

Forest Information and Monitoring System - Fact sheets of software modules



**Support to the further Development of
Georgia's Forestry Information and Monitoring System (FIMS)
Technical Proposal - 81276643**

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Client

Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Authors

Dr. Axel Weinreich, Unique landuse GmbH
Vincent von Dosky, Unique landuse GmbH

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List of abbreviations

AFS	Adjara Forest Service
APA	Agency of Protected Areas
BFD	Biodiversity and Forest Policy Department, MEPA
DBMS	Database Management System
DES	Department of Environmental Supervision
DTM	Digital Terrain Model
FIMS	Forest Information and Monitoring System (for Georgia)
FIMS-TWG	Forest Information and Monitoring System – Technical Working Group
FMI	Forest Management Inventory
FMP	Forest Management Planning
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH
IS	Information System
NBMS	National Biodiversity Monitoring System
NFA	National Forest Agency
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NSDI	National Spatial Data Infrastructure
NTFP	Non-Timber Forest Products
RS	Remote Sensing

FIMS modular structure – overview

In the following graph the FIMS related modules are presented in an overview. The graph contains a system of IDs for each module, some of the bigger modules are divided into sub-modules representing a specific bundle of features to provide support for a defined business process.

To highlight crosscutting technical tools relevant for many FIMS modules 3 different symbols have been used at each module. They represent (from left to right) the need for: WebGIS / Spatial DB (yellow); a Mobile App (blue); "Forest Model" Tools (green)

In the order of ID numbers presented in the overview, all FIMS modules are described in a factsheet style in the following chapters.

