



EFORWOOD

Sustainability Impact Assessment
of the Forestry - Wood Chain



Project no. 518128

EFORWOOD

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RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Summary

This report is a project deliverable PD 4.3.9. "*Final report on value added model and response functions*" of the EFORWOOD project. The purpose of this report is to suggest one solution to the industry dynamics and scenario inter-linkage problem highlighted in PD 4.3.8. and thus give information to the rest of EFORWOOD.

The report describes the logic and user interface of the proposed value added model. Together with PD 4.3.8. "*Draft description of response function framework and examples*", this report tries to give one solution to the problems related to inter-linkages between modules, processes and indicators, and the scenarios.

The author of this report is Pöyry Forest Industry Consulting. For this report, Pöyry has followed the work of EFORWOOD's "Scenario"-group and organised meetings with EFI, who is responsible for the "ToSIA" tool and runs the "EFI-GTM"-model.

1 INTRODUCTION

This report belongs to European Commission's EFORWOOD project, contract number 518128-2. Module 4, who is responsible for this report, is a partnership of European companies focusing on the manufacturing and processing ("gate to gate") stage of the Forestry Wood Chain (FWC) in Europe. This document is a project deliverable PD 4.3.9. " *Final report on value added model and response functions*".

This report should be read together with PD 4.3.8. " *Draft description of response function framework and examples*". They try to give one solution to the problems related to inter linkages between modules, processes and indicators, and the scenarios.

The information from reports *PD 4.3.10.*, *PD 4.3.4* and *D 4.3.11.*, which deal with the comprehensive picture of the industry dynamics, is also essential for the work. The different dynamics between forestry-wood value chain actors, e.g. between forest and paper industry, should be kept in mind in the development and interpretation of ToSIA.

The current work of EFORWOOD's "Scenario"-group and the "ToSIA" tool has been kept in mind while compiling this report.

The author of this report is Pöyry Forest Industry Consulting.

2 VALUE ADDED MODEL

2.1 Introduction to Basic Structures

The Pöyry Forest Industry Consulting VaMoNos (**V**alue chain **M**odel **i**Ntegrated **t**O **r**e**S**ponse function generation) value added model is, as the complex yet dynamic acronym states, built to combine four purposes:

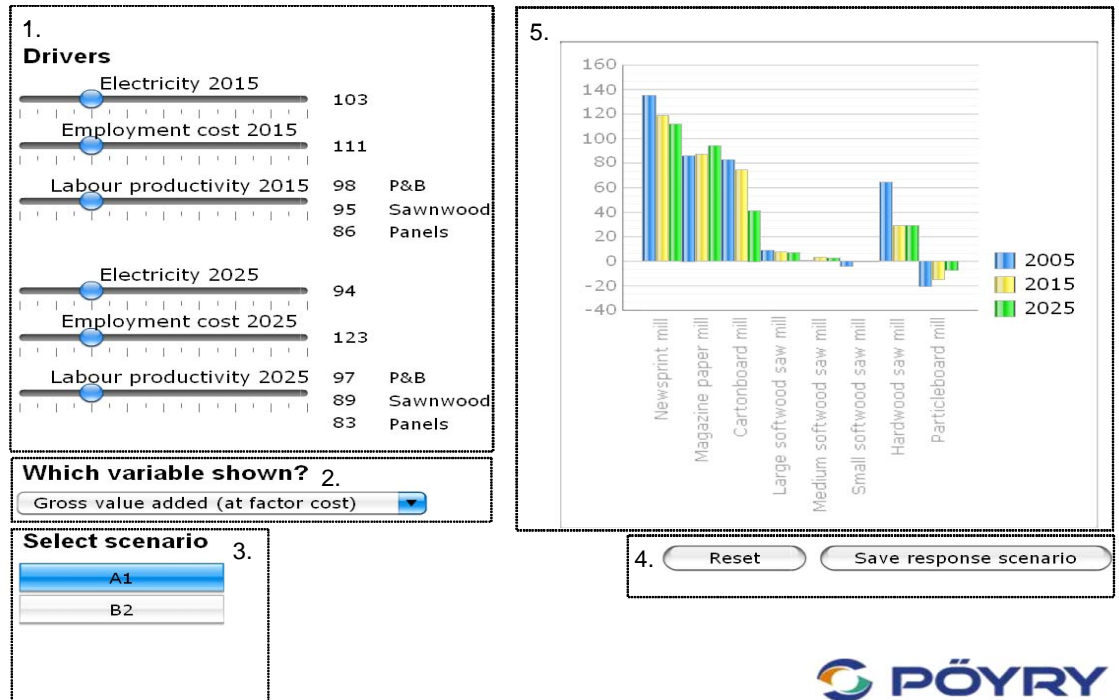
- model, to a sufficient level, the dynamics of the value chain
- experiment with, save and load value chain states
- link to the EFORWOOD reference futures
- generate response functions for the variables studied (in the Pöyry case, the economic variables).

