.4		
Subproject 4	Title		
WP 4.0	Title		
WP 4.1	"		
WP 4.2	"		
WP 4.3	"		
Subproject 5	Title		
WP 5.0	Title		
WP 5.1	"		
WP 5.2	"		
WP 5.3	"		
Subproject 6	Title		
WP 6.0	Title		
WP 6.1	"		

Table 5: Workpackages - Plan and Status Barchart.

4.1 Appendix 1

4.1.1 WP-reports for months 37-51

Periodic Activity Report, WP Leader Annual report 12 months

5 Period: November 1, 2008 – January 31, 2010

WP leader	Gero Becker, ALUFR	WP number	3.0
Date	08.01.2010		
Work package objectives			
<ol style="list-style-type: none"> 1. To ensure that M3 objectives are fulfilled and deliverables are provided according to the time schedule; 2. To coordinate the interaction with IP management and with other modules; 3. To develop an intra-module training concept; 4. To carry out and guide the annual reporting, as well as other to be accomplished Deliverables and project work; 5. To coordinate case study Baden-Württemberg; 6. To coordinate M3’s contributions to the regional cases Scandinavia and Iberia, and the EU 25+2 case study. 			

Progress towards objectives

1. It had been taken care of work on deliverables, requests from task forces and other modules and WPs in a timely manner, especially also concerning the data collection for the case studies. In order to have a good time management, a detailed working program in cooperation with the other M3 members had been developed;
2. There was a good IP management interaction, as well as with other modules. M3 attended all IP board meetings;
3. For the intra-module interaction M3 organised a workshop for data entry in the EU 25+2 study and a M3 meeting for the scenario storyline development, where both times also other modules were invited and participated. Additionally, the Eforwood-week was organised in Freiburg and was hosted by ALUFR and FVA;
4. The annual reporting was carried out and guided, as well as other deliverables and project work that was accomplished. In addition, for D deliverables, M3 was successful to appoint Andrzej Kundzewicz from Bastex, Poland as external reviewer;
5. Franka Brüchert (FVA) managed the BW case study from M2-M5 and ensures good connection between the modules. A description of bioenergy scenario within BW case study against the background of Reference Future A1 and B2 has been developed.

Management and coordination of Baden-Württemberg regional case study (FVA): Actual items in the Baden-Württemberg case study were organised, e.g. harmonisation of material flow for ToSIA. Processes and structure were defined and entered in Database Client. The indicator data were collected for the reference year 2005, the reference futures A1 and B2 for the years 2015 and 2025, and the bio-energy scenario applied for reference future A1 for both reference years. All data were imported into Client, validated and revised. Supplementary, required information of material flow quantifications, product shares, split ratios and conversion factors were reported, validation tools developed and revisions applied accordingly.

Innventia has organised and coordinated activities on case study level on sustainability effects of different aspects of wood quality, in cooperation with FR, Skogforsk and FVA, executed within WP 3.1.

6. Work within the EU 25+2 study has been organised and prepared between all partners. The topology of the EU-FWC in the EFORWOOD database was built up. M3 is working on country level; however, country groups were built to ensure that representative data will be available for a group of countries if the responsible organisation won't find any data for one country. All processes and products were defined and filled in the database client.

It was taken care about the progress of work and ensured that all partners deliver required data as material flow quantifications, shares, split ratios, conversion factors and indicator values for the reference year 2005, the reference futures and the conservation scenario.

All M3 partners contributed actively to the work in WP 3.0.

Deviations from workprogramme (if any)

WP leader	Sven-Olof Lundqvist	WP number	3.1
Date	7th January 2010		
<p>Work package objectives, starting point of work at beginning of reporting period.</p> <ol style="list-style-type: none"> 1. To test the methods developed for the mapping of properties and volumes forest resources, based on combined use of inventory and measurement data, integrated sets of models and simulation, and show their usefulness through the execution of regional case studies, reflecting important aspects in different forestry wood chains and European countries. 2. To document some sets of integrated models useful for mapping of forests resources of important tree species in Europe 3. To illustrate sustainability effects of wood raw material allocation in different forestry wood chains and European countries, by simulating the impact of allocation on selected sets of relevant ToSIA sustainability indicators in regional case studies. 4. To define and compare proper alternatives for allocation of raw materials meeting the requirements of relevant production lines and to illustrate the effects in regional case studies. 5. To identify and illustrate the usefulness of methods for early assessment of allocation. 			
<p>Progress towards objectives</p> <p>Partners involved: Innventia, FCBA, ALUFR, FVA, Forest Research (FR), Skogforsk</p> <ol style="list-style-type: none"> 1. The objective of the mapping of properties and volumes in forest resources is to provide information to support optimal allocation of wood to various products and also efficient processing. The mapping is achieved through simulation with models. The following tasks have been performed: a) Innventia has built “Regional Resource Databases” for the forest resource of Västerbotten (Sweden), with estimated properties of trees and parts of trees related to products; b) Skogforsk has applied software for bucking simulation and log characterisation on stands selected for “Scandinavian Case, including market pricing of wood products relating to properties; c) FVA has matched inventory data and quality classes of Baden-Württemberg, to estimate grades of saw logs from spruce in the resource; d) FR has forecasted growth of Sitka spruce under different management in Craik Forest in South Scotland and predicted volumes of logs that will become available for different end uses (structural timber, pallet wood, biomass). - Models for log grading of Maritime pine in Aquitaine have been built by FCBA and used for simulating wood quality and log grading of the wood supply 2. The integrated sets of models used for Scots pine, Norway spruce and Sitka spruce in the cases studies a)-d) are documented in the report and deliverable PD3.1.8 “Mapping of forest resources and models used”. 3. To illustrate sustainability effects of raw material allocation in different FWCs and European countries, the impacts of allocation on selected sets of relevant ToSIA sustainability indicators have been simulated in two case studies: e) from Innventia by fibre based products in a study starting with trees in Västerbotten and ending with used and recycled boxes for packaging in Germany and f) by FR for solid wood products and bio-energy in a study on allocation of wood from a forest resource in Scotland to sawmills with different end-products and to a power plant. In both cases, different options of mills were compared, showing that the results may change very 			

much if different perspectives, processes, constrains etc. are applied. Therefore, it is hardly possible to produce general results. Several of the process models in ToSIA showed to be too simplistic for this. When going into studies of applicable character, much specific expertise on processes, products, logistics and markets is needed to reach realistic results: to define the case, specify interactions and limitations, add detail and implement modifications. More dedicated tools would be useful.