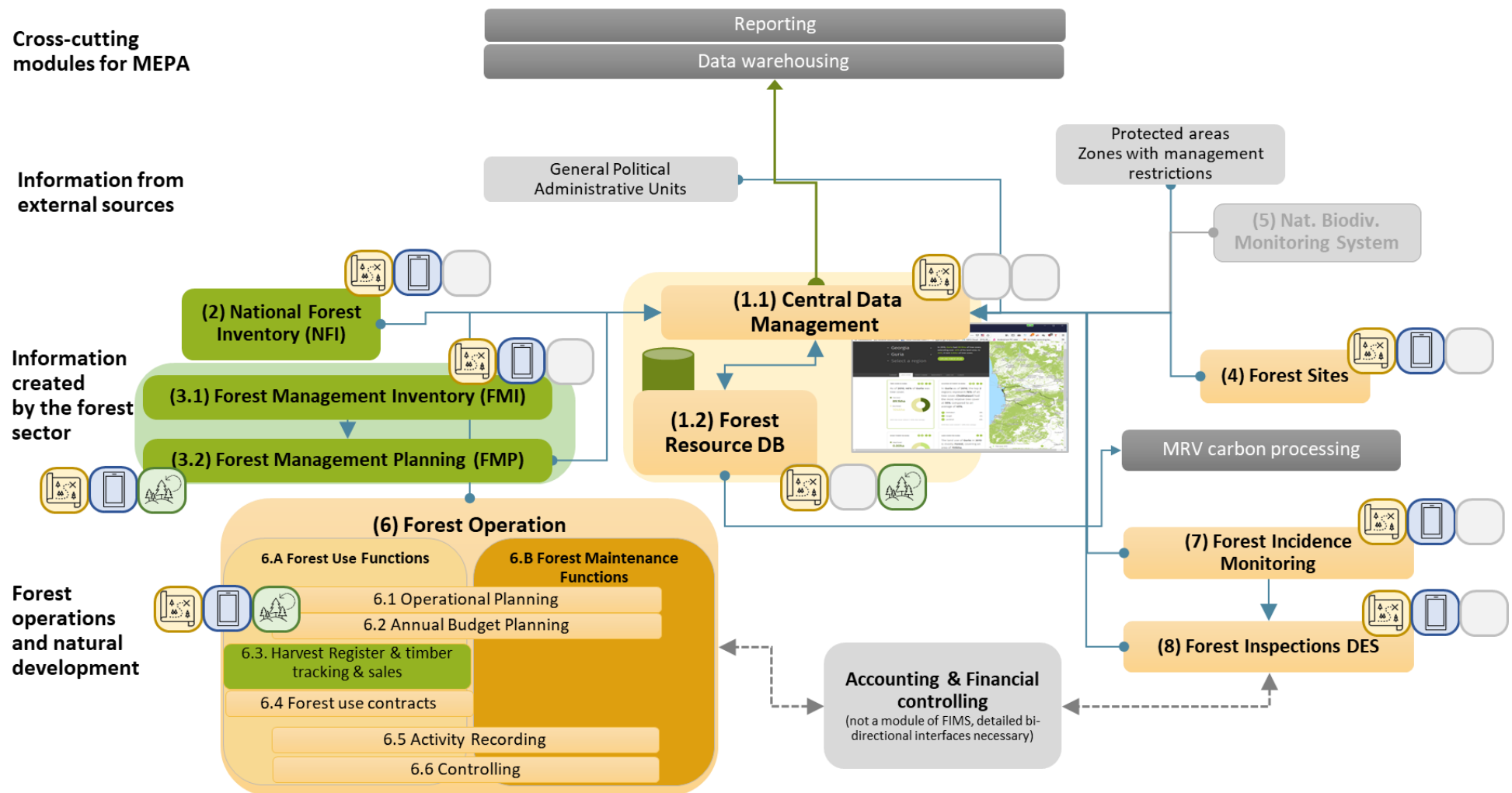


Figure 1 Overview over the modules; the symbols at each module represent (from left to right) the need for: WebGIS / Spatial DB (yellow); a Mobile App (blue); Forest Modelling Toolbox (green)

1. (1) Central-FIMS modules

1.1. (1.1) Central Data Management module

Business processes

The Central Data Management module acts as a central provisioning and retrieval infrastructure for data exchange between the different modules. It allows (spatial) queries of all data from the decentralized modules (2) - (8) that are relevant for the functioning of other modules. While (1.1) is required for data exchange, the data itself is held in (1.2).

The FIMS concept follows the idea that each institution or department of the forest sector, which is creating and updating information, shall manage the information based on its own special software module (e.g. NFI software, Forest Operation software). The related modular databases are also under ownership of each institution. The Central Data Management module combines the information from different sources / software systems and makes all of them available via the Central Data Management Module web-portal. Between software modules (e.g. FMI software and FMP software), the integration of the different data is achieved via standardized interfaces. The Central Data Management Module also allows offering most of the forest information via web-browser to a wider public.

Within the proposed FIMS different user groups will have different access rights according to modules and databases, allowing them the fulfillment of their daily work and decision-making via one general user-interface build as a Web-GIS-portal using a general spatial analytical potential and monitoring functionalities. This module is defined as "central platform". It is planned as the central access and data retrieval point for all user groups, combining all relevant spatial and tabular data, spatial analytics and access to the different software modules.

Features and tools

- Data on that platform are provided via standardized interfaces between the spatial databases of the different FIMS modules especially from the (1.2) Forest Resource Database or via WFS or WMS. Like in a "spatial data warehouse" information from different FIMS software modules can be combined and analyzed not only via visual interpretation but also using spatial analytics.
- Geodata management required (spatial DB).
- User access rights management, allowing a fine-grained provisioning of data depending on their access rights (ranging from other modules to data available to the general public)

Users

- Owner/Main users: MEPA BFD
- Users: NFA, APA, AFS, DES

- Other users with (limited) access: Gov. Bodies, Public

Most relevant data interfaces

- As the Central Data Management module is the integrative platform for data access and retrieval there are data interfaces to all modules necessary.

Status of development

- Planned
- Existing technologies in MEPA available like ABACO, but technical suitability and costs to be clarified.
- Development of functional specifications, programming and integration into FIMS needed.
- Consideration of necessary functional and logical interrelationship among modules

Further comments

- The central data management module is a core system and needs a higher priority as it influences tools, interface techniques or other technical standards of other FIMS modules.

1.2. (1.2) Forest Resource Database

Business processes

The Central Forest Database (ex "Forest Register") is the central module of the FIMS holding all data that needs to be exchanged between the modules and needs to be provided to third parties (e.g. other governmental bodies and the general public). This is the location where the forest and the forest structure are described using forest stands as their core forest management unit. A regular update is maintained by Forest Management Planning and features to simulate annual growth and changes induced by forest operations (harvesting, re afforestation etc.).