At the beginning of EFORWOOD project it was planned that ToSIA would analyse response functions generated with module specific tools, e.g. the VaMoNos model. Later it was decided that ToSIA will not be able to analyse response functions. Because of this, we decided not to complete response function development as they would not be used in ToSIA.

Nevertheless VaMoNos is developed for the generation of response functions so that it could be used later on. In the future it might be possible to include response functions in the ToSIA analysis. VaMoNos and this report gives guidelines for the further development of response functions for ToSIA.

The VaMoNos interface has been designed to accomplish all of this in a Spartan yet hopefully user-friendly way. Figure 2-1 shows the interface and its areas (the outlines and numbers are annotations, not part of the interface).

Figure 2-1
Illustration of the VaMoNos Model



Area 1, Drivers is where the values of the selected reference future drivers are changed by grabbing the notch and moving the slider. The selected drivers for demonstration are the developments of electricity price, employment cost and labour productivity. Labour productivity is divided into three different segments which are Paper and Board, Sawn wood and Wood Panels. By moving the slider of one Labour productivity segment, all other move as well.

Area 2, Variable choice is a drop-down menu of economic variables, which determines what is shown in area 5.

Area 3, Scenario choice is a set of buttons through which the reference futures of the EFORWOOD can be loaded in with its corresponding values and settings.

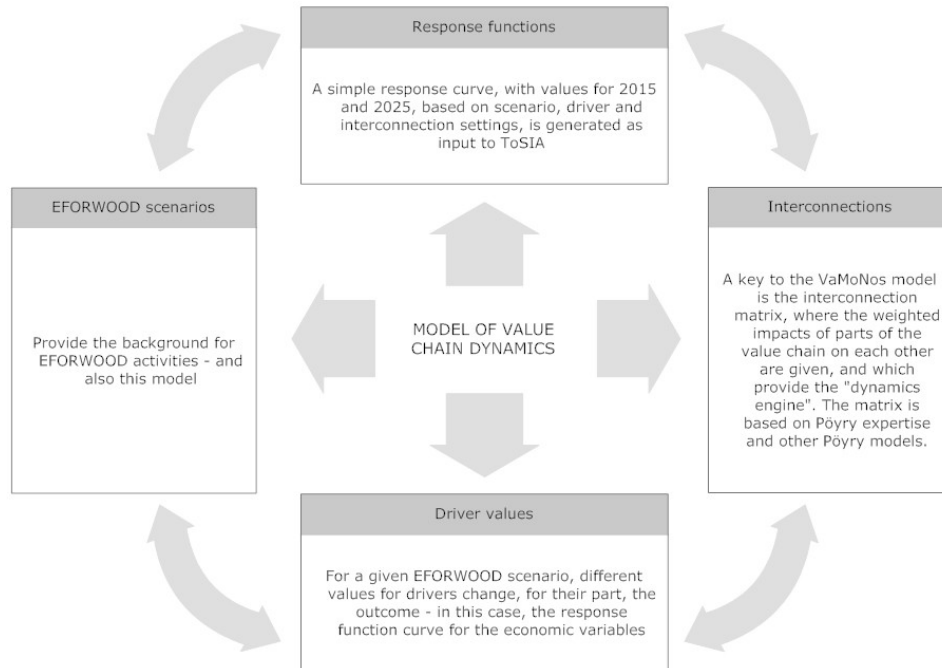
Area 4, response scenario management makes it possible to save and load different driver/variable/scenario value settings in unlimited numbers – for education and experimentation.

