**Forest Information System for Europe**

Concept paper revabb\_3.1

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# Introduction

Forests are a precious resource. They offer many and various highly valuable ecosystem services to Europe's societies and economies. Forests provide wood and other forest products; they capture and store carbon and thus mitigate climate change; they prevent soil erosion; they provide water quality, retention and management; they clean the air; they protect from floods and landslides and support climate adaptation; they represent some of the richest biological areas in Europe; and they support leisure and recreation.

Europe's forests are also a limited and increasingly vulnerable resource, yet we demand more from them. Reinforced by EU policies to grow the bio-economy and the use of renewable energy sources, demand for wood is on the rise. Storms, fires and pests are expected to damage forests more frequently and more intensely as a result of climate change. And forests suffer from continued habitat and biodiversity loss, while high nitrogen depositions are a concern. All this is affecting their resilience and ability to secure multiple products and ecosystem services.

A large and growing amount of EU and national policies draw on, or affect directly and indirectly, forest ecosystems and the services which their management has to provide. Because of the large number of interest, disciplines and sectors involved there is a clear need for multidisciplinary, cross-sectorial approaches if we are to appropriately manage and preserve forest ecosystems and forested landscapes, accounting for all ecosystem services and reconciling the many and various interests.

The EEA relies on data to achieve its outcomes in relation to informing the policy cycle as independent provider of information. Data management activities are carried out across the whole of EEA and a significant amount of resources is used on data related activities.

To inform and support such approaches, we need a wide range of dependable, high quality, easily accessible, harmonised, and mostly quantitative but also qualitative, data and information on a number of forest ecosystem and management parameters. Yet, much forest information, data and statistics for the EU - just like forest related policies in general – is fragmented, inconsistent, of unsatisfactory quality, and partly even not existing. The expectation is that FISE will help overcome these challenges and address the needs.

# Glossary

Data

Information

Data centre

# General framework

The idea of putting out a 'one stop shop' information system on Europe's forests and forestry sector is not new. Over the past three decades, various European projects, initiatives and organisations attempted to create such a system. They sometimes mobilised significant resources and efforts, and progress has been made in many areas. Yet, so far no such system has become publicly available.

The EU even legislated in the field: **Regulation 1615/89** laid the basis for a system to 'collect and provide objective, reliable, comparable and pertinent information on the structure and operation of the forestry sector' in the EU. Data collected by Eurostat should play an important role in the system, and the Standing Forestry Committee was given a formal say on its development and operation. Yet, this Regulation expired just when the JRC had produced a first system prototype called EFIS in 2002.

A second Regulation entitled **'Forest Focus'**[[1]](#footnote-1) was put in place on a year later (2003) to continue the expired forest regulation. Focus was shifted from protecting forests against atmospheric pollution and fires to climate change impacts, biodiversity and soils. Equipped with EUR 65 million per year, it aimed to set up a scheme for harmonised, comprehensive and long-term monitoring of European forest ecosystems. One of the main outcomes was the BioSoil demonstration projects for biodiversity and soils respectively. The scheme continued using the network of over 5000 forest monitoring plots, in cooperation with UNECE's programme **ICP Forests**[[2]](#footnote-2)and the activities of the **European Forest Fire Information System (EFFIS)**, bothstarted a decade earlier. The ending of the Forest Focus Regulation in 2006 terminated the monitoring scheme and its co-funding, and it removed the obligation of Member States to conduct co-ordinated, EU-level forest monitoring. Some of the work triggered by the Forest Focus Regulation could be continued as part of the LIFE+ programme.

The **Green Paper on Forest Protection and Information in the EU** from 2010 argued that 'information about forest resources and conditions is essential to ensure that decisions made regarding forests bring greatest benefits in socio-economic and ecological terms on all levels'. It also highlighted the need for reliable and consistent forest information to meet the EU's reporting obligations towards UNFCCC and the CBD.

The **EU Forest Strategy** from 2013 committed the Commission and the Member States to set up 'the Forest Information System of Europe by collecting harmonised Europe-wide information on the multifunctional role of forests and forest resources and integrating diverse information systems (e.g. EFFIS) and data platforms (e.g. EFDAC) into a dynamic modular system that combines data and models into applications'. It also said that the Commission would 'develop several modules, e.g. on forests and natural disturbances like fires and pests, forest and the bio–economy, forests and climate change and forest and ecosystem services that could contribute to the EU’s forestry statistics and Integrated Environmental and Economic Accounting for Forests.'

