



## Stage 1 - Service Consolidation Actions of the Earthwatch GMES Services Element

### Core-User-Group Executive Report U8

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##### Operational Service Providers



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##### Research Partners



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## GSE Forest Monitoring

### Core User Group Executive Report, U8

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**Summary:** This document contains the consensus high-level view of the involved *end-user-organizations*, based on their individual experiences, as documented in the *Service-Utility-Reports* for the Phase 2 consolidation stage of the FM project.

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## Document Change Record

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## Executive Summary

According to the origin of their needs the core user were assigned to three user segments as follows:

**Table.1 User Segments**

User Segment	Service package name	Core User & Service Provider
<b>Climate Change GHG Reporting</b>	Forest Monitoring Inputs for National Greenhouse Gas (GHG) Reporting	<b>User:</b> BMVEL <b>Service provider:</b> SFM, GAF
	Forest Monitoring Inputs for National Greenhouse Gas (GHG) Reporting	<b>User:</b> NOA <b>Service provider:</b> Geoapikonisis
	Forest Monitoring Inputs for National Greenhouse Gas (GHG) Reporting	<b>User:</b> MAPAAR <b>Service provider:</b> VTT
<b>Climate Change, CDM Projects</b>	Forest Monitoring Inputs for CDM Projects	<b>User:</b> STORA ENSO <b>Service provider:</b> VTT
<b>Sustainable Forest Management</b>	Mapping and Monitoring of Disturbances (Clear Cuts, Forest Fires and other Disturbances)	<b>User:</b> NBF <b>Service provider:</b> METRIA
	Mapping and Monitoring of Disturbances (Clear Cuts, Forest Fires and other Disturbances)	<b>User:</b> FS of Irkutsk GSNR <b>Service provider:</b> RSC ISTP SB RAS
	Sub-National Forest Information Update	<b>User:</b> TLFWJ <b>Service provider:</b> FELIS
<b>Environmental Issues &amp; Forest Protection</b>	Land Cover & Forest Indicators	<b>User:</b> UBA (AT) <b>Service provider:</b> Joanneum Research
	Land Cover & Forest Indicators	<b>User:</b> UBA (DE) <b>Service provider:</b> GAF

In the following the comparative assessment of benefits for each user segment considering the utility level of the services delivered during 2004.

The overall outcome of the subsequent analysis could be summarized as follows:

- (a) According to the overall evaluation statements the high value of the provided GSE-FM services is confirmed
- (b) The vast majority of users wish provision of the service and the products for the whole territory of their domain of activity for a final evaluation of the services utility in operational conditions.
- (c) Temporal and spatial resolution of the satellite data as well as the data continuity is a critical component to optimise users confidence to the services.
- (d) The users acknowledging the large-scale benefits from the services are willing to elaborate scenarios for own funding of the services.

## Table of Contents

<b>DOCUMENT STATUS SHEET .....</b>	<b>IV</b>
<b>DOCUMENT CHANGE RECORD .....</b>	<b>V</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>VI</b>
<b>TABLE OF CONTENTS.....</b>	<b>VII</b>
<b>LIST OF TABLES.....</b>	<b>VIII</b>
<b>1. OVERVIEW OF THE EXISTING SITUATION .....</b>	<b>1</b>
<b>2. SERVICES ASSESSMENT IN RESPECT TO THE END USER SEGMENTS .....</b>	<b>1</b>
2.1. COMPARATIVE ASSESSMENT OF BENEFITS FOR THE USER-SEGMENTS .....	1
2.1.1. Climate Change .....	1
2.1.2. Sustainable Forest Management.....	1
2.1.3. Environmental Issues and Forest Protection .....	2
2.2. RECOMMENDATIONS FOR IMPROVEMENTS TO THE SERVICE PORTFOLIO .....	2
2.2.1. Climate Change .....	3
2.2.2. Sustainable Forest Management.....	4
2.2.3. Environmental Issues and Forest Protection .....	5
2.3. OVERALL VALUE STATEMENT ON SERVICE PORTFOLIO.....	5
2.3.1. Climate Change, National Reporting Obligations .....	6
2.3.2. Sustainable Forest Management.....	6
2.3.3. Environmental Indicators and Forest Protection .....	6