Area 5, the window into the dynamic value chain, shows the value chain results by model mill for 2005, 2015 and 2025 for the variable chosen in area. The model mills shown here are from the Baden-Württemberg case study.

2.2 Response Function Development and Selected Key Parameters

The model works as described in Figure 2-2 below:

Figure 2-2
VaMoNos Inner Logic

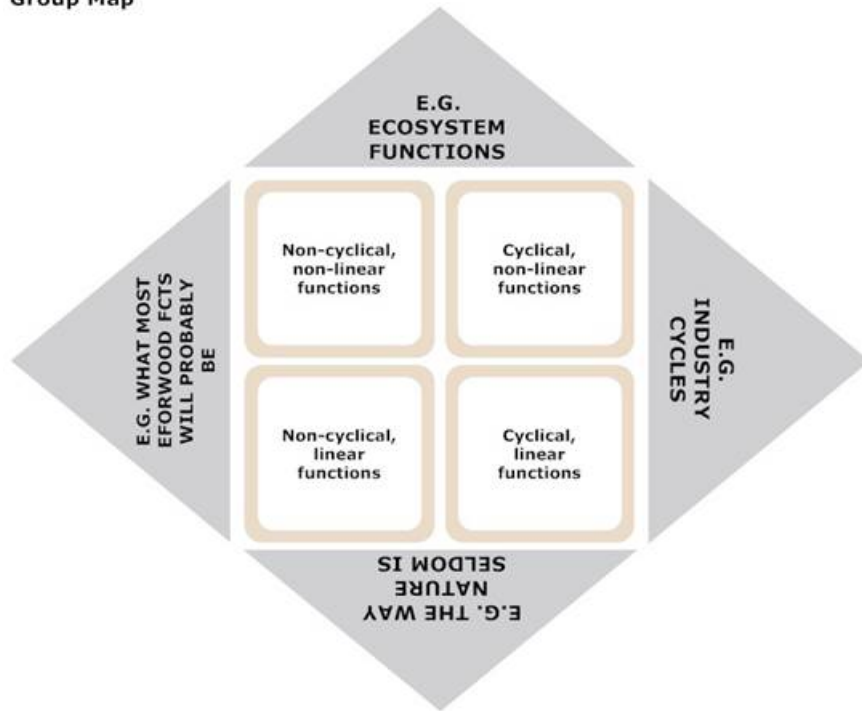


Common EFORWOOD scenarios are the backbone of the work to generate response functions for ToSIA. **Driver values** influence the outcome, as does the **interconnection matrix**, which encapsulates the dynamic cross-impact of value chain components.

As a conjunction of the above, response functions for ToSIA can be generated for the economic variables. The choice of response function types was made earlier among the possible types in Figure 2-3.