In response to the EU Forest Strategy, DG JRC has developed a **pilot version** of FISE including four modules on forests and natural disturbance, forests and the bioeconomy, forests and climate change, and forests and ecosystem services. Following the decision of JRC in mid-2016 to keep developing new FISE applications but to leave the operation of the system to a different organisation, DG ENV found in the **EEA a new partner** for the hosting, operation and further development of the system. This paper lays out the concept, requirements and plans for this new phase, whilst a transitional arrangement between ENV and JRC will support a smooth system handover to the EEA in the course of 2017.

## Development principles

**Full focus on generic products and unique selling points**

The fragmented, inconsistent, and partly deficient nature of much forest information, data and statistics for the EU has already been mentioned in the introduction. FISE should become the key mechanism to overcome this situation. The main goal and long-term vision for the system is therefore to provide

* on a *single website*
* *better forest data and statistics* compared to what is currently on the market,
* offering through a *user-friendly interface* a *consistent line of generic products* and *customisable output formats*,
* addressing all *aspects and parameters* needed to reflect the *holistic understanding of forest ecosystems and management* advocated in the EU Forest Strategy
* to serve the *user needs* and support the *objectives* outlined later on.

With this main purpose in mind, the structure and design of FISE will differ from already existing information systems (BISE, WISE, Climate*-*ADAPT) in some respects e.g. no need for a dedicated 'policy' section (which overlaps with Commission websites anyway); no need for a 'networks' section (the core product is forest data and statistics, and not links to other pages); reduction of external links, pop-up windows and nested databases to the absolute minimum etc.

**An objectives and user needs driven system – 'form follows function'**

Any content provided on FISE should clearly match the user needs and objectives outlined in sections 3.2 and 3.3. The mere availability of forest related data and information should not be a sufficient argument to incorporate them into the system (no supply driven approach).

**A comprehensive approach**

The *content* of FISE should reflect the holistic understanding of forests advocated e.g. in the EU Forest Strategy, including tight links to other ecosystems and sectors.

FISE *users* should hence get a one-stop-shop which allows picking and mixing the information which they need in a format which is convenient for them (map overlays, customisable graphs, downloadable pdf fact sheets etc.).

T*echnically,* FISE therefore be capable of creating a coherent piece of information from different data sources, even if this requires tapping into a variety of underlying data centres and platforms such as CLIMAT-ADAPT, WISE, BISE, COPERNICUS, the Article 12 and 17 assessments (Nature Directives), or the planned LULUCF registry.

**A quality service**

FISE should build on and provide only official, high-quality information (specific in space and time and following common EEA standards (see Annexes), SEIS, ReportNet and INSPIRE guidelines etc.). FISE's information tools and channels must match user requirements and must be intuitive to use, easy to grasp and fully explained.

**A long-term project**

The purpose of this concept paper is to set out the long-term goals and development programme for FISE.

**A transparent and inclusive process**

Any information on FISE will be available to anyone. All data sources and collection/processing methods must be described. The governance of FISE should also be fully inclusive and involve all relevant main stakeholders and interests, to gain the system the trust and endorsement needed.

## Objectives

FISE should be designed to serve the following principal objectives, ranked by order of importance:

**1) Inform policy making and decision-taking**

Information provided through FISE should support transparent and informed EU and national forest-related policy-making and implementation to both protect and sustainably use Europe's forests.

**2) Support monitoring, reporting and assessments**

Information provided through FISE can feed both into technical reports from MS to the EU, and into EU reporting on international obligations or to global forest information systems such as the FAO Forest Resource Assessments.

**3) Facilitate expert knowledge sharing, research and innovation**

Information provided by FISE should help its users better understand the complex changes and challenges facing forest ecosystems and their management. Projects funded under the EU Horizon 2020 and LIFE + programmes will also generate data, information and tools which can be fed into FISE.

**4) Improve public awareness and knowledge**

Information provided by FISE should also be fully accessible to the public and the media.

