



**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

**Deliverable D1.4.6**  
**Documentation of ToSIA developments up to month 23**  
**Deliverable D1.4.5 version 2**  
**Second prototype TOSIA-FWC in open source for single chains (Executive Summary)**

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European Forest Institute (EFI)

# Executive Summary

## Scope and purpose of the report

This combined deliverable report 1.4.6/1.4.5(update) presents ToSIA (Tool for Sustainability Impact Assessment), predominant product of EFORWOOD. ToSIA is being developed as a decision support tool for sustainability impact assessment of the European Forestry Wood Chain (FWC) and subsets thereof (i.e. selected Single FWCs and Case studies with multiple regional FWCs). ToSIA will allow various end-users, such as national and international policy makers, researchers and the forest-based industry, to analyse the sustainability effects of changes due to deliberate actions (e.g. in policies or business activities) or due to external/exogeneous forces (e.g. climate change, global markets).

The report aims to inform both the researchers in other subprojects as well as interested stakeholders and the general public about the progress of work on the sustainability impact assessment (SIA) approach in EFORWOOD. The purpose of this document is to present the latest developments in ToSIA methodology and to give an overview on the work that has been done up to month 23 of the EFORWOOD project. This report does not provide a comprehensive documentation of technical details of the ToSIA modelling framework, as this was already done in Deliverable D1.4.3. Moreover, a review of the results of two single chains, the forest-defined pine chain in Scandinavia and the regional-defined spruce chain in Baden Württemberg is presented.

Attached to the documentation is the second ToSIA prototype. In the Annex more technical details on the development of the second prototype are outlined, including instructions how to use the prototype. The prototype itself with more detailed documentation of the Java code is attached in the zip-archive.

## Description of the ToSIA approach to Sustainability Impact Assessment of FWCs

The data required by ToSIA are stored in the EFORWOOD database, which also contains the predefined topologies of Forestry Wood Chains (FWC) that are studied in the project. Linked to the database is the EFORWOOD Database Client that allows EFORWOOD partners to enter data and design chains.

The SIA of the forest-based sector in EFORWOOD builds on the conceptual representation of FWCs as chains of value-adding processes. A FWC is understood in ToSIA as a dynamic structure linking production processes with input and output products. The FWC is characterized by a material flow entering and leaving each process. The amount of material that a process in a FWC handles is dynamically calculated based on the amounts of material that the process being examined is receiving from processes that precede it in a FWC. 5

ToSIA generates information on sustainability impacts by calculating values of environmental, economic, and social sustainability indicators for production processes along the FWC. In ToSIA, the calculation of sustainability indicator values is linked to the material flow through the processes where the sustainability indicator results for a process are calculated by multiplying the input material flow of the process with efficiency parameters for each of the selected indicators.

In ToSIA prototype 2, the focus of programming work has been on implementing a working calculation engine. In prototype 2 a simple graphical user interface was created to simplify the generation of results. The implementation of more advanced functionalities and the development of an appropriate Graphical User Interface (GUI) will be taken up next. In ToSIA prototype 2, more information is provided to the user about selected demonstration results of calculations. The result presentation has been improved as well.

Application of ToSIA for Single FWC analysis

Single FWC analyses are the first applications of ToSIA in the EFORWOOD project and therefore they serve to test the prototype and to demonstrate the use of the model.

The aim was to represent the production processes in different parts of the Forestry-Wood Chain with comparable amount of detail. Three Single FWC applications have been developed using different perspectives of the Forestry-Wood Chain which have consequences for the definition of system boundaries for the analysis:

(i) a forest-defined FWC analysis is looking at the FWC from the forest resource perspective. This means that forest resources are regionally defined, but industrial processing and consumption of the products may also take place outside of the region where the forest resource is located. Example in EFORWOOD: **Forest-defined pine chain in Scandinavia for furniture and bio-energy**

(ii) a product defined FWC analysis is taking a different perspective with the starting point of the consumption of wood products in a specific region, whereas the industrial processing and forest resources may also be situated outside of the region. Example in EFORWOOD: **A product-defined fine paper/newspaper chain including recycling**

(iii) the third application of Single FWC analysis applies a regionally-defined perspective. This means that all the FWC processes occur within the study region. Example in EFORWOOD: **A regional-defined spruce chain in Baden Württemberg**

Reliable ToSIA outputs require reliable and complete input data. Therefore, data quality control represents an important part of the data gathering task in EFORWOOD. The data is introduced into the database from various sources (statistics, research data, modelling outputs etc.) with the help of the EFORWOOD database client. Numerous data collectors are involved in the project and it constitutes a challenge to ensure that assumptions and calculation routines are 6

consistent throughout the chains. Currently, tools (routines) are being developed to check automatically inconsistencies in the reported data and also in the output data.

Using the data from the single chains three verification tests for ToSIA calculations were conducted. Tests were carried out by taking a sample of processes for which the calculations were performed.

The single chain calculations were initialised by fixing the amount of material flowing within the chain to comparable amounts. This was done for two test chains, the forest-defined pine chain in Scandinavia and the regional-defined spruce chain in Baden Württemberg. For the third chain, product-defined fine paper/newspaper chain including recycling, the ToSIA calculations were postponed to the phase of Case studies. This document presents a review of the results of two single chains, the forest-defined pine chain in Scandinavia and the regional-defined spruce chain in Baden Württemberg.