The production chains studied, alternatives compared, objective and method applied and the results obtained in each case study are presented in a report and deliverable PD 3.1.9 “Illustration of sustainability effects of allocation”.

4. The efforts to define proper alternatives for allocation of raw materials meeting the requirements of relevant production lines in different countries have continued. This has been a prerequisite for the presented applications. The design of allocation schemes together with experts from other Modules has also been a crucial issue for case studies and the European level. A challenge has been to keep it as “simple” as possible but still reasonably realistic, in order to reduce the work with data collection.
5. Alternatives for assessment of quantity and quality at early stages of the chain and in key positions between forest and industry have been analysed with respect to their effectiveness and costs, in order to identify methods for early assessment of properties, forming a basis for allocation. This has engaged all partners, in particular those involved in the case studies a) – f).

The work of Forest Research to analyse the effectiveness of pre-harvesting, and post harvesting assessments of the quality of standing Sitka spruce trees and bucked logs has continued, including acoustic measurements and studies of how remote sensing (airborne LIDAR and terrestrial Laser Scanning) can be used to evaluate the volume and quality of the timber resource.

Discussions and presentations on methods, status and results related to WP3.1 has been held at the Eforwood weeks in Freiburg (May 2009) and Uppsala (September 2009) as well as the M3 meeting in Paris (March 2009). For the studies with allocation, there has been a tight coordination between the activities of Innventia and Forest Research. Results were presented in two speeches at the Conference “Sharpen your sustainability tools” in Uppsala (September 2009). Skogforsk presented results from a detailed case analysis of available sawlog properties for different solid wood products in Västerbotten at the poster session of the same conference. Small scale seminars have been arranged. Successive status reports have been given at meeting with industry groups.

Deviations from workprogramme No major deviations as compared to the workprogramme established for year 4.

WP leader	Staffan Berg	WP number	3.2
Date	08.01.2010		
Work package objectives , starting point of work at beginning of reporting period.			
<ol style="list-style-type: none"> 1. To select a preliminary set of data for ToSIA at different levels (case study) and to select preliminary set of data for European case study 2. To analyze existing and future harvesting systems (scenarios) on different technical levels and organizational framework and their sustainability impacts 3. To apply chosen harvesting systems for different product lines (solid wood, fibre, bio energy), terrain (flat, steep) and socio-economic framework (big scale-small scale enterprises) 4. To elaborate existing and new concepts for integrated planning and organization of 			

- harvesting operations and
5. assess their influence on the sustainability impact of the operation
 6. To analyze interactions between harvesting systems/techniques and silvicultural management concepts with special regard to sustainability impacts
 7. To identify, evaluate and calculate adequate harvesting systems for different product lines (solid wood, fibre, bio energy), terrain (flat, steep) and socio-economic framework (big scale-small scale enterprises)
 8. To analyze interactions between harvesting systems/techniques and wood allocation (quality, defects, sorting) in different product lines
 9. To define training needs for planning staff and operators

Progress towards objectives, tasks worked on, and achievements made with reference to planned objectives, contractors involved.

The Working Package has for case studies concluded data collection for the base case and have analysed changes and properties of logging systems in reference futures and scenarios, as for the changed technical and organisational framework for these in the actual reference future or scenario. Their sustainability impacts have been duly evaluated (objective 1-6). For European case study a set of values for the demonstration set of indicators have been selected for EU 27. It has been done with i) collecting of appropriate data, ii) when those were incomplete - by modelling based on knowledge about used systems and their technical, biological and economical environment. Changes due to applied reference futures and scenarios have been performed as well as evaluation of sustainability impact (objective 1-6). Efforts were being made to design the interaction between harvesting system and allocation of roundwood to different product lines, N.B. sawn wood, pulpwood and energy assortments (Objectives 7-8). Due to lack of data with sufficient dissolution concerning intrinsic wood properties in case studies and European case, the interaction between logging and products have nor been dealt with in WP 3.2 but in WP3.1 (objectives 7-8). Training of staff have been done at the participant organisations and at four occasions (Helsinki January and June 2009; Freiburg during May and August 2009). Scientists from Skogforsk, ALUFR, FR FCBA and FVA were contributing to the effort. Innventia has followed the work in WP3.2. Some results (see above) have been incorporated in WP3.1

Deviations from workprogramme (if any), corrective actions taken, nature and reason for problem, contractors involved.

The collection and calculation of data sets for case and European studies have been more laborious than foreseen, consequently demanded more time than planned. Fewer efforts were spent in order to solve objectives 7 and 8 as data in case studies didn't have the degree of detail that was deemed necessary.

WP leader	Elisabeth LE NET	WP number	3.3
Date	January 14th, 2010		
Work package objectives , starting point of work at beginning of reporting period.			
<ol style="list-style-type: none"> 1. To analyze and calculate scenarios of existing and future road, rail and water transport systems for wood products, 2. To harmonise transport aspects between different modules (M3-M4-M5), 3. To analyze and calculate the transport techniques, logistic concepts, loading and storage alternatives with special emphasis on environment, economy of the whole process and the social dimensions, 4. To analyze and calculate the complete transport system with special emphasis on the 			

<p>sustainability impacts for the case study and European case</p> <p>5. To detect training needs for planning staff and operators</p>			
<p>Progress towards objectives, tasks worked on, achievements made with reference to planned objectives, contractors involved.</p> <ol style="list-style-type: none"> 1. Identification a set of future transport and logistic solutions for the FWC products (hypothesis made for 2015 and 2025) 2. Common data formats for transport (M3, M4, M5) and integrated approach: transport & international trade (incl. bucket approach) 3. Collection of data and database dedicated to the FWC products usable for ToSIA and adapted to partial models 4. Two transport tools (Excel files) - one for the intra-national flows and one for international flows – calculating indicators. Usage of the Transport Tool for the data collection and calculation on different FWCs for reference year 2005, reference futures A1 and B2 in 2015 and 2025, in different scenarios and import/ export processes. 			
<p>Deviations from workprogramme (if any), corrective actions taken, nature and reason for problem, contractors involved.</p> <p>For case studies and the European FWC, a focus has been made on the elaboration of a common “Eforwood transport tool” for comparable results along the chain. Therefore, during this fourth year, the training dimension for wood transportation has not been prioritised.</p>			
WP leader	Janine Fischbach	WP number	3.4
Date	8th of january, 2010		
<p>Work package objectives</p> <ol style="list-style-type: none"> 1. To define the module specific parts of case studies and European case study; 2. To calculate common criteria /indicators and to develop routines; 3. To calculate the data for reference futures and scenarios and develop a routine which calculates data from all partners in an harmonised way; 4. To integrate partial results of SIA analysis from WP 3.1 to WP 3.3 into a chain model at case study and European level as an example; 5. To integrate more detailed process models and chains to allow comparison of allocation alternatives based on effects in all the chain (forest to recycling); 6. To identify inter-module and external training needs. 			
<p>Progress towards objectives</p> <ol style="list-style-type: none"> 1. M3- specific parts of the case studies in as well as chains in the EU 25+2 were defined for material allocation, harvesting, hauling, transport and mill-gate handling. Therefore, participation at EU-TF meeting, 12-14/01/2009 in Espoo, Finland. 2. Economic, environmental and social indicators in the case study and EU 25+2 study were calculated for different time horizons in cooperation with Skogforsk and FVA. A manual which supports researchers in the collection and calculation of data in the EU-FWC for harvesting and hauling processes was developed and conversion factors for M3 were identified. 3. Possible impact of M1 general drivers on M3 forest operations were determined and quantified for 2015 and 2025 for an A1 and a B2 reference future and the results were integrated into a calculation model which can be used in case studies and EU 25+2 study. This partial model for M3-reference future calculation has been chosen within 			