## Key users and their needs

Concentrating on the 28 EU Member States, the non-EU 5 EEA member countries and the cooperating countries (West-Balkan), in total 39 countries, FISE should be designed to serve first and foremost the specific needs of three broad user groups:

1. **Policy-makers and decision takers** at international, EU and national levels (EU institutions, national governments and authorities, UN and other international bodies etc.).
2. **Professionals and experts** working in organisations with specific forest-related interests (interest groups, trade associations, commercial companies, NGOs etc.)
3. **Scientists and researchers** (academia, private institutes, consultancies, independent researchers etc.)

By addressing the needs of these user groups, FISE will also provide a useful information service to the (English speaking) wider public and media, in support of the objective of improving public awareness and knowledge of EU forests.

The Annex on page lists some typical user needs for the various user groups of FISE.

## P**riority** data work (ideally!!)

A growing amount of EU and national policies and legal provisions draw on, or affect directly and indirectly, forest ecosystems and their management. Major EU policies - and indeed major challenges - relate to the objectives of developing the forest-based bioeconomy, protecting and enhance forest nature and biodiversity, monitoring and optimising forest carbon sinks, and maintaining and enhancing forest health and resilience i.e. the overall forest condition.

Whilst each of these policies on their own comes with its particular objectives and challenges, the even bigger and more important challenge will be to integrate and reconcile them all, seeking synergies but also deciding on unavoidable trade-offs.

Doing this in a transparent, sound and sensible way requires the provision of targeted quality information. Because of this overall context, efforts to further develop and operate FISE should concentrate during the years to come on the following five priority themes for forest information:

1. **Forest base information** should include fundamental numerical forest land and ecosystem parameters which can be partly be used as a reference for other area-based indicators. Examples include forest cover, forest types, annual increment and removals, ownership, tree species etc.
2. **Forest bioeconomy information** should provide numerical data on forest biomass production , other relevant forest ecosystems services and the related value chains; socio-economic indicators such as primary wood and other forest products, employment etc.[[3]](#footnote-3)
3. **Forest nature and biodiversity information** should include the conservation status of forest species and habitats of European interest (Article 12/17 assessments); the forthcoming EU common forest bird species indicator and other SEBI Indicators; structural proxy indicators such as deadwood levels, variety of tree species, forest fragmentation and connectivity; and area designations such as forest areas which are formally protected for nature conservation/biodiversity. The complexity of biodiversity may require the use of proxy indicators and qualitative data, yet numerical data are to be preferred whenever possible.
4. **Forest carbon information** should mainly provide data collected to implement the LULUCF rules to allow monitoring of forest carbon stocks and carbon sinks over time. Data from GHG inventories, including LULUCF, are currently already on the EEA website.
5. **Forest condition information** should allow monitoring forest ecosystem health and resilience in the context of changing conditions (climate change, pollution…). Main data sources include EFFIS (which initially could be simply provided as an external link in FISE, leaving the possibility for a more seamless integration into FISE to a later stage), ICP Forest plot data, Copernicus etc.

Importantly, the priority given to the themes outlined above does not imply that FISE must organise and display information under these headings. Data provided under these heading partly overlaps. Forcing users to look for data under different headings is hence likely to be inefficient, and the tunnel view resulting from information silos may make it harder to freely combine different pieces of information and to get the full picture. A hierarchical "tree" of topics for selection, as done e.g. by ESTAT and EEA, could be an alternative way of providing information.

The geographical scope of FISE will include all EEA 39 countries: the EU28 member states, the 5 non-EU EEA member countries[[4]](#footnote-4), and the 6 cooperating countries from the West Balkan region.

# Main pillars

The FISE information system is expected to have a lifetime of at least 10 years and needs therefore four pillars for maintaining the status quo regarding content and IT aspects.

## Pillar 1: Governance (system infrastructure and ownership)

The governance structure organises the roles and responsibilities of the FISE actors. Clear ownership and leadership must be ensured, and the involvement and commitment of all key partners is needed. FISE should develop according to the focus and the vision for environment information systems.

