



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 PD1.2.4 Software solution for the interface between
EFORWOOD database and ToSIA model.**

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Date: January 2007

Due date of deliverable: 31.1.2007
Actual submission date: 25.1.2007

Start date of project: 011105
Duration: 4 years

Organisation name of lead contractor for this deliverable: IFER

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	X
CO	Confidential, only for members of the consortium (including the Commission Services)	



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Summary

Interface between EFORWOOD database and ToSIA is represented by two XML files which transform content of the database to the format suitable for ToSIA. Special software tool has been developed to generate XML files based on ToSIA specifications.

Software solution presented in this deliverable represents additional functionality to the EFORWOOD database which was described in previous deliverable D1.2.1 „Database structure“.

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Attachment:

Documentation of software solution

1 Introduction

The purpose of the presented document is to describe new software solution of interface between EFORWOOD database and ToSIA. This new deliverable represents additional functionality to the EFORWOOD database which was described in previous deliverable D1.2.1 „Database structure“.

WP 1.2 is responsible for EFORWOOD database development, maintenance and data handling.

Part of the WP 1.2 activity is related to the development of relevant tools which are necessary for smooth data transfer from the database to ToSIA (see fig. 1). Software tool presented in this document covers such functionality.

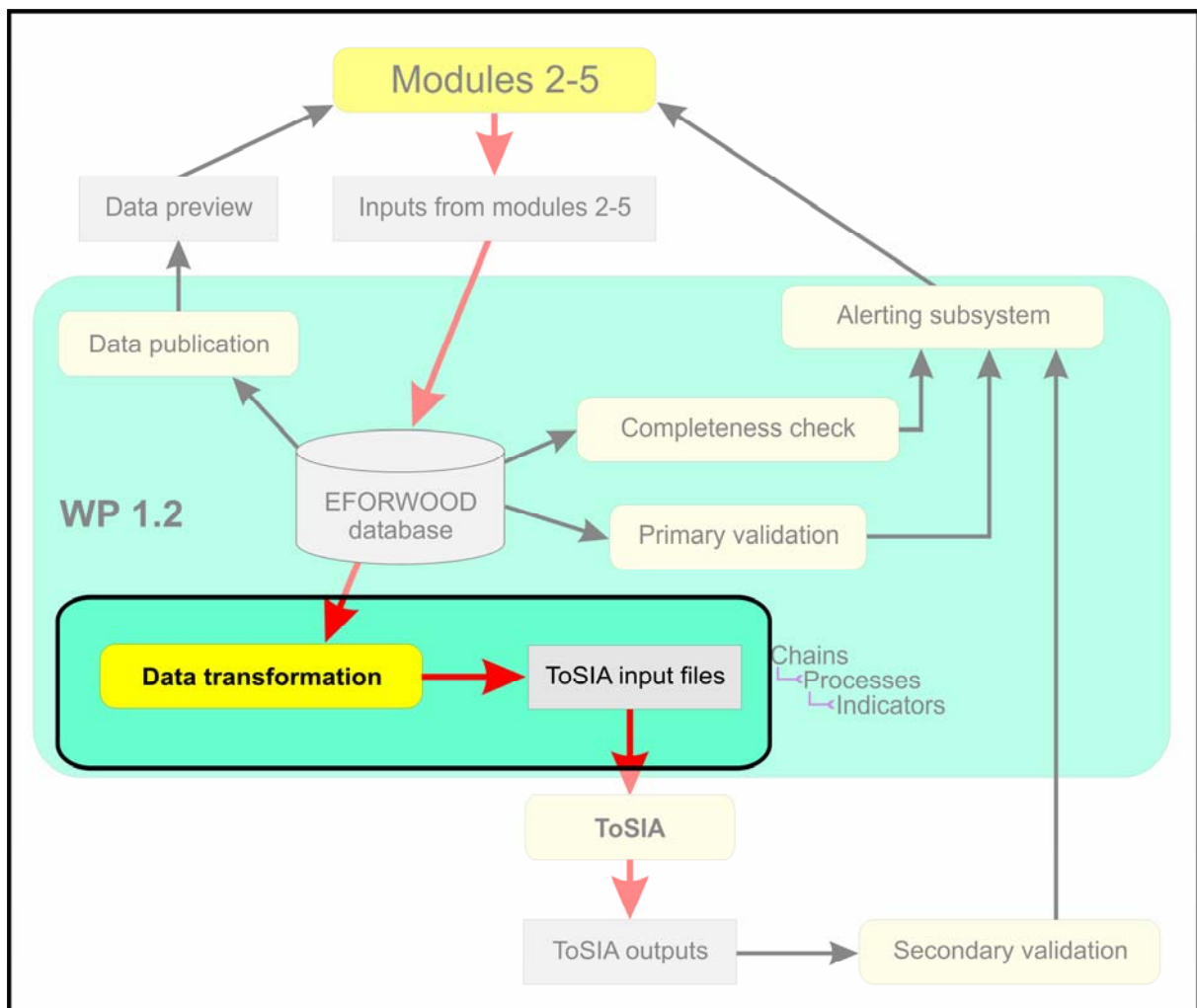


Fig. 1. Data transformation between EFORWOOD database and ToSIA as a part of overall logistics of data management

2 EFORWOOD database

The structure of EFORWOOD database reflects informational content and logical relationships as they are formulated by respective EFORWOOD modules. Information on forestry wood chains, processes and indicators is stored in the relational database supporting overall logic of EFORWOOD solution (see fig. 2). Current version of the database has been defined prior and during collection of the data of test chains. Based on the results and experience gathered for the test chains the final version of the database will be formulated.