## List of Tables

<b>Table 1.</b>	<b>User Segments .....</b>	<b>vi</b>
<b>Table 1.1</b>	<b>Services' Starting point' .....</b>	<b>1</b>
<b>Table 1.2</b>	<b>Required products .....</b>	<b>2</b>
<b>Table 2.2.1.</b>	<b>Overview of recommendations relevant for the Kyoto Protocol users segment .....</b>	<b>3</b>
<b>Table 2.2.2.</b>	<b>Overview of recommendations relevant for the Sustainable Forest Management users .....</b>	<b>4</b>
<b>Table 2.2.3.</b>	<b>Overview of recommendations relevant for the Environmental Issues and Forest Protection users segment.....</b>	<b>5</b>
<b>Table 2.3.1.</b>	<b>Value statement of the current service relevant for the UFCC &amp; Kyoto Protocol &amp; Kyoto CDM users segment. ....</b>	<b>6</b>
<b>Table 2.3.2.</b>	<b>Value statement of the current service relevant for the Sustainable Forest Management users segment .....</b>	<b>6</b>
<b>Table 2.3.3.</b>	<b>Value statement of the current service relevant for the Environmental Indicators &amp; Forest Protection users segment.....</b>	<b>6</b>

## List of Abbreviations

SLA	Service level agreement
AIJ	Activities implemented jointly of the UN-FCCC
ARD	Afforestation, Reforestation, Deforestation,
BMVEL	Bundesministerium für Verbraucherschutz, Ernährung und Landwirtschaft, Federal Ministry of Consumer Protection, Food and Agriculture, Bonn, Germany
CDM	Clean Development Mechanism under Article 12 of the Kyoto Protocol
CDS	Country Data Submission of the Kyoto Protocol
EO	Earth Observation
GHG	Greenhouse Gases
GIS	Geo-Information System
GMES	Global Monitoring for Environment and Security
GPG	Good Practice Guidance
GPS	Global Positioning System
GSE	Global Monitoring for Environment and Security - Service Element
GSE-FM	Global Monitoring for Environment and Security - Service Element Forest Monitoring
ICP-Forests	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
KP	Kyoto Protocol
LUC	Land-Use Change
LULUCF	Land-Use, Land Use Change and Forestry
SLA	Service level agreement
Stora Enso	Core User for JI / CDM Projects, Finland
UBA	Core User Umwelt Bundesamt , Berlin, Germany
UNFCCC	United Nations Framework Convention on Climate Change

## 1. Overview of the Existing Situation

To address the high-level assessment of the GSE – FM services an overview of the current (considered as being a without the GSE FM services condition) situation is presented. In the following table (Table 1.1) it is presented a summary of the available tools & methods and data sets within the core users community are ranked from L (low) to H (High) with regard to their adequacy in serving their needs in terms of coverage or frequency or reliability, or cost efficiency etc.

**Table 1.1 Services' Starting point'**

User Segment	User	Tools & methods	Data
<b>Climate Change GHG reporting, CDM projects</b>	BMVEL	H	M
	NOA	L	L
	MAPAAR	L	L
	STORA ENSO	L	L
<b>Sustainable Forest Management</b>	NBF	M	M
	FS GSNR	M	M
	TLFWJ	M	M
<b>Environmental Issues &amp; Forest Protection</b>	UBA (DE)	M	M
	UBA (AT)	H	M

To assess services similarities, the products requested per user are presented below (Table 1.2). Similarity assessment does not account for detailed thematic content, frequency and accuracy requirements. In this context the products requested within the 1<sup>st</sup> and 3<sup>rd</sup> user segment may be considered as addressing the 'same' base of services requirements. In the contrary the forest management requirements vary according to the organizational set up of the user, the area (user authority domain) specificity and the priority issues that have to be handled.

**Table 1.2 Required products**

<b>Products requirements 2004</b>	<b>Core Users</b>			
<b>CLIMATE CHANGE (1)</b>	<b>BMVEL</b>	<b>NOA</b>	<b>MAPAAR</b>	<b>STORA ENSO</b>
Ortho Images and Mosaics	X	X		
Forest Area Map	X	X	X	
Land Use/ Land Cover Map		X		X
Land Use / Land Cover Change Map	X	X	X	X
<i>Forest Type Map for Optimising Efficiency and Reliability of Biomass and Carbon Statistics</i>	X			
<i>National and Regional Volume, Biomass and Carbon Statistics utilising NFI data</i>	X			
<b>SUSTAINABLE FOREST MANAGEMENT</b>	<b>NBF</b>		<b>FS GNSR</b>	<b>TLFWJ</b>
<i>Historical Ortho Image Scenes</i>	X			X
<i>Historical Clear Cut Mapping</i>	X			
<i>Disturbances Mapping Service</i>	X		X	
<i>Clear Cut Monitoring Service</i>	X			
<b>SUSTAINABLE FOREST MANAGEMENT</b>	<b>NBF</b>		<b>FS GNSR</b>	<b>TLFWJ</b>
High Precision Forest Area Map			X	X
<i>Stand Type Map for Sub-national Forest GIS</i>				X
Land Use/ Land Cover Map			X	
Land Use / Land Cover Change Map			X	
Hot spots			X	
Vegetation suppression/ Burned scars			X	
<b>ENVIRONMENTAL ISSUES &amp; FOREST PROTECTION</b>	<b>UBA (DE)</b>		<b>UBA (AT)</b>	
Ortho Images and Mosaics			X	
Forest Area Map			X	
Forest Type Map	X		X	
Land Use/ Land Cover Map	X			
<i>Forest related Indicators</i>	X		X	