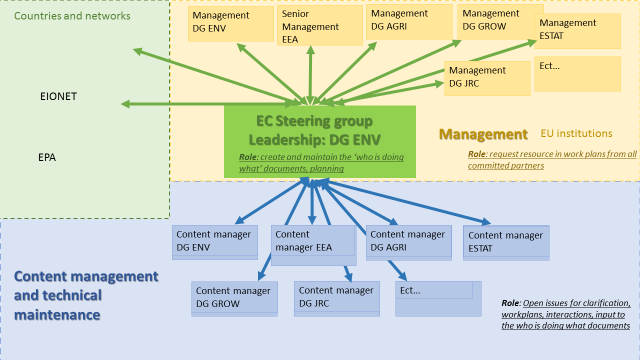
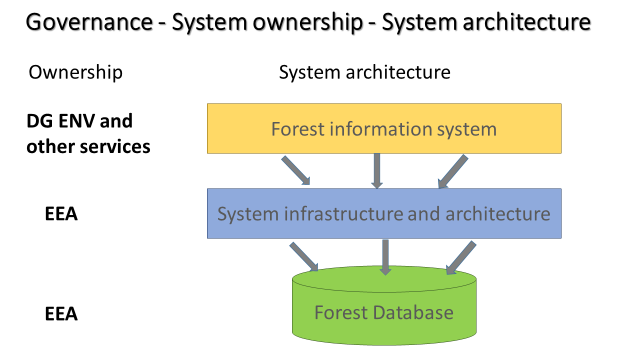


Figure : the system architecture and ownerships that lead to how governance is organised. DG ENV and other services (DG AGRI, DG RTD, ..) have the leadership in FISE; EEA contributes with content, operates the system, provides the IT infrastructure; the Steering Group mobilises resources, content management and maintenance capacity; JRC contributes with research products (tools, data sets) that are incorporated into in FISE as operational content; ESTAT contributes with content and standards (e.g. metadata); DG GROW contributes with /is linked to COPERNICUS etc.



The annual governance of FISE will involve the following components and responsibilities:

### FISE owner and coordinator

DG ENV of theEuropean Commission will be the system owner and coordinator, being also accountable for FISE. Its role is to support, through financial and management contributions, the development of FISE. DG ENV is also the FISE system and thematic coordinator and the principal interlocutor with the EEA. In this role, ENV steers but also takes final decisions on the system development, in consultation with other Commission services. Its role is to clarify open questions that cannot be solved by thematic responsible managers for specific content parts. His/her role will be to delegate responsibilities and should be call up to take decisions.

### FISE operator

The EEA acts as the FISE operator. The EEA is the thematic content contributor, one of the primary user of European data and the service provider that is hosting the organisation and the operation of the information system and providing the IT infrastructure.

The EEA proposes its infrastructure and the architecture to organise and structure the FISE building upon the Forest Data Centre fully owned by the EEA. This means that the EEA is responsible for the daily management of FISE. The development of technicalities, regular maintenance and updating of FISE is likewise under the responsibility of the EEA.

EEA will coordinate with member countries and also the ones that are not EU members, and will communicate and discuss about FISE in the EIONET (NFP, NRC and expert meetings) and EPA meetings.

EEA will have an in-house EEA Steering Group made up of representatives of all implied programmes, and it may also set up a forest expert group, either as a NRC Forest as part of the EIONET.

ENV and the EEA will form the *FISE management team*, responsible for overseeing and coordinating the daily system and content development, editorial control, and liaison with external partners.

### FISE Steering Group

Composed of ENV, EEA, JRC, ESTAT, AGRI, CLIMA etc. this group will lead the practical operation and management of FISE and steer the future development of the system. This includes ensuring that planned tasks are sufficiently resourced from the various contributors, reviewing submissions for changes, proposing next steps, setting priorities for agreed work packages, clarifying open issues that are not dealt under content management, or agreeing on content from other organisations.

In practice the Steering Group will e.g. collect input from all thematic coordinators or content managers, forward a consolidated 'who does what' document with proposals for action to the FISE coordinator (ENV) and operator (EEA) and so on.

The Steering Group should meet at least twice a year. It may also calls in meetings of all contributors/content managers when deemed necessary e.g. when a new functionality is introduced or major changes in context should be addressed.

### FISE Content Managers

The content management reflects the needs for knowledge and