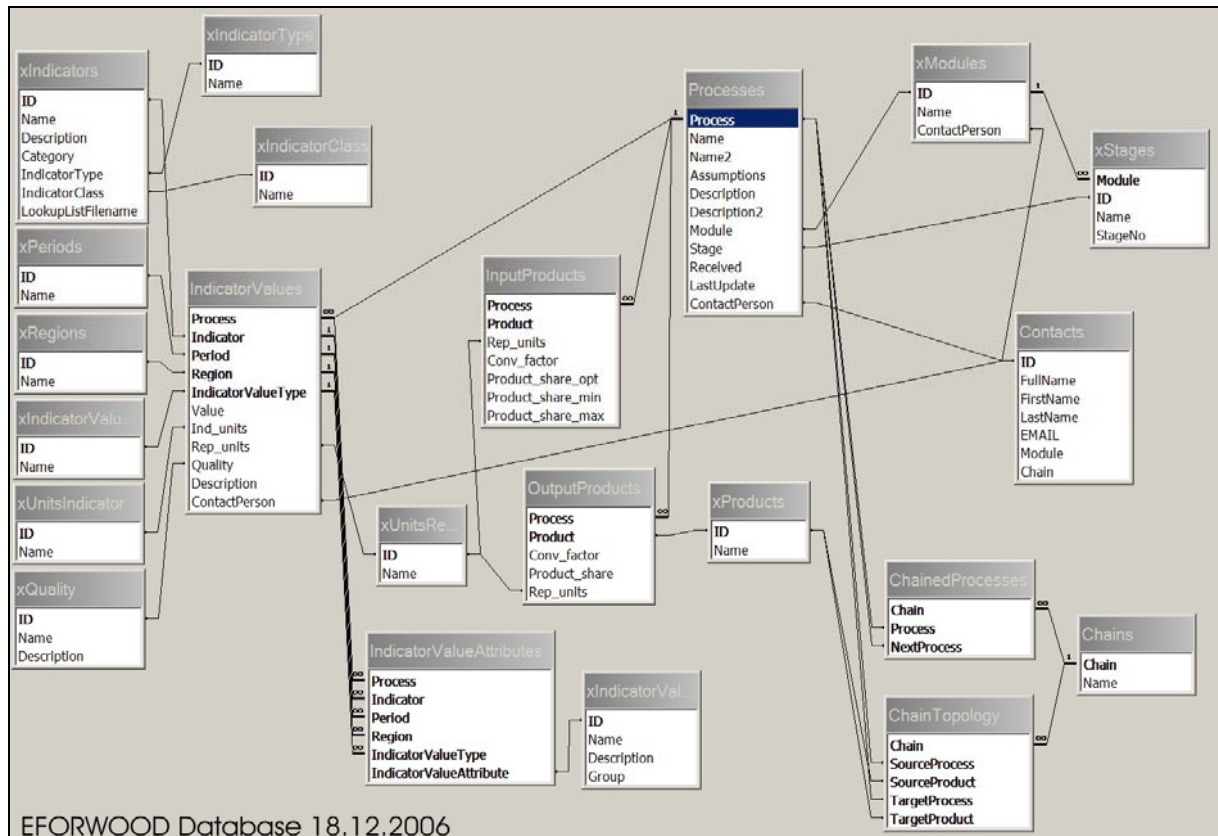


Fig. 2. Structure of EFORWOOD database

3 ToSIA requirements

Main purpose of the EFORWOOD database is to provide ToSIA with relevant data. Requirements of ToSIA are expressed by the structure of XML (eXtensible Markup Language) files which are used on input to ToSIA.

Two XML files have been defined in the “Deliverable_1_4_2_v4.doc” document. The first XML file presents description of individual processes and relevant indicator values:

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT conversion_factor (conversion_factor_id, conversion_factor_name,
conversion_factor_value)>
<!ELEMENT conversion_factor_id (#PCDATA)>
<!ELEMENT conversion_factor_name (#PCDATA)>
<!ELEMENT conversion_factor_value (#PCDATA)>
<!ELEMENT data_quality_class (#PCDATA)>
<!ELEMENT data_quality_comment (#PCDATA)>
<!ELEMENT dataqualitycomment (#PCDATA)>
<!ELEMENT datetime_stamp (#PCDATA)>
<!ELEMENT datetimestamp (#PCDATA)>
<!ELEMENT georeference (#PCDATA)>
<!ELEMENT ind_category (#PCDATA)>
<!ELEMENT ind_description (#PCDATA)>
<!ELEMENT ind_id (#PCDATA)>
<!ELEMENT ind_max_value (#PCDATA)>
<!ELEMENT ind_min_value (#PCDATA)>
<!ELEMENT ind_name (#PCDATA)>
<!ELEMENT ind_units (#PCDATA)>