Features and tools

The database structure and main functions are very similar to the FMP software. A Forest Resource Database module can be derived from the partly completed 3.2) FMP module. To ensure the proper functionality of the module, the following features should be included:

- Relational spatial database of the core forest management entities: forest compartments and stands.
- Data import from forest management plans including secure overwriting of outdated stand and management units.
- Data check, data aggregation and analysis
- Actualization of stands triggered by activity records from (6) Forest Operations module and (7) Incidence Monitoring module:
 - Continuous actualization triggered by all forest operations changing the structure of forest stands or incidences (fire, storm, pests)
- Geodata management required (spatial DB)

Users

- Owner/Main users: MEPA BFD
- Users: NFA/APA/AFS – all management bodies; DES – for inspection
- Other users with (limited) access: Gov. Bodies, Public

Access is provided via the 1.1) Central Data Management module

Most relevant data interfaces

(1.1) Central Data Management – access and retrieval

(3.2) Forest Management Planning (FMP) – uploading forest management plans once project is completed.

(6.3) Harvest register and timber tracking – provide up to date prices and assortment tables

(6.4) Activity records – send trigger with data allowing to update forest stand information (timber harvesting, regeneration, fencing)

Status of development

- Planned, can be derived from basic DB structures of the (3.2) FMP module.
- Most obvious adaptations are:
 - Features like “annual growth” and “actualization of stands” triggered by activity records – as described above - are not existing in most of the known software products on the market.
 - Add objects like forest roads, bridges, business yards, offices (assets)
 - Switch to a spatial database.

2. (2) National Forest Inventory Module (NFI)

Business processes

The National Forest Inventory is an internal core information creation process. A software solution is needed for data collection, data aggregation, data analysis and reporting. The smallest unit for which statistical sound data can be provided following the developed design for the National Forest Inventory are forest types and tree species (groups) within a region, a district or even within a certain forest function zone.

Features

- Relational spatial database for point sampling
- Data check, data aggregation and analysis, sample error calculation
- Reporting: Reports all relevant data (tables and maps)
- Mobile data collection App including plausibility checks and GPS navigation
- Integration of all functions of the sub-module (3.3) Forest Modelling Toolbox

Users

- Owner/Main users: MEPA BFD – NFMS unit (not established yet)
- Users: NFA, APA, AFS
- Other users with (limited) access: DES, Gov. Bodies, Public
- Access is provided via the (1.1) Central Data Management module

Most relevant data interfaces

- (1.2) Forest resource DB – upload of copies of views showing NFI results to be retrieved via (1.1) Central Data Management module.

Status of development

- Open Foris of FAO established and used for the first NFI.
 - NFI team has delivered a first report; the software for data collection, processing, analysis and reporting is functioning (with very minor tasks remaining to be completed).
 - Clarifications needed:
 - The Open Foris Calc software cannot not used as interactive reporting system. If such a feature is needed: 1.2) Forest Resource DB could be used to stored pre-defined NFI results as alternative to the SAIKU reporting tool embedded in Open Foris.
- Integration of the (3.3) Forest Modelling Toolbox not discussed and developed.

3. (3) Forest Management Inventory & Forest Management Planning module (FMI-FMP)

3.1. (3.1) Forest Management Inventory (FMI)

Business processes

ForestEye (2016) has defined the purpose of the FMI as part of the Forest management planning business process like follows: "FMI are to provide scientifically sound and technically meaningful data and information to support planning and decision processes within the forest district where the FMI takes place" (ForestEye 2017). The FMI is an inherent part of the Forest Management Planning process: "Quantitative and qualitative assessment of forest resources for production" (Article 26, Forest Code).

The Forest Management Inventory is an internal information creation process. The FMI module allows data collection, data aggregation and data analysis for a point sampling inventory. It has an interface to feed stand and strata data into the (3.2) FMP module.

Features

- Relational spatial database for point sampling
- Mobile App for data collection including plausibility checks required (saves 30% of time and costs)
- Data check, data aggregation and analysis, sample error calculation
- Reporting
- Geodata management required (spatial DB) features (MSSQL or Postgres/PostGIS) and a web-GIS tool

Users

- Owner/Main users: Management bodies responsible for FMP: NFA / APA / AFS
- Users: see 3.2) FMP module as data are reported within a Forest Management Plan
- Other users with (limited) access: see 3.2) FMP module as data are reported within a Forest Management Plan

Most relevant data interfaces

- (3.2) Forest Management Planning – providing updated sampling inventory-data for the taxation of stand in the FMP process.

Status of development

- For the meanwhile 3 pilots for the FMI process Open Foris has been used.
- The automatic data aggregation for the stand level (taxation) is not yet developed. The FMI and FMP databases are not connected.