## **2. Services Assessment in Respect to the End User Segments**

### **2.1. Comparative Assessment of Benefits for the User-Segments**

The assessment of benefits presented below for each user segment are based on the users provided input (U7).

Even for users for which tools and methods are well established and forest areas relevant data are systematically collected, the benefits are strong and apply also to the services requiring more complex products.

#### **2.1.1. Climate Change**

Strong positive impact and user benefit is the result of the user segment evaluation for the delivered services of GSE-FM referring mainly to the following aspects

1. The establishment of the reference year (1990) relevant products
2. The establishment compliant to the needs and 'easily' updated data.
3. Wall-to-wall EO based thematic products support the improvement of existing data reliability
4. Costs reduction

In most of the cases the EO approach consists almost the unique possibility to cover their needs as a whole or in parts

#### **2.1.2. Sustainable Forest Management**

The users segment benefit is considered overall high and relies in the following service characteristics:

1. Wall-to-wall EO based thematic products provide efficient (time optimisation) collection of basic data, efficiency in field work ('hot spots'), objective and consistent data results
2. Monitoring capacity improvement (overview, smaller monitoring cycle)
3. Cost efficiency improvement.
4. Optimised planning for forest management relevant activities
5. Monitoring of remote areas.

The efficiency of the users work was deteriorated by budgets availability and planning difficulties (update cycles, air-borne data acquisition and processing costs, extended ground data collection, etc). In this aspect the GSE-FM service looks very promising.

### **2.1.3. Environmental Issues and Forest Protection**

The users segment benefit is considered overall medium<sup>1</sup> and relies in the following service characteristics:

1. One shot overview of the forest areas over the whole area of interest (users' domain area)
2. Monitoring capacity improvement (smaller monitoring cycle, refinement of the assessment unit, comparable data across the whole area of interest)
3. Cost effectiveness.
4. Information refinement (more categories, better spatial resolution)
5. Significant potential for data harmonization and modelling processes and outputs optimisation

### **2.2. Recommendations for Improvements to the Service Portfolio**

Low impact improvements are proposed with reference to technical issues. However, most critical improvements, which also summarize in a certain extent the users reserves towards the consolidated services, refer to:

- (a) The necessity to develop full-scale services covering the whole area of their domain of activity.
- (b) The adequacy of the Space Infrastructure for satisfying demands in repetition cycle and resolution.
- (c) The cost of the services especially for those cases where the products consist an additional asset to existing practices/techniques is a matter of concern for the users.

In the following an overview of the improvements proposed by the users as expressed in the Utility assessment they have provided is presented for each user segment.

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<sup>1</sup> The worse ranking per question among the two users of the specific segment was retained.

### 2.2.1. Climate Change

Products		Services	
Thematic Content	<p>IF RELEVANT, ACCORDING TO THE GPG FOR GHG INVENTORY GUIDELINES</p> <p>IMPROVEMENT OF THEMATIC CONTENT</p> <p>FOREST AREA CHANGES SHOULD BE PRESENTED SEPARATELY FOR AREAS UNDER ARTICLE 3.3 AND 3.4</p> <p>ENHANCE COMPARABILITY OF RESULTING INFORMATION BETWEEN 1992 AND 2003 ASSESSMENT YEARS</p> <p>INCLUSION OF MORE CLASSES THAN JUST FOREST AND NON-FOREST</p>	Documentation	No rec
Geographic coverage	<p>COVERAGE FOR THE WHOLE OF THE NATIONAL TERRITORY SHOULD BE MORE ADEQUATE FOR A COMPLETE SERVICE ASSESSMENT</p>	Delivery format	NONE
Precision (scale, min mapping unit)	<p>FOREST AREA CHANGES MINIMUM SIZE OF 0.1 HA IS RECOMMENDED</p> <p>TOTAL ERROR BUDGET SHOULD ACCOUNT FOR OTHER ERRORS BESIDE THE SAMPLING ERRORS</p>	Delivery mode	NONE
Frequency of the production	NONE	Other	
Other	SERVICE COST OPTIMISATION		