the “scenario task force” as a proxy for model development for modules M2 to M5, as well as to give feedback on general data needed from M1 for reference future and scenario calculation within the modules. In addition to this it passes on M3 information to M2 and M4/M5.

4. The integration of models and results related to calculation of indicators has been complemented with the integration of models and results for analysis of properties along the chains for identification of proper allocation alternatives with respect to raw material requirements of relevant products and for comparison of allocation alternatives based on sustainability indicators. The major effort has been to complement the building of the Resource Database for Västerbotten with integrated data on stands, trees, logs and chips with the development and integration of more detailed process models and chains in cooperation with M4 and M5 experts. These results have provided a basis for the analysis of sustainability effects from better allocation in all the chain from the forest to the used and recycled product performed in WP3.1 (Innventia).
5. Several trainings took place. The partners FR, FVA, Skogforsk and ALUFR took part in a “M3 data entry workshop for EU level” at 3-4/08/2009 in Freiburg, Germany. There was a M3 meeting for the set up of the chain in the European case study at 2-3/03/2009 in Paris, France.

Deviations from workprogramme (if any)

5.1

5.2 Appendix 2

5.2.1 List of deliverables

Table 1. List of Deliverables during the period November 1, 2008 – January 31, 2010.

List all deliverables, giving date of submission and any proposed revision to plans.

Del No.	Deliverable name	WP No.	Due date	Actual/ Forecast delivery date	Estimated indicative person-months *)	Used indicative person-months *)	Lead contractor
PD3.0.3	Draft Description of Baden-Württemberg Caste Study – Update spring 09	WP3.0	Month 43	Month 43	ALUFR:0.75 FCBA:0 FR:0 FVA:0.2 SF:0 Innventia:0	ALUFR: 0.75 FCBA: 0 FR: 0 FVA: 2.0 SF: 0 Innventia: 0	FVA and ALUFR
D3.0.5	Annual reporting for 4th year	WP3.0	Month 47	Month 52	ALUFR:1.58 FCBA:0.7 FR:1.5 FVA:0.2 SF:0.2 Innventia 0.7	ALUFR:2.0 FCBA: 0.7 FR: 0.63 FVA: 1.0 SF: 0.2 Innventia:0.7	ALUFR
PD3.0.3	Final Description of Baden-Württemberg Caste Study	WP3.0	Month 47	month 52	ALUFR:0.75 FCBA:0 FR:0 FVA:0.5 SF:0 Innventia:0	ALUFR: 3.78 FCBA: 0 FR: 0 FVA: 4.35 SF: 0 Innventia: 0	FVA and ALUFR

PD3.1.8	Mapping of properties in forest resources and models used	WP3.1	Month 43	month 51	ALUFR: 3.0 FCBA:0 FR:6.5 FVA:2.0 SF:0.8 Innventia: 2.3	ALUFR:3.0 FCBA 0.2 FR: 7.0 FVA: 7.25 SF: 0.8 Innventia: 2.3	Innventia
PD3.1.9	Illustration of effects on sustainability from allocation in fibre and solid wood chains in M3 with effects downstream in M4 and M5	WP3.1	Month 47	will be delivered as soon as possible	ALUFR: 2.83 FCBA:0.7 FR:1 FVA:2.0 SF:0.2 Innventia:3.0	ALUFR: 3.84 FCBA: 0.5 FR: 3.0 FVA: 0 SF: 0.2 Innventia: 3.3	Innventia
PD3.2.6	Set of data for harvesting processes to be put into ToSIA at case study and European case level	WP 3.2	Month 42	month 51	ALUFR:3.72 FCBA:4 FR:1,5 FVA:5.0 SF:3.0 Innventia: 0	ALUFR: 6.17 FCBA: 4.0 FR: 2.31 FVA: 13 SF: 3.0 Innventia: 0	SF
D332	Analysis of existing transport methods and identification of alternate methods developed from new cost data, labour input and energy consumption	WP 3.3	Not determined - new version	June 2009 (M44)	ALUFR FCBA: 0.5 FR FVA: 0 SF: 0.2 Innventia	ALUFR 3.17 FCBA: 0.5 FR: 0.25 FVA: 0 SF: 0.2 Innventia: 0	FCBA
PD334	Data collection of transport processes to TosIA at case study and EU level	WP 3.3	April 2009 (M42)	July 2009-10-12(M45)	ALUFR 1.1 FCBA: 2.25 FR FVA SF: 0.4 Innventia:0	ALUFR 2.0 FCBA: 2.25 FR: 0.5 FVA: 0.25 SF: 0.5 Innventia:0	FCBA
PD336	Stratified partial model on transport	WP 3.3	April 2009 (M42)	July 2009-10-12(M45)	ALUFR 1.9 FCBA: 2.25 FR FVA SF: 0.6 Innventia: 0	ALUFR 2.0 FCBA: 2.25 FR: 0.57 FVA:0 SF: 0.6 Innventia:0	FCBA
PD337	With PD334&6 : Eforwood transport tool (Excel files)	WP 3.3	April 2009 (M42)	May 2009 New version (more friendly user): November 2009	FCBA		FCBA
PD3.4.6	Development of –topology for M3 processes at EU-chain level	WP3.4	Month 39	Month 39	ALUFR:3.3 FCBA:0 FR:1 FVA:1 SF:1.3 Innventia: 2.0	ALUFR:3.3 FCBA: 1.0 FR: 0.6 FVA: 0 SF: 1.3 Innventia: 2.0	ALUFR

D3.4.7	"Processes, Volume Flows and of Values of Sustainability Indicators of the Chain of Technical Timber Production to Support the Tool for Sustainability Impact Assessment (Methods and Materials using the Example of Poland; Results for Poland, Czech Republic, Lithuania and Hungary)"	WP3.4	Month 47	Month 47	ALUFR:3.35 FCBA:1 FR:2,5 FVA:1 SF:1.0 Innventia: 2,0	ALUFR: 6.35 FCBA: 1.0 FR: 0 FVA: 0 SF:1.0 Innventia: 1.84	ALUFR
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*) if available

5.3 Appendix 3

5.3.1 List of milestones

Table 2. List of Milestones during the period November 1, 2008 – January 31, 2010.