<!ELEMENT ind_value (#PCDATA)>
<!ELEMENT indicatorVPMF (ind_id, ind_name, ind_description, ind_category,
ind_value, ind_units, ind_min_value, ind_max_value, provider,
datetime_stamp?, datetimestamp?, stdev, mean_error?, value_origin?,
meanerror?, valueorigin?, data_quality_class, data_quality_comment?,
dataqualitycomment?)>
<!ELEMENT mean_error (#PCDATA)>
<!ELEMENT meanerror (#PCDATA)>
<!ELEMENT module (stage+)>
<!ATTLIST module
  module_name CDATA #REQUIRED
>
<!ELEMENT module_store (module+)>
<!ATTLIST module_store
  xmlns:xsi CDATA #IMPLIED
  xsi:noNamespaceSchemaLocation CDATA #IMPLIED
>
<!ELEMENT organic_carbon_share (#PCDATA)>
<!ELEMENT process (#PCDATA | process_id | process_description |
indicatorVPMF | product_info)*>
<!ATTLIST process
  process_name CDATA #REQUIRED
>
<!ELEMENT process_description (#PCDATA)>
<!ELEMENT process_id (#PCDATA)>
<!ELEMENT process_output_share (#PCDATA)>
<!ELEMENT product (product_name, product_id, product_description,
production_line, organic_carbon_share, georeference, conversion_factor+)>
<!ELEMENT product_description (#PCDATA)>
<!ELEMENT product_id (#PCDATA)>
<!ELEMENT product_info (process_output_share, share_info_source,
share_info_provider, share_description, product)>
```