- Option to integrate the FMI data collection and Stand level data collection in a mobile and GI-containing application need to be evaluated as a mobile app is targeted for both sub-modules (3.1) FMI and (3.2) FMP.

3.2. (3.2) Forest Management Planning (FMP)

Business processes

The Forest Management Planning is an internal information creation process providing regular (10 years cycle) updates on forest status and future planned activities. The FMP module is used to define and update stand data and forest maps. These feed back into the 1.2) Forest Resource DB to complete the actual picture of the forest resources of an enterprise or an administration entity. Typically, the smallest management unit is a forest stand (litter) inside a forest district. The FMP is updated every 10 years.

The purpose is to support the development of Forest Management Plans in all steps:

- Phase 1: Analysis of the forest structure (Status)
- Phase 2: Evaluation of the past period (10 years period)
- Phase 3: Definition of planned measures for the next 10-years period
 - Forest stands: Harvest, tending, thinning, regeneration, reforestation
 - Non forest: Afforestation, agriculture, grazing rights, Non timber production rights
 - Roads: Building & maintenance

Features

- Relational spatial database for stands (litter), including Geodata management features (MSSQL or Postgres/PostGIS) and a WebGIS tool
- Mobile App for stand description and planning required (saves 30% of time and costs)
- Data check, data aggregation and analysis (i.e. DBH classes per tree species by stand or stratum)
- Integration of all functions of the sub-module (3.3) Forest Modelling Toolbox
- Planning:
 - Group and filter stands by strata
 - Calculate and present model based yield indicators (increment, yield table etc.)
 - Support comparison of model based yield planning and stand based yield planning
- Reporting:
 - Status of forest by forest types, species, age class, DBH distribution, stocking density, volume and others
 - Activity records from the last period
 - Target – actual comparison
 - Planned measures by forest type for harvesting, reafforestation, roads, NTFP and other plans.

Users

- Owner/Main users: Management bodies responsible for FMP: NFA / APA / AFS

- Users: MEPA BFD, NFA / APA / AFS - via upload of FMPs to (1.2) Forest Resource DB
- Other users with (limited) access: Gov. Bodies, Public - via upload of FMPs to (1.2) Forest Resource DB

Most relevant data interfaces

(3.1) Forest Management Inventory (FMI) – retrieving up to date information on the stand level for planning

(3.3) Forest Modelling Toolbox – evaluating the effect of different interventions and intensities based on forest growth predictions

(1.2) Forest Resource DB – results of the FMP modules are used to update respective data from previous management plans

Status of development

- Programming is partly concluded, but improvements and amendments are needed:
 - Switch to spatial DB, integration of a Web-GIS tool needed.
 - Development of integration of the sub-module 3.1) FMI and the sub-module 3.3) Forest-Modelling Tools required.
 - Mobile data collection app not yet developed.
- Issues remain to be solved: in the test case of Akhmeta the link with spatial file-based data requires a lot of manual work.

3.3. (3.3) Forest Modelling Toolbox

Business processes

The Forest Modelling Toolbox is a collection of tools/functions to simulate growth and development of forests, simulate management interventions and allow to evaluate economic impacts of the simulation runs.

It can be defined as toolbox as some elements and features can be used in the context of different FIMS modules.