List all milestones, giving date of achievement and any proposed revision to plans.

Milestone No.	Milestone name	Workpackage No.	Date due	Actual/Forecast delivery date	Lead contractor
M3.0.3	Draft Description of Baden-Württemberg Caste Study – Update spring 09	WP3.0	Month 43	Month 43	FVA and ALUFR
M3.0.5	Annual reporting for 4 th year	WP3.0	Month 47	Month 51	ALUFR
M3.0.3	Final Description of Baden-Württemberg Caste Study	WP3.0	Month 47	Month 51	FVA and ALUFR
M3.1.8	Mapping of properties in forest resources and models used	WP3.1	Month 43	Month 51	Innventia

M3.1.9	Illustration of effects on sustainability from allocation in fibre and solid wood chains in M3 with effects downstream in M4 and M5	WP3.1	Month 46	Month 51	Innventia
M3.2.6	Set of data for harvesting processes to be put into ToSIA at case study and European case level	WP 3.2	Month 42	Month 51	Skogforsk
M.337	Delivery of a preliminary set of data for transport processes to be provided for ToSIA at European case level (Month 30)	WP 3.3	Month 30 (in the DOW)	January 2009 (M39): first version of the Transport tool	FCBA
M 3.4.6	Development of – topology for M3 processes at EU-chain level	WP3.4	Month 39	Month 39	ALUFR
M3.4.7	"Processes, Volume Flows and of Values of Sustainability Indicators of the Chain of Technical Timber Production to Support the Tool for Sustainability Impact Assessment (Methods and Materials using the Example of Poland; Results for Poland, Czech Republic, Lithuania and Hungary)"	WP3.4	Month 47	Month 47	ALUFR

Periodic Management Report

Section 1 - Justification of major cost items and resources

WP0.0 Scientific Co-ordination:

Albert-Ludwigs Universität Freiburg (ALUFR)

ALUFR with Prof. Dr. Dr. h. c. Gero Becker as its coordinator is the leader of Module M3. ALUFR consist out of the Institute of Forest Utilization and Work Science (M3) with director Prof. Dr. Dr. h. c. Gero Becker as well as of the Institute of Forest Yield (M2) with director Prof. Dr. Heinrich Spiecker.

In addition to the module M3 coordination, ALUFR is also participant of several Work Packages (WP0.0, WP3.0, WP3.1, WP3.2, WP3.3 and WP3.4).

ALUFR is involved in several scientific coordination activities and is working closely together with the project Co-ordinator Skogforsk, as well as with the other module leaders and the WP leaders of Module M3. These activities comprise the following issues which ensure the continuing progress and scientific quality of the project EFORWOOD.

- to co-ordinate and harmonise the efforts among the module activities;
- to design and regularly update the implementation plan (Implementation Plan Month 37 to 48) of the IP, including the designing of the reporting methods and templates for the modules;
- to watch over the distribution of manmonths of the partners for the individual Implementation Plan and the remaining time of the project,
- to follow up the overall progress of the project and to give direction to the project;
- to design the content of joint IP meetings and to participate at those
- to prepare the scientific progress and the fourth annual report to the European Commission
- to ensure an efficient transfer of project results into dissemination (co-ordinated by Module 6)

WP 3.0 Coordination/Management: Work performed by each contractor (year 4)

Albert-Ludwigs Universität Freiburg (ALUFR) (6,53 MM)

ALUFR is the work package leader of WP3.0 “Coordination”. Thus, its work includes the coordination and management of the work within the Module M3, in cooperation with the leaders of its five work packages WP3.0 “Coordination”, WP3.1 “Quality assessment and allocation”, WP3.2 “Harvesting systems”, WP3.3 “Transport systems”, WP3.4 “Integrated Partial Chain Modelling” and its five partner organisations (FCBA, FVA, Forest Research (FR), Innventia, and Skogforsk) as well as the interface management between those organisations, work packages and case studies, EU 25+2 study and scenarios. It included intra-module communication with all partners via telephone and email, as well as the organisation of the following inter- and intra-module meetings:

- EFORWOOD week in Freiburg, Germany date (pre-meeting at 4th) 5-7/05/2009
- EFORWOOD week in Uppsala, Sweden, date 21-22/09/2009
- Final EFORWOOD conference in Uppsala, Sweden, date 23-24/09/2009

Meetings for EU-FWC:

- EU-TF, telephone meeting, date 04/11/2008, 11-12h
- EU-TF, telephone meeting, date 28/11/2008, 10 -12h

- o EU-TF physical meeting in Espoo/ Finland (KCL), physical meeting, date 12-13/01/2008
- o EU-TF, telephone meeting, date 12/02/2009, 10 -12h
- o EU-TF, telephone meeting, date 18/03/2009, 10-11:30h
- o EU-TF, telephone meeting, date 22/04/2009, 10:30
- o EU-TF, physical meeting at EFORWOOD Week in Freiburg/ Germany 4th and 7th of May
- o EU Meeting: workshop on import/ export issues in Espoo/ Finland (KCL), date: 10-12 /06/2009
- o EU-TF, telephone meeting, date 28/08/2009, 12:30h
- o EU-TF, physical meeting at EFORWOOD Week in Uppsala, Sweden, date 23-24/09/2009
- o EU-TF, telephone meeting, date 01/12/2009, 15h
- o EU-TF, telephone meeting, date 11/01/2010, 14h

Internal meetings as e.g.:

- o Physical meeting with FVA and Fobawi for discussing chain topology, data collection, calculation and status quo in EU-FWC, date 23/01/2009
- o Physical meeting with FVA and Fobawi for adding country specific processes to the chain topology and status quo in EU-FWC, date 02/02/2009
- o Internal Meeting (Physical meeting) to discuss research questions in EU-FWC and BW case study (ALU-FR, FVA), date: 04/02/2009
- o Physical meeting with FVA and Fobawi for discussing chain topology, data collection, calculation and status quo in EU-FWC, date 07/04/2009
- o Physical meeting with FVA and Fobawi for discussing chain topology, data collection, import/export and status quo in EU-FWC, date 27/01/2009
- o Physical meeting with FVA and Fobawi for calculation of split ratios and share (including import/export) and status quo in EU-FWC, date 13/07/2009

Meetings for scenario:

- o Scenario TF, telephone meeting, date 03/11/2008, 1-2 p.m.
- o Scenario TF, telephone meeting, date 01/12/2008, 1-2 p.m.
- o Scenario TF, telephone meeting, date 10/02/2008, 10 a.m.
- o Scenario TF, telephone meeting, date 09/03/2008, 9 a.m.
- o Scenario TF, telephone meeting, date 06/04/2008, 10 a.m.
- o Scenario TF Meeting at EFORWOOD Week at 6th of May, physical meeting
- Physical meeting with FVA and Fobawi for discussing bio-energy assumptions and to quantify the storyline of the BW case study; date 30/01/2009, 4p.m.

Meetings for BW case study as e.g.:

- o Physical meeting with FVA and Fobawi for data calculation and data cross check in BW case study, date: 19/11/2008
- o Telephone meeting to discuss the calculation of reference futures I , date 11/12/2008, 15h. Participants: M3 Skogforsk, FVA and ALUFR
- o Physical meeting to discuss the driver for the calculation of reference futures in all case studies, date 12/12/2008, 2.30p.m.; Participants: M3 Skogforsk, FVA and ALUFR
- o BW Task Force Meeting at EFORWOOD Week at 6th and 7th of May, physical meeting
- o Telephone conference for all case studies, date: 26/03/2009, 1-2 p.m.
- o Meeting with FVA and Fobawi for data evaluation and conversion factor harmonisation, date: 13/07/2009

- Telephone conference for validation of results from Baden-Württemberg case study with EFI, FVA, vTI and ALUFR; date: 22/01/2010, 10:30 a.m.

M3 Meetings:

- M3 physical meeting in Paris, date 02 and 03/03/2009
- M3 physical meeting: training in ALUFR “M3 data entry workshop for EU level” at 3-4/08/2009 in Freiburg, Germany

and the participation at the following meetings:

- IP Board meeting (32), telephone meeting, date 04/11/2008, 1-3 p.m.
- IP Board meeting (33), telephone meeting, date 04/12/2008, 1-3 p.m.
- IP Board meeting (34), telephone meeting, date 10/12/2008, 0:30-2:30 p.m.
- IP Board meeting (35), physical meeting in Brussels
- IP Board meeting (36), telephone meeting, date 12/03/2009, 1-3 p.m.
- IP Board meeting (37), telephone meeting, date 15/04/2009, 3-3.45p.m.
- IP Board meeting (38), physical meeting in Freiburg/ Germany during EFORWOOD week, date 06/05/2009
- IP Board meeting (39), telephone meeting, date 10/06/2009, 1-3 p.m.
- IP Board meeting (40), telephone meeting, date 08/07/2009, 1-3 p.m.
- IP Board meeting (41), telephone meeting, date 01/09/2009, 1-2.30p.m.
- IP Board meeting (42), physical meeting in Uppsala/ Sweden during EFORWOOD week, date 22/09/2009
- IP Board meeting (44), telephone meeting, 12/11/2009, 10-11:25 a.m.
- IP Board meeting (45), physical meeting in Frankfurt airport, date 14/12/2009, 10 a.m.-4p.m.
- General Assembly Meeting (6) in Freiburg/ Germany date 05/05/2009
- „42. International Symposium on Forestry Mechanisation (FORMEC)” in Prague and Kostelec/ Czech Republik
- Scientific Conference „Shape your sustainability tools – and let your tools shape you“; in Uppsala, Sweden, date 23-24/09/2009
- 6th FTP Conference in Stockholm, Sweden, date 09-11/11/2009

Module coordination:

- Harmonisation of data collection, data handling, data storage, quality insurance;
- ALUFR coordinated the information flow between coordinator, other modules and task forces (on Case study Baden-Württemberg, EU25+2 study and scenarios) with M3 module partners, by forwarding e.g. IP board and other protocols, as well as by distributing, reminding and gathering of requests and/ or reports from other modules like documents (e.g. the xls-files with calculated volumes, outputs, size classes etc from Alterra) and other or simple questions via email.
- ALUFR organised and coordinated the EFORWOOD-week in May 2009 in Freiburg.
- Organisation and harmonisation of work on the case study Baden-Württemberg and the, EU25+2 study as well as for the scenarios.
- To set-up a detailed working plan for the project months 37 to 48.
- Carrying out the annual reporting for WP0.0, WP3.0, WP3.4 and M3, including preparing the forms for the partners (work packages 3.0 to 3.4), proof-reading, checking and editing.
- Clarifying questions concerning project administration with the partners
- Reminding and initiating financial auditing for M3 partners, if necessary

The module coordination tasks were substantial. Additional coordination activities were necessary for inputs to the task forces (development of calculation tool for reference futures).

Forest Research (0.63 MM)

- contributed to the reporting of work package results, to the management of financial and administrative tasks, the promotion and publicising of the Eforwood project in the UK, and to the overall cooperative communication between all module partners;
- FR has organised and documented monthly internal Eforwood meetings where project deliverables and indicator data were discussed;
- Presented Eforwood methodologies and initial UK results at the Institute for Agricultural Engineers (IAgrE) Conference (May 2009);
- FR has participated in several meetings and workshops including: M3 workshop in Paris 2-3 March 2009, Data collection and analysis meeting in Dublin with Irish partners 9-10 March 2009, Data refinement meeting in Glasgow with James Jones (sawmilling company) 14 April 2009, M3-M4 meeting in London with BRE 30 April 2009, Eforwood week in Freiburg 4-7 May 2009, Eforwood Import-Export workshop in Helsinki 9-12 June 2009, M3 workshop in Freiburg 3-5 August 2009, Eforwood week and Final Conference in Uppsala 21-24 September 2009

Innventia (0,7 MM)

- Innventia has as leader of WP3.1 participated in the management of M3 and contributed to the reporting of work package results, to the management of financial and administrative tasks, the promotion and publicising of the Eforwood project, and to the overall cooperative communication between all module partners;
- In this role emphasised issues related to mapping of properties of forest resources, requirements of different products and processes, and proper allocation to meet these property demands, in cooperation especially with FR;
- Coordinated the case studies on mapping of forest resources and sustainability effects from wood allocation;
- Presented Eforwood methods and results at meetings with industry, pulp and paper companies in particular, and universities.;
- Participated in several meetings and workshops including: M3 workshop in Paris 2-3 March 2009, Eforwood week in Freiburg 4-7 May 2009, Eforwood week and Final Conference in Uppsala 21-24 September 2009 and the 6th FTP Conference in Stockholm 9-10 November 2009.