**Table 2.2.1 Overview of recommendations relevant for the Kyoto Protocol users segment**

## 2.2.2. Sustainable Forest Management

Products		Services	
Thematic Content	CROWN DENSITY INFORMATION AT LEAST 3 AGE GROUPS WOULD HAVE TO BE DIFFERENTIATED NO-FOREST CATEGORY SHOULD BE DIVIDED IN A NUMBER OF LAND CATEGORIES DIFERENTIATION BETWEEN HARVESTED AND BURNT AREAS	Documentation	HAS TO BE IMPROVED THE DOCUMENTATION SHOULD ALLOW A FULL IMPLEMENTATION IN THE USERS' GIS FACILITIES
Geographic coverage		Delivery format	HAVE TO ACCOUNT FOR FULL INTEGRATION IN THE USERS' GIS FACILITIES
Precision (scale, min mapping unit)	ENHANCEMENT OF THE EO DATA PRECISION A SCALE OF 1:10000 WOULD BE IDEAL USAGE OF HIGHER RESOLUTION EO DATA SHOULD BE CONSIDERED	Delivery mode	
Frequency of the production		Other	
Other	COMPLETE AREA (NATION/STATE) WIDE COVERAGE WITH EO DATA IS NECESSARY MIR SENSOR BAND IS RECOMMENDED OPTIMIZATION OF THE FIRE DETECTION ALGORITHM		

**Table 2.2.2. Overview of recommendations relevant for the Sustainable Forest Management users segment**

### 2.2.3. Environmental Issues and Forest Protection

Products		Services	
Thematic Content	INCLUSION OF AGRARIAN SURFACE IN HIGH SPATIAL RESOLUTION	Documentation	THE DOCUMENTATION SHOULD STRESS ALTERNATIVE DELIVERY FORMATS OF THE LC/LU DATA
Geographic coverage	COMPLETE NATION WIDE AREA COVERAGE WITH EO DATA IS NECESSARY	Delivery format	
Precision (scale, min mapping unit)	ENHANCEMENT OF THE SPATIAL RESOLUTION OF DATA PROVIDED FOR CRITICAL LOADS MODELLING TO 100x100M GRID	Delivery mode	
Frequency of the production		Other	METADATA INFORMATION HAS TO BE COMPLETE
Other			

**Table 2.2.3. Overview of recommendations relevant for the Environmental Issues and Forest Protection users segment**

### 2.3. Overall Value Statement on Service Portfolio

The analytic scores per user segment, which are presented below documents the high quality of the GSE – FM services performance. The GSE-FM Services offer to their users either a capability that they did not have before to accomplish their information needs and/or efficiency in carrying out their work.

It is worthwhile underlying that the main factors deteriorating the portfolio performance were beyond the control of the service providers (e.g. satellite availability and cost, currently available algorithms).

The majority of the core users expressed a high potential for own funding of the services under certain conditions. In this frame, flexibility in new demands, further research for optimized processing solutions and EO data continuity and full area case studies are crucial parameters for amplifying services acceptance and assure the services sustainability.

### 2.3.1. Climate Change, National Reporting Obligations

CRITERIA	EVALUATION
Did the user adequately address requested products specification?	<i>H</i>
Current Service deliveries evaluation (integration/completeness/correctness)	<i>M</i>
Current Service efficiency evaluation	<i>H</i>
Evaluation of the recommended improvements	<i>M</i>
<b>Overall evaluation</b>	<b>H</b>

**Table 2.3.1. Value statement of the current service relevant for the UFCC & Kyoto Protocol & Kyoto CDM users segment**

### 2.3.2. Sustainable Forest Management

CRITERIA	EVALUATION
Did the user adequately address requested products specification?	<i>H</i>
Current Service deliveries evaluation (integration/completeness/correctness)	<i>H</i>
Current Service efficiency evaluation	<i>H</i>
Evaluation of the recommended improvements	<i>M</i>
<b>Overall evaluation</b>	<b>H</b>

**Table 2.3.2. Value statement of the current service relevant for the Sustainable Forest Management users segment**

### 2.3.3. Environmental Indicators and Forest Protection

CRITERIA	EVALUATION
Did the user adequately address requested products specification?	<i>M</i>
Current Service deliveries evaluation (integration/completeness/correctness)	<i>H</i>
Current Service efficiency evaluation	<i>M</i>
Evaluation of the recommended improvements	<i>M</i>
<b>Overall evaluation</b>	<b>M</b>

**Table 2.3.3. Value statement of the current service relevant for the Environmental Indicators & Forest Protection users segment**