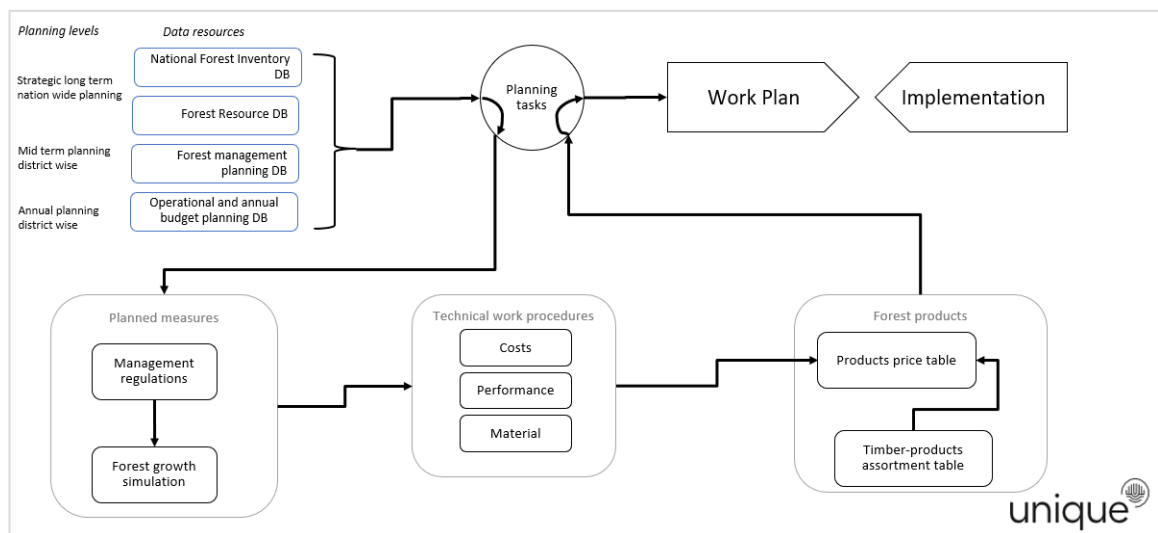


Figure 2: Schema of the Forest Modelling Toolbox

The full set of tools are necessary for the (3.2) Forest Management Planning module or the (2.) NFI module. A complete national forest management plan and simulation of the forests could be provided, if the toolbox is linked to the NFI database.

The tools for “technical work procedures” like plan costs by measures tables or the tools for “forest products” like a timber assortment table or function can be used for the 6) Forest operations module – specially to derive an Annual plan (6.1) Operational plan, (6.2) Annual Budget plan one-to-one.

Features

Set of tools plugged on different forest database NFI, FMP, Forest Resource DB (see upper left in figure 2)

- Forest Growth Simulator
 - Simulation of annual growth by using: increment data per tree species to update stand information annually and updating of age information.
 - Simulation of management interventions (regeneration or thinning or final harvesting)
- Forest Management regulations: in a digital format describing rules for the application of certain interventions and intensities (forest type x: Between 17-18 m of mean height apply selective thinning and remove 20% of the volume).

- Technical work procedures tool: List of typical technical work procedures combined with: Tables or functions for costs per unit for all kind of measures; tables and functions defining performance of work per output unit (m³/h skidding, m³/h felling and delimbing etc.); Tables of material inputs per work procedure (oak seedlings / ha etc.).
- Forest product tool: Assortment tables or functions allowing to calculate assortments based on tree species, height and DBH and an estimate of quality classes of each assortment. Table of prices per assortment – including features to update it from timber sales statistics.

Users

- Owner/Main users: MEPA BFD
- Users: NFA / APA / AFS – indirectly used via the respective modules
- Other users with (limited) access: - -

Most relevant data interfaces

- 1.2) Forest Resource DB
- 2) National forest inventory module
- 3.2) Forest Management Planning module
- 6.1) Operational plan, 6.2) Annual Budget plan

Status of development

- Conceptual work about the modeling toolbox has started but is not yet concluded
- The so-called "Forest Model" as MS Excel developed for the GCF project proposal has been and can be used as kind of template.
- Module itself not yet under active development

4. (4) Forest Sites Module

Business processes

The Forest Site Module is foreseen as a tool to develop “forest site maps”. The mapping of forest sites (soil, climate, productivity and risks) is an internal information creation process applying a multi-source mapping procedure using external and internal sources. The mapping comprises collection, processing, and analytical steps to derive a “forest site map”. The results are information layer – a map – showing soil, climate and integrates it to a tree species suitability map. The system should be climate sensitive as site conditions are changing (too) fast under climate change.

Features

- Spatial database application
- Spatial analytical scripts / models to derive site classifications for a combination of climate and soil attributes relevant for tree and forest growth conditions.

Users

- Owner/Main users: MEPA BFD - NFMS team (not yet established)
- Users: NFA, APA, AFS, DES
- Other users with (limited) access: Gov. Bodies, Public

Access via the 1.1) Central Data Management module

Most relevant data interfaces

- 1.1) Central Data Management module
- 3.2) Forest Management Planning (FMP)

Status of development

- Not yet under development, Not yet on the radar of any organization, receives little priority
- Definition and development could be connected with the upcoming soil mapping project – supported by GIZ.

5. (5) National Biodiversity Monitoring System (NBMS) – not part of the FIMS any more

It was decided by BFD that the National Biodiversity Monitoring System is not going to be part of the FIMS. Given the spatial coverage (the entire Georgian territory and territorial waters) and then range of monitored fields (forests being a sub-part of them) it makes sense to handle the NBMS separately.