Skogforsk (0,2 MM)

- Coordinated the development of Data Collection Protocol and contributed to the coordination of the Scandinavian Case.
- Contributed to the reporting and management of results, financial and administrative matters.
- Communication between all module partners;
- Skogforsk has participated in several meetings and workshops including: M3 workshop in Helsinki January 2009, Paris March 2009, Eforwood week in Freiburg 4-7 May 2009, Eforwood Import-Export workshop in Helsinki 9-12 June 2009, M3 workshop in Freiburg 3-5 August 2009, Eforwood week and Final Conference in Uppsala 21-24 September 2009.

FVA (7.35 MM)

- FVA contributed to the M3 annual report [D 3.0.6] and to the on-going issues on coordination and management within Module 3 concerning data collection, data handling, data storage, quality insurance;
- FVA contributed to the discussions on indicator calculation and revision of data collection protocols;
- FVA participated in the following meetings: Eforwood weeks in Freiburg (May 2009), and Uppsala (September 2009), the Eforwood Conference (September 2009); internal module meeting in Paris (March 2009); the EU-case import&export training in Helsinki (June 2009); telephone meetings; and contributed to the discussions on data exchange within and between modules.

Coordination Case study Baden-Württemberg:

- FVA took on responsibility for coordinating the case study “Baden-Wuerttemberg”; this included intra- and inter-module communication with all partners via telephone and email, and organisation of and presence at physical meetings during the Eforwood weeks in Freiburg and Uppsala. Telephone meetings were held to liaise between the different modules M3, M4 and M5. Day-to-day contact was held by email and telephone when necessary. FVA took on responsibility that deadlines were met according to the time schedule set by the IP board.
- FVA coordinated the information flow between coordinator, other modules and task forces (on indicators and scenarios) with BW task force member partners, by forwarding necessary documents, i.e. IP board minutes, DCP protocols, and information on clarification of further problems arising from the documents provided.
- FVA managed the revision of the Baden-Wuerttemberg case topology in Database Client, coordinated the information exchange and communication ensuring verification and finalisation of the case structure by the task force partners in accordance with the requirements of the ToSIA tool.
- FVA organised and harmonised data collection, data handling, data storage, quality insurance of work on the case study Baden-Wuerttemberg;
- FVA developed a tool for material flow calculations for the Baden-Wuerttemberg case applicable for all time references in order to validate Tosia calculations.
- FVA compiled regular up-dates of the PD 3.0.3 “Progress report on Case study Baden-Wuerttemberg” in cooperation of all partners involved in the case study.
- FVA acted as contact for matters arising from data collection concerning the different product chains and supported partners in modules M2, M3, M4 and M5 by providing information and data in Baden-Wuerttemberg specific matters;

FCBA (0,7 MM)

- participated to the EU Forest Wood Chain Task Force;
- organised an internal review of FCBA deliverables;
- Contributed to the reporting of results, financial and administrative data;
- has participated in several meetings and workshops including: M3 workshop in Paris March 2009 (taking in charge the organisation), Eforwood week in Freiburg 4-7 May 2009, Eforwood Import-Export workshop in Helsinki 9-12 June 2009, M3 workshop in Freiburg 3-5 August 2009, Eforwood week and Final Conference in Uppsala 21-24 September 2009

WP 3.1 Quality Assessment and Allocation: Work performed by each contractor (year 4)

WP3.1 deals with the issues to localise (map) raw materials with different wood and fibre properties in forest resources, to define property requirements of products and to assess and allocate available raw materials to mills and products. It is led by Innventia.

Albert-Ludwigs Universität Freiburg (ALUFR) (6.48MM)

- Contribution to the organisation and discussion on the layout and on the work plan of the workpackage, in close cooperation with Innventia and the other partners.
- Contributions to the identification of allocation possibilities and linkage to processes; further to that the determination of boundaries towards M2 and M4, in close cooperation with Innventia.
- Work on product tables for construction wood, pulp and paper, and bio-energy with regard to the case studies. Aimed for defining products of the Baden-Württemberg case study, the EU25+2 study and scenarios and reconciliation across the modules on certain production chains, close cooperation with Innventia, Sweden, and Forest Research, GB.
- Presentation, discussion and further development of these results at a M3 meeting in Paris, France, dated: 02-03/03/2009.
- Identification of sources for relevant data and of models for all case study regions, and scrawling of EUROSTAT data base, including data collection for the case studies and the EU-FWC.
- Contribution to work on scenarios. Presentation, discussion and further development of this item at M3 meeting in Paris/ France, dated: 02-03/03/2009.

Forest Research (10 MM)

- refined a South Scottish case study and performed an allocation analysis. The results and methodologies were documented in PD 3.1.8 and PD 3.1.9 and also presented at the Eforwood Final Conference;
- Completed and populated the UK and Ireland forest wood chains with data for 2005, A1/B2 reference futures and the Natura 2000 scenario;
- collaborated with internal and external organisations to source indicator data to be applied towards M3 processes (harvesting, forwarding, and transport to mill);
- created comprehensive databases to house and manage indicator and statistical data, FMAs, and conversion factors.