```

<!ELEMENT product_name (#PCDATA)>
<!ELEMENT production_line (#PCDATA)>
<!ELEMENT provider (#PCDATA)>
<!ELEMENT share_description (#PCDATA)>
<!ELEMENT share_info_provider (#PCDATA)>
<!ELEMENT share_info_source (#PCDATA)>
<!ELEMENT stage (process+)>
<!ATTLIST stage
  stage_name CDATA #REQUIRED
>
<!ELEMENT stdev (#PCDATA)>
<!ELEMENT value_origin (#PCDATA)>
<!ELEMENT valueorigin (#PCDATA)>

```

The second XML file presents topology of forestry wood chains:

```

<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT calculated_indicator_value (idindatabase, ind_name?, ind_value?,
ind_units?, georeference, ind_value?, ind_units?, ind_description?,
ind_ind_description?, ind_category?, provider?, datetimestamp?, stdev?,
meanerror?, valueorigin?, dataqualitycomment?, reference_VPMF)>
<!ELEMENT chain (chain_ind_name, chain_id, initial_flow, link_to_process+)>
<!ELEMENT chain_id (#PCDATA)>
<!ELEMENT chain_ind_name (#PCDATA)>
<!ELEMENT chain_space (chain+)>
<!ELEMENT dataqualitycomment EMPTY>
<!ELEMENT datetimestamp EMPTY>
<!ELEMENT flow_amount (#PCDATA)>
<!ELEMENT flow_id (#PCDATA)>
<!ELEMENT flow_item (flow_id, flow_product, flow_amount)>
<!ELEMENT flow_product (#PCDATA)>
<!ELEMENT georeference (#PCDATA)>
<!ELEMENT idindatabase (#PCDATA)>
<!ELEMENT ind_category (#PCDATA)>
<!ELEMENT ind_description (#PCDATA)>
<!ELEMENT ind_ind_description (#PCDATA)>
<!ELEMENT ind_name (#PCDATA)>
<!ELEMENT ind_units (#PCDATA)>
<!ELEMENT ind_value (#PCDATA)>
<!ELEMENT initial_flow EMPTY>
<!ELEMENT link_id (#PCDATA)>
<!ELEMENT link_to_process (link_id, points_to_process, predecessor_LTP+,
successorLTP+, flow_item+, calculated_indicator_value+)>
<!ELEMENT meanerror EMPTY>
<!ELEMENT points_to_process (#PCDATA)>
<!ELEMENT predecessor_LTP (#PCDATA)>
<!ELEMENT provider EMPTY>
<!ELEMENT reference_VPMF (#PCDATA)>
<!ELEMENT stdev EMPTY>
<!ELEMENT successorLTP (#PCDATA)>
<!ELEMENT valueorigin EMPTY>

```

Description of two XML files fully defines format of the data exported from EFORWOOD database to ToSIA (fig. 3, 4).

The screenshot shows a window titled "D:\IFER_Projects\EFORWOOD\Data\module_store_20070131.xml". The XML content is as follows:

```

<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!-- EFORWOOD 2006 - Static Data: description of processes -->
<!-- compiled by WP 1.2 /IFER -->
<!-- http://www.eforwood.com -->
- <module_store>
- <module module_name="M2 - Forest resources management">
- <stage stage_name="M21- Regeneration">
- <process process_name="Development of naturally
  regenerated spruce stand in regeneration phase">
  <process_id>1000001</process_id>
  <process_description>Process describes stand growth
  until development phase Young</process_description>
- <indicatorVPMF>
  <ind_id>17000</ind_id>

```

Fig. 3. Example view of XML (process description)

The screenshot shows a window titled "D:\IFER_Projects\EFORWOOD\Data\chain_store_20070131.xml". The XML content is as follows:

```

<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!-- EFORWOOD 2006 - Dynamic Data: description of chains -->
<!-- compiled by WP 1.2 /IFER -->
<!-- http://www.eforwood.com -->
- <chain_space>
- <chain>
  <chain_ind_name>A regional-defined spruce chain in Baden-
  Württemberg</chain_ind_name>
  <chain_id>10000001</chain_id>
  <initial_flow />
- <link_to_process>
  <link_id />
  <points_to_process>1000001</points_to_process>
  <predecessor_LTP>1000008</predecessor_LTP>
  <successorLTP>1000081</successorLTP>
- <flow_item>
  <flow_id />
  <flow_product>1010600</flow_product>

```

Fig. 4. Example view of XML (chain topology)

4 Interface between EFORWOOD database to ToSIA

Software solution of the interface between EFORWOOD database to ToSIA has been developed using Java. It has two functions: *(i)* connect to EFORWOOD database and *(ii)* export data to ToSIA XML files.

Since it has rather specific functionality the software is easy to use. It has two buttons, each of them performing one of the functions.

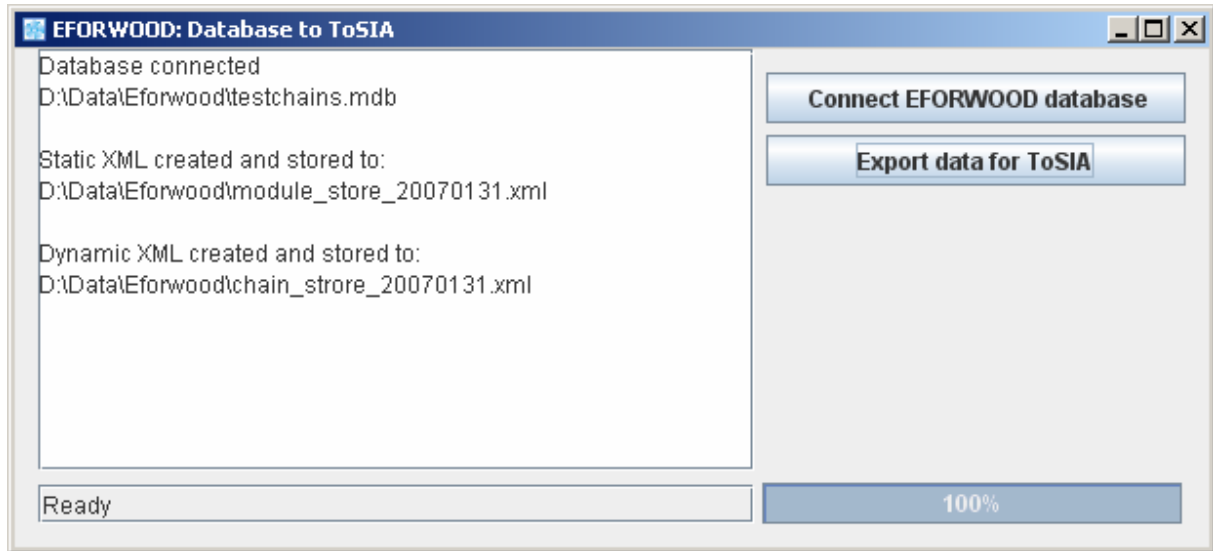


Fig. 5. Screenshot of software solution

Data are exported into user-defined folder and named according to naming rules. Standard name is followed by the date of file creation:

module_store_YYYYMMDD.xml – process description

chain_store_YYYYMMDD.xml – topology of forestry wood chains

For example:

module_store_20070112.xml

chain_store_20070112.xml