Therefore, the NBMS is not discussed at length here.

Nevertheless, it has been discussed that most of the data relevant for the NBMS can be retrieved from the NFI-data and in the future from the module (1) Central-DB and (6) Forest Operations. An interface for data retrieval or the direct calculation of the indicators within the FIMS should be developed.

6. (6) Forest Operations Module

Overview on Forest Operations sub-modules

Forest Operations happens on an annual or daily level. It comprises the annual planning, implementation, inspection, recording and controlling of all management activities in the forest enterprises. It is an internal management process at management institutions (NFA, APA, AFS) using the results of Forest Management Plans stored and regular updated in the (1.2) Forest Resource DB.

The Forest Operations software can be split into several sub-modules, the purpose of the module is to support all operational management steps on an annual base:

- (6.1) Operational planning (stand level, harvesting areas)
- (6.2) Annual Budget Planning
- (6.3) Harvest register & timber tracking (including sales)
- (6.4) Forest use contracts and licenses
- (6.5) Activity recording (recording all other activities)
- (6.6) Controlling

6.1. (6.1) Operational Planning (stand level, harvesting areas)

Business processes

The Operational Planning breaks down the mid-term planning of 10 years from (3.2) Forest Management Planning into annual steps that should be realized. They are converted into specific operational steps comprising information on who is responsible for carrying out a specific task, when, with which technique, which personal, material, and financial resources. The activities are spatially explicit broken down to the litter level (harvesting, tending, planting...), operations on forest roads (repair, maintenance), other managed areas (meadows).

Features

- Geodata management required (spatial DB)
- Mobile App required for
 - Delineating and/or marking the areas with interventions
 - Selection and quantification of measures
- Output
 - Catalogue of interventions with resources
 - Operational plan of (harvest) measures and timber sales (NFA, APA)

- Operational plan of all other measures in a forest stand (planting, weeding, tending)

Users

- Owner/Main users: Forest management institutions (NFA, APA, AFS) - departments of forest use and maintenance
- Users: BFD / DES (for inspection tasks) / NFA / APA / AFS
- Other users with (limited) access: external service providers

Most relevant data interfaces

(1.2) Forest Resource DB – pushing and pulling updates on the stand level

(3.3) Forest Modelling Toolbox – Forest Management regulations; Technical work procedures tool; Forest product tool

All other sub-modules of (6) Forest Operations – (6.1) serves as foundation of most other sub-modules of (6)

Status of development

- Concept documents exists, but not yet discussed in the FIMS-TWG, current issue to get it into a fine-concept.
- Not yet under development

6.2. (6.2) Annual Budget Planning

Business processes

The Annual budget plan aggregates all planned measures from (6.1) Operational Planning and develops a central annual budget plan (costs, earnings, investments) and an annual action plan for a forest management institution.

Features

- Aggregation of measures from the (6.1) Operational Plan on regional units or groups of measures to derive a planning base for state budget and enterprise level economic planning and controlling.
- Calculation of annual allowable cut based on (6.1) Operational Plan data and mid-term plans stored in the (1.2) Forest resource DB. Option to correct (6.1) Operational plans in an iterative loop process.
- Geodata management required (spatial DB)

Users

- Owner/Main users: Forest management institutions (NFA, APA, AFS) - departments of forest use and maintenance
- Users: BFD / NFA / APA / AFS
- Other users with (limited) access: - - -

Most relevant data interfaces

(6.1) Operational Planning - base for aggregation of individual measures

(3.3) Forest Modelling Toolbox – evaluating cost, performance and material requirements of different interventions and intensities.

Status of development

- Not yet under development
- Concept documents exists, current issue to get it into a fine-concept
- Recommendation to check if the Annual Planning software developed for Adjara FS can be used in minimum as a template

6.3. (6.3) Harvest Register & Timber Tracking & Sales

Business processes

In the forest use departments and regional offices of the forest management institutions the oldest software system is in place based on a demand defined in the (former) forest code (Art. 50, paragraph 5): "The forest management body develops an "Electronic System of Timber Resources" to register forest use, its movement and primary processing activities." However, the software system is not covering all relevant business processes yet and was updated recently to cover the business yards as a new entity. The web-based software had been programmed by the Ministry of Finance and is hosted there. The NFA forest use departments are responsible for the management activities covered by the software. For the control of timber transport, the DES is involved and has access to the system.