Figure 2-3
Illustration of Potential Response Function Types

Response Function
 Group Map

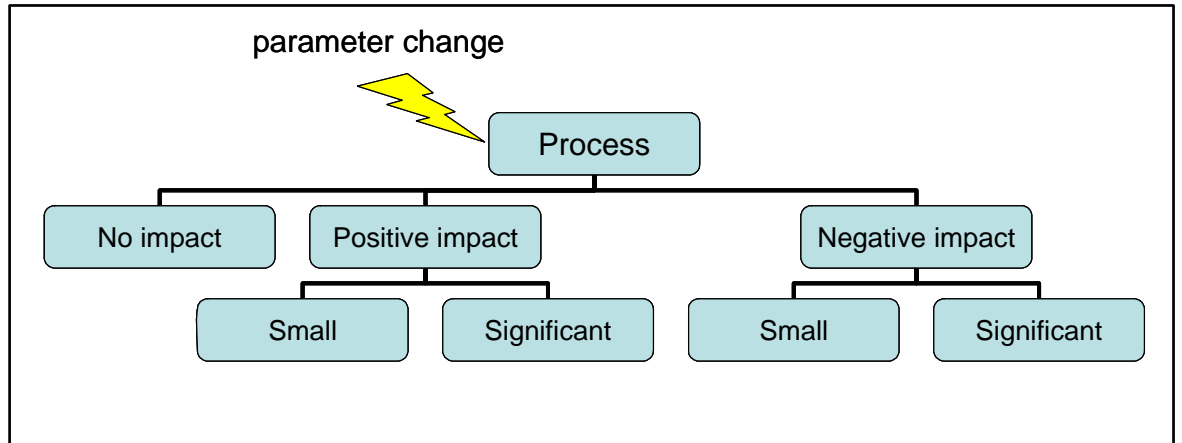


It is worth repeating:

- The shape and slope of the response function depends on the nature of the system. The aim is to present reality in a simplified way. Needless to say, the task is challenging.

When a parameter not defined in the system (exogenous) changes, the resulting impact may be any of the following:

Figure 2-4
Impact Map of Change in a Parameter External to System



Different response functions combine into a system which considers the net impact of all the drivers. As the different responses have different impacts and significances, often unintuitive, the net response can be rather unpredictable in many cases. This is where the VaMoNos model is at its best as it considers all the impacts on the fly.

2.3 Summary and Evaluation

The VaMoNos model uses sophisticated methods to evaluate the net effect on the value added. The model does this dynamically in real-time and thus allows fast, easy and understandable visualisation of the situation concerning the products in question.

The underlying dynamics can be difficult to comprehend, and even impossible to display in a coherent fashion. This problem is surpassed in the VaMoNos interface as the model only shows the driver sliders, a snap shot of the response functions and the result.

3 ILLUSTRATION OF MODEL ACTIONS

3.1 Data behind the model

For the presentation of the VaMoNos model we selected data from the Baden-Württemberg case study. The same concept can be used for all case studies, EU FWC and for all scenarios. The data behind the model include the economical indicator values for 2005 and for the reference futures A1 and B2 for years 2015 and 2025. In addition the driver development data for the price of Electricity, Employment cost and Labour productivity from EFI-GTM runs are included. The model enables studying the logicity of the indicator data and constructing own scenarios by changing the selected drivers. Even though there are preset scenarios, presenting different reference futures, the user can freely generate their own scenarios and compare them.

3.2 The connection between EFI-GTM, VaMoNos and ToSIA

First of all: it should be remembered that VaMoNos only serves as a

- generator of know-how on FWC interactions
- generator of response functions for economic variables

and not for any other purpose. However, even for this restricted role, it might be instructive to recapitulate, in a simplified way, the relationship between EFI-GTM, VaMoNos and ToSIA – as filtered through VaMoNos and WP 4.3 (Figure 3-3).

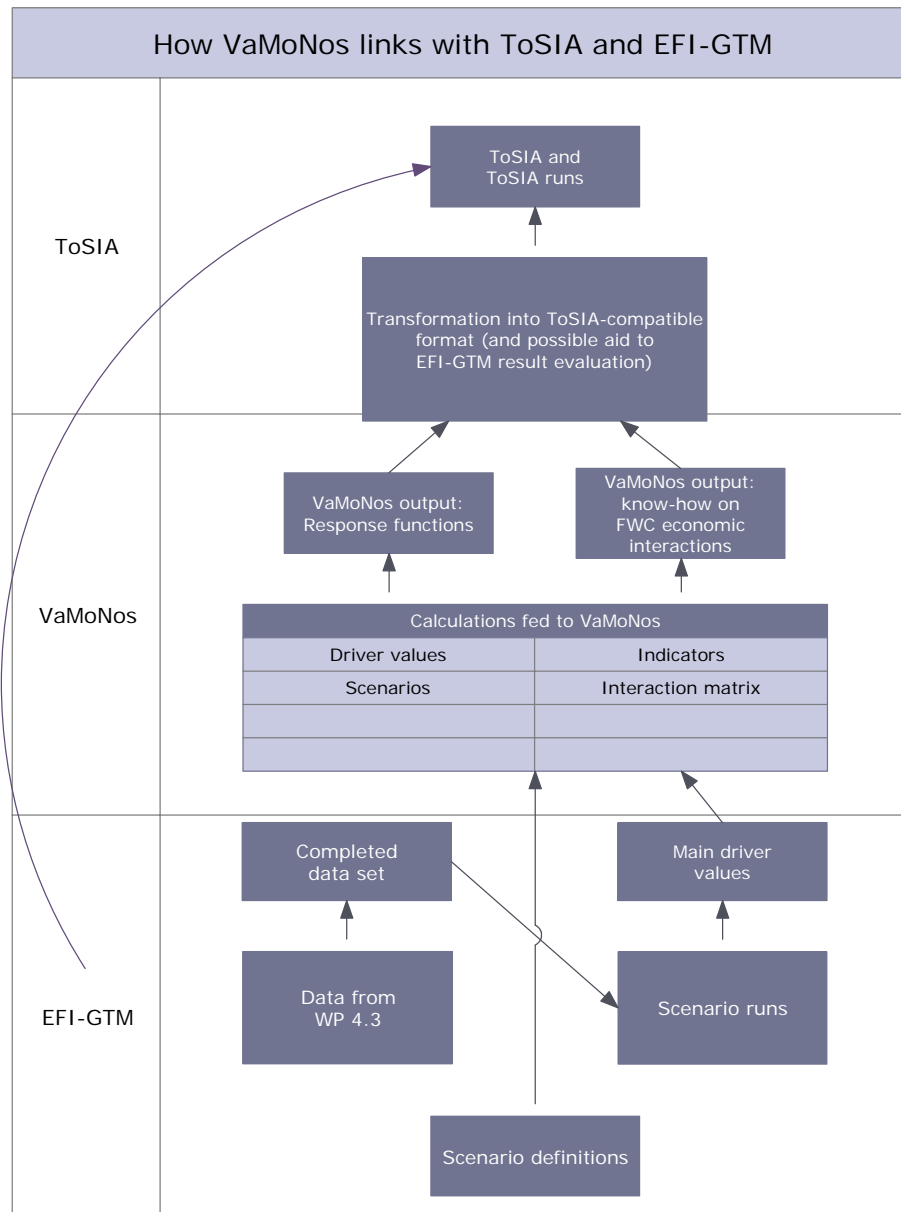
The EFI-GTM level is one where scenario definitions and data from WP 4.3 aid in completing the EFI-GTM data set, and where scenario runs of EFI-GTM give values for the main drivers – which serve as input to VaMoNos.

The VaMoNos level is where the EFI-GTM driver values link with scenario information, indicator values calculated from the EFI-GTM driver values and interconnection matrices for the FWC worked out for the model. The output is twofold:

- a) response functions for economic indicators
- b) know-how on FWC interactions (derived from experimenting with the model).

The ToSIA level is where the response functions from VaMoNos for *economic indicators* is used in the future. Furthermore, it may be that the know-how on FWC interactions helps EFI-GTM modellers to refine parameters of their model – however, this is *a possible consequence of added knowledge, not an automatic, quantifiable process*.

Figure 3-3
EFI-GTM, VaMoNos and ToSIA



3.3 VaMoNos model

See Annex.

ABBREVIATIONS

ToSIA	Eforwood's Tool for Sustainability Impact Assessment
FWC	Forestry-wood chain
EFI GTM	European Forestry Institute's Global Trade Model

Annex
VaMoNos Model