Innventia (5,62 MM RTD and 0,03 MM Training)

- Coordination of the overall work within WP3.1, with special emphasis on fibre-based product chains, while solid wood and bio energy chains were emphasised by FR;

- Development of methods for the mapping of properties and volumes of available forest resources, application and testing of the methods by building “Forest Resource Databases” for the Västerbotten forest resource;
- Coordination of four regional case studies (two in Västerbotten, one in Baden-Württemberg, one in South Scotland), reflect important aspects in different forestry wood chains and European countries, and the production of the report “Mapping of forest resources and models used” (Deliverable PD3.1.8), in cooperation with FR, FVA and Skogforsk;
- Compilation of models used in mapping of forest resources and documentation in the report, in cooperation with FR, FVA and Skogforsk;
- Identification of proper allocation alternatives of wood raw materials available in forest resources to key products and processes, in cooperation with the partners but with special contributions by FR, FVA and Skogforsk;
- Establishment of a further detailed Forest-Wood-Chain from trees in Västerbotten to used and recycled boxes of corrugated materials in Germany, detailed enough to allow the comparison of alternatives in wood allocation and their consequences all along the FWC;
- Comparison of alternatives from simulated impact on sustainability indicators;
- Coordination of this study and a case studies on solid wood and bio energy products performed by FR and the production of the report “Illustration of sustainability effects of allocation” (Deliverable PD3.1.9/Innventia report No 34) in cooperation with FR;
- Illustration of benefits of early assessment of properties to support proper allocation
- Presentation of results at the M3 workshop in Paris 2-3 March 2009, Eforwood week in Freiburg 4-7 May 2009 and Final Conference in Uppsala 21-24 September 2009, as well as at seminars and meetings with industry and universities.

Skogforsk (1 MM)

- Skogforsk has applied simulations of bucking optimization based on prevailing wood prices and prediction of wood properties. In addition we have performed detailed estimates of cost and environmental loads from harvesting and haulage operations of all logs included in the simulations;
- Simulated harvesting and bucking of sample trees from Västerbotten (SLU, National Forest Inventory). This work has been published in (Innventia Report 33,2009 = PD3.1.8). Material and models described in chapter 3 and results given in chapter 5. ”Characterisation of wood supply by bucking simulation of forest inventory”;
- Contributed to the compilation of models for predicting stem, wood and fibre properties in PD3.1.8;
- Detailed estimates of costs and environmental loads of harvesting, forwarding and haulage operations as functions of tree sizes, number of assortments, harvesting object conditions and distances to alternative sawmills (Some results presented in D3.1.8 chapter 5.).

FVA (7.5 MM)

- Simulation tool for round wood quality for Norway spruce in Baden-Württemberg further enhanced. FVA revised the layout of the “Resource Database Baden-Wuerttemberg”. This includes the necessary interface for inputs from the national

inventory database for whole of Baden-Württemberg and models describing the resource for stem form, crown length, branchiness and average ring width. Queries allow to extract log quality information on A, B, C, D grades of full length logs and standard length logs of 5m on the basis of granding standards HKS and EN 1927-1 for spruce;

- contribution to discussion in the WP's approaches to map quality features based on inventory data;
- FVA contributed to the deliverable PD 3.1.5 "Draft results of the mapping of properties of the forest resources according to use by generally applicable methods at case study level" and PD 3.1.8. "Models used and results from case studies on allocation" in conjunction with partners Innventia, Skogforsk and FR.

FCBA (0.7MM)

- Finalization of Wood quality models for maritime pine : grain angle, wood density, heartwood content and wood stiffness;
- Connection with growth models;
- Simulation of the impact of different FMAs for the log quality delivered to the industry, including sub options identified in the context of increasing risks (Cf WP 2.1 and WP 2.5).

WP 3.2 Harvesting: Work performed by each contractor

WP3.2 deals with harvesting methods and technology. It is led by Skogforsk.

Albert-Ludwigs Universität Freiburg (ALUFR) (6.17MM)

- Working on process structure and indicator calculation of the BW, Västerbotten and Iberian case studies as well as for the EU 25+2 study;
- Modelling and calculation of relevant harvesting systems for case studies and identifying resources for data, which are relevant for the characterisation of the case studies, in close cooperation with partner FVA; Skogforsk and M2;
- Calculation of relevant harvesting systems for the Baden-Württemberg case study and calculation of relevant harvesting systems in the EU 25+2 study;
- Development of calculation tool for reference futures in case studies as well as for the EU 25+2 study;
- Input, check and maintenance of harvesting indicators within the client;
- Contribution to the identification of a module specific and a common set of indicators;
- Contribution to the identification of a common set of indicators;
- Contribution to work on scenarios;
- Started identification of relevant harvesting systems for the EU-FWC and started to identify and check resources for relevant data for their characterisation;
- Contribution to PD 3.2.6.

The work load within WP3.2 was considerable because additional efforts were necessary to design the case study and EU25+2 processes.

Forest Research (2.31 MM)

- Worked on indicator research, collection and refinement to be applied within the Scottish case study as well as for the UK and Irish contribution to the EU-FWC;
- Defined and modelled harvesting and forwarding systems for the Scottish case study and for the UK and Ireland;
- Completed the input of indicator, reference future and scenario data into the database client;
- Further developed production forecasting and log assortment models;
- Contributed to PD 3.2.6.

Innventia (0MM)

Innventia has followed the work in WP 3.2. Some results have within WP 3.4 been integrated into the models for sustainability effect of wood allocation, which are used in one of the case studies about total chain sustainability effects of allocation in WP 3.1.

Skogforsk (3,0 MM RDT, Training 0,71 MM)

- Skogforsk Coordinated the WP3.2.
- Concluded data collection for the Scandinavian (Västerbotten) Case and have analysed changes and properties of logging systems in reference futures and scenarios. Their sustainability impacts have been evaluated.
- For European case study a set of values for the demonstration set of indicators have been selected for EU 27. It has been done with i) collecting of appropriate data, ii) when those were incomplete - by modelling based on knowledge about used systems and their technical, biological and economical environment. Changes due to applied reference futures and scenarios have been performed as well as evaluation of sustainability impact.
- Efforts were being made to design the interaction between harvesting system and allocation of roundwood to different product lines, N.B. sawn wood, pulpwood and energy assortments.
- Training of staff have been done at four occasions (Helsinki January and June 2009; Freiburg during May and August 2009).

FVA (13 MM)

- FVA revised the chains for the data set-up by module M1; liaising with partner ALU-FR (M2 and M3) and collected, validated and revised all data for these processes in its responsibility for all reference years for the Baden-Württemberg case study;
- FVA took on responsibility for the countries Austria, Switzerland, Netherlands, Hungaria and Slovakia for the European case and defined the topology of relevant harvesting systems of this case study. FVA finalised data collection and revision of these sub-chains for all relevant time references.
- FVA contributed to the deliverables PD3.2.4 Data collection of harvesting processes to be provided for ToSIA at case study level, PD3.2.5 "Prototype development of stratified partial models for harvesting on case study levels" and PD3.2.6 Set of data for harvesting processes to be put into ToSIA at case study and European case level.

FCBA (4MM RDT)

- Provided indicator data to be applied within the Iberian case study and the EU-FWC for seven EU countries;
- Defined harvesting and forwarding systems for the Iberian case study and some EU-FWC countries;
- Contributed to PD 3.2.6;
- For France, Spain, Portugal, Italy, Greece, Belgium and Luxembourg, re-designed the chain for Transport, Export and Chipping processes (added and removed products and links).

WP 3.3 Transport: Work performed by each contractor

WP3.3 deals with the issues of transport and logistics and is led by FCBA.

Albert-Ludwigs Universität Freiburg (ALUFR) (7.17 MM)

- Identifying relevant processes and indicators within the work package “Transport” for the case studies as well as for the EU 25+2 study.
- Work on indicator and process calculation by means of contributing to project deliverable D3.3.2, PD 3.3.4 and PD 3.3.6 and providing available information about transport systems in Baden-Württemberg and Germany.
- Gathering transport related indicators for the case studies, calculating them according to processes and filling them into the Client.
- Input, check and maintenance of transport related indicators within the client for all case studies.
- Testing and supporting the development of the transport tool developed by FCBA.

Forest Research (1.32 MM)

- Gathered and calculated indicator data to be applied within the Scottish case study as well as for the UK and Irish contribution to the EU-FWC;
- Met with forest and transport industry experts to more accurately determine logistic techniques, regulations, alternatives, common practices, and economic impacts derived from transport of forest materials;
- Populated the Transport Tool with UK and Irish data and sent the data to IFER for input into the Database Client;
- Completed the input of indicator, reference future and scenario data into the database client for the Transport with Container process;
- Contributed to PD 3.3.2, PD 3.3.4 and PD 3.3.6.

Innventia (0 MM)

- Innventia has followed the work in WP3.3 and in WP3.4 integrated some results into the detailed models for sustainability effects of wood allocation (PD 3.1.8).

Skogforsk (1.3 MM in RDT, training 0,4MM)

- Designing transporting chains in Reference futures and Scenarios
- Collecting and calculation of data for case studies and European case
- Testing and aiding to the development of the partial model on transport.
- Taking part in training activities (0,4 MM) in Helsinki, June 2009 and Freiburg 7th of May 2009

FVA (0.25 MM)

FVA contributed to the discussions on identifying the relevant processes, and collected, validated, and revised indicators within the “Transport” stage of the European case study in conjunction with all other partners on the case.

FCBA (5 MM RTD + 0.1 training):

- Develop the Transport tool (Web application available) and provided indicator data to be applied within the case studies and the EU-FWC;
- Proposed data for some EU countries on transport;
- Modified PD 3.3.2 (new version), made PD 3.3.4 and PD 3.3.6.
- Calculated the input of indicator, reference future and scenario data for transport of roundwood in the Iberian case study and sent the data to IFER for input into the Database Client;
- Calculated volumes and shares for the transport (roundwood transport and transport with container processes), export of roundwood and chipping with chipper processes for France, Spain, Portugal, Italy, Greece, Belgium and Luxembourg.

WP 3.4 Integrated partial modelling: Work performed by each contractor (year 3)

Albert-Ludwigs Universität Freiburg (ALUFR) (9.65 MM)

ALUFR is the work package leader of WP3.4 “Integrated Partial Modelling” and thus organises and coordinates the work on process modelling within M3 and in connection to M1 and M2.

- Background studies on process modelling and ARIS Business Architect (Modelling software based on object-oriented programming, business process modelling and UML-unified-modelling language), as well as the modelling of processes regarding the case studies and EU 25+2 study;
- Development of a classification system with which information such as stand, log, personnel and machine classifications as well as indicators can be linked to the models mentioned above;
- Modelling of M3 processes within the case studies and EU 25+2 level;
- Working on case study Baden-Württemberg and EU 25+2 study as well as gathering background knowledge; furthermore refining calculation schemes for processes,

indicators and for reference future calculation. This scheme has been chosen by the scenario task force as a proxy for other modules and can be found at the Portal;

- Contribution to the identification and gathering of module specific models. An overview thereof is at the Portal;
- M3 representation in task force for all case studies and scenarios, including participation in several telephone conferences.

Modelling work within WP3.4 turned out to be more complex than estimated, mainly due to the diverse structure at the related chains / processes.

Forest Research (0.60 MM)

- Improved a timber quality database that is used in M3 process modelling which collates and synthesises knowledge bases from resource evaluation and characterisation in the field and laboratory analysis. Various data sets have been collected, ranging from stem straightness data, wood density and tree ring data to MOE, MOR data;
- Drafted and modelled the M3 processes within the Scottish case study and for the UK and Ireland's representation within the EU-FWC;
- Linked yield models and process based growth models to timber quality models in order to map the current and future timber properties of Sitka spruce across the UK
- Completed the input of indicator, reference future and scenario data into the database client.

Innventia (3,84 MM)

- Contributions to definitions of module specific parts of chains prepared for case studies, with emphasis of issues related to mapping of wood and fibre properties in forest resources, property requirements for key products and proper wood allocation;
- Development of further detailed models for the Forest-Wood-Chain defined in WP3.1 for illustration of sustainability effects of allocation, from trees in Västerbotten to used and recycled boxes of corrugated materials in Germany, with detail enough for comparison of alternatives in wood allocation and their consequences all along the FWC;
- Communication with process experts of M4 and M5 on products and logistics to establish the models. Communication with experts in 3 forest and industry companies to define sound alternatives for comparison;
- Development of a tool for simulating the impacts of allocation alternatives on sustainability indicators, using the models with further detail than the ToSIA models.
- Contributions to WP reports.

Skogforsk (2,3MM in RDT and 0,2 MM in training)

The Skogforsk part was to;

- define the module specific parts of the case study and European chain by defining processes for allocation of material between processes as harvesting, transport and handling;

- to calculate and to integrate SIA-results of the different work packages within the framework of the case study and European chain for the year 2005, as well as for the reference futures A1 and B2 for 2015 and 2025, and scenarios.

Skogforsk contributed in also in training (Helsinki June 2008, Freiburg 2-3 August 2009 and internal).

FCBA (2MM RDT)

Completed the input of indicator, reference future and scenario data into the database client for:

- harvesting and forwarding systems within the Iberian case study and the EU-FWC for seven EU countries;
- the chipping with chipper process for France, Spain, Portugal, Italy, Greece, Belgium and Luxembourg and sent the data to IFER for input into the Database Client;
- the Transport (roundwood transport and transport with container processes) for France, Spain, Portugal, Italy, Greece, Belgium and Luxembourg.