Features and tools

- Registration and management of harvesting measures (cutting areas)
- Issuing of timber logging tickets (commercial, social, main, special cuts); Issuing of Logging Tickets (firewood); issuing of certificate of origin.
- For harvesting operations implemented by the management institutions:
 - Management of harvesting machines (skidder, cable yarder, trucks)
 - Management of forest worker (staff management, time recording)
- ~~Forest use contracts~~
- ~~Link to electronic auction platform~~
- ~~Export invoices to Financial Accounting software~~
- Timber tracking (Barcode-system)
- Timber sales and timber sales statistics
- Business yards (use def. from reg. 221) – functions to register timber and management of timber to and from the new business yards
- Geodata management required (spatial DB) and Web-GIS
- Mobile App required for:
 - Timber data recording during harvest operations
 - Timber recording prior to loading & tracking (Barcode-system)
 - Issuing of certificates of origin

Users

- Owner/Main users: NFA / APA / AFA – forest use departments
- Users: NFA / APA / AFA and DES (inspections)
- Other users with (limited) access: BFD

Most relevant data interfaces

(6.1) Operational Planning – base for selection of harvesting measures to be implemented

(6.5) Activity recording (recording all other activities) – adds information on completed measures to the activity records

(6.6) Controlling – adds data on timber produced, transport and sales to the controlling process

- Data interface to Accounting & Financial controlling system

Status of development

- "Log e tracking system" and the auctioning system are operational and well adopted; integration of "business yards" nearly completed.
- Plans to add timber tracking from sawmill to final product sales (incl. App and barcoding-system): No concept yet.
- Integration into the other Forest Operation sub-modules (6.1 – 6.6) not yet conceptualized.
- Switch to spatial DB, Web-GIS and mobile solution not yet implemented.

6.4. (6.4) Forest use contracts and licenses

Business processes

A steady task outside of the annual cycle is the sale and management, inspection and control of **forest use contracts and licenses**.

Features

- Selection and import of cadaster data
- Select and import forest data (compartments, stands, stand information)
- Link to electronic auction platform
- Export invoices to Financial Accounting software
- Geodata management required (spatial DB)
- Mobile App

Users

- Owner/Main users: NFA / APA / AFA – forest use departments
- Users: NFA / APA / AFA and DES (inspections)
- Other users with (limited) access: BFD

Most relevant data interfaces

(1.2) Forest resource database – selection of areas under management for use contracts and licenses

- Data interface to Accounting & Financial controlling system

Status of development

- Draft concept documents exists in NFA
- Not yet under development

6.5. (6.5) Activity Recording

Business processes

The Activity Recording is used to record all harvesting and non-harvesting activities: such as maintenance (e.g., planting, weeding, tending), road construction or maintenance and other works. These activities (unless unforeseen) are retrieved from the (6.1) Annual Operational Plan. For each activity it is recorded who, when and with what resources it was executed. The recording starts once a concrete measure is selected to be implemented and is completed after completion. The record answers directly on the measure planned and allows a continuous controlling as target - actual comparison. In a final step

all activities changing the forest stands (harvesting, re-forestation), other managed areas (meadow) or forest roads (repair, maintenance) shall be registered in the (1.2) Forest resource DB. Thus, an update of the forest structure of the respective stands and objects will be documented.

The activity recording is used in forest use measures as for any forest maintenance measures. The features and tools can be applied in both type of departments.

Features

- Geodata management required (spatial DB)
- Mobile App to register activities and results in the field.
- For maintenance measures implemented by the management institutions:
 - Management of machines (e.g., trucks, bulldozers)
 - Management of forest worker (staff management, time recording)
- Preparation of invoice and salary data for to Financial Accounting system
- Link to (1.2) Forest resource database allowing to trigger the update of stand level or any changes on objects in the forest resource database.

Users

- Owner/Main users:
- Users: NFA-APA, AFA, DES, external service providers
- Other users with (limited) access:

Most relevant data interfaces

(6.1) Operational planning (stand level, harvesting areas) – selection of planned measures

(6.3) Harvest register & timber tracking (including sales) – records from completed harvesting measures

(6.6) Controlling

Status of development

- Draft concept documents exists and planned as part of the “maintenance module” only.
- Not yet under development.

6.6. (6.6) Controlling

Business processes

Financial data and activity recordings must be continuously compared with the operational plan (continuous controlling as target - actual comparison). What was done, where, when, by whom, for what costs, with what impact and revenues? These are questions to be answered by the controlling units of all forest managing bodies and finally partly also by the MEPA BFD.

Features

- Geodata management required (spatial DB)
- Dashboard including Web-GIS
- Bidirectional data interface to the financial accounting system

One option for a future technical solution the controlling sub-module can be a part of the financial accounting system as software products integrating controlling are existing.

Users

- Owner/Main users: Forest management institutions (NFA, APA, AFS) - departments of forest use and departments of maintenance or controlling units
- Users: NFA / APA / AFS – management level
- Other users with (limited) access: - - -

Most relevant data interfaces

(6.1) Operational planning (stand level, harvesting areas)

(6.2) Annual Budget Planning

(6.3) Harvest register & timber tracking (including sales)

(6.4) Forest use contracts and licenses

(6.5) Activity recording (recording all other activities)

(6.6) Controlling

- Financial accounting system

Status of development

- No concept yet and not yet under development

7. (7) Forest Incidence Monitoring Module

Business processes

The Forest Incidence Monitoring module is part of the internal information creation process of the forest sector. Its purpose is the recording of all incidental changes (unplanned changes man made and due to natural causes) in forest area and structure. The recording of incidences shall allow a continuous updating of forest structural data. It is combined with an alert system, which mobilizes responsible forest managers to react and to plan and implement restoration measures (e.g., planting of a fire damaged area). Sources of information are monitoring by staff on the ground (DES, forest engineers of APA, NFA, AFS), alert function might allow inputs from a wide public. Remote sensing services can be embedded to detect incidences (pests, fires, illegal harvesting).

Features

- Recording of incidences in relation with forest objects (stands, roads etc.)
- Mobile App required to record inspections in the field and to record and describe incidences
- Geodata management required (spatial DB), a Web-GIS tool would allow to use RS-based services (automated fire, pest, forest cover change monitoring)

Users

- Owner/Main users: Forest management institutions (NFA, APA, AFS) - departments of forest maintenance
- Users: DES – as part of the inspection tasks
- Other users with (limited) access: Public (an alert system for citizens to report violations or incidences)

Most relevant data interfaces

(1.2) Forest Resource DB – contextual data on damaged forest stand or other objects

(6.1) Forest Operations – notifying (6) forest operations about recorded incidences (fires, flood damage on roads) can change their operational planning

(8) Forest Inspections – If illegal logging is accidentally found, a notification can be pushed to (8) Forest Inspections module for inspection by DES

Status of development

- No concept developed yet.

Further Remarks

It could be efficiently combined as a “multipurpose monitoring” with nature and environmental protection monitoring activities and software systems.

8. (8) Forest Inspection Module (DES)

Business processes

DES is tasked with a catalogue of inspection tasks along all activities related with forest management:

- Control of FMPs
- Control of annually planned measures
- Control of running operations (implementation, marking, forest-waste leftovers, ...)
- Control of logging trucks
- Control of delivered timber at a sawmill or business yard
- Detection and description of all illegal man-made activities and calculation of fines

Given the nature of these tasks, DES' inspection module has to operate on the entire territory of Georgia, not only in forests.

Features

- Geodata management required (spatial DB).
- Inspection mission management:
 - Planning and conducting different types of inspection missions in the field, distributed across different teams
 - Automated calculation of penalty prices based on collected field data
- Mobile App
 - Check-lists, data-view and entry of work that has been planned in the office
 - Detailed information about relevant topics (guidelines, laws)
 - GIS-functionalities allowing access to (1.2) Forest resource DB, (6.1) Operational Plans, (6.3) Harvest Register, (6.4) Forest use contracts, (6.5) Activity Recording
 - Calculation functionalities, such as: DBH calculation from the diameter of the wooden stump of a logged tree, Volume of wood-piles
- Data interface to the DES Financial Accounting system

Users

- Owner/Main users: DES
- Users: /
- Other users with (limited) access: Forest Management institutions (NFA, APA, AFS) and BFD, Public (A process for citizens to report violations)

Most relevant data interfaces

(1.2) Forest Resource DB - contextual data on forest stands or other objects

(6) all submodules of Forest Operation – retrieving planned and current and completed activities for inspection

(7) Forest Incidence monitoring module – men-made incidences that are recorded on behalf of DES can be further registered as inspection result and fines can be calculated

Status of development

- Development of a mobile app is under development by MEPA-IT
- Completion of the module is of high priority to DES
- The new module structure presented here means that the concept and software needs to be revised and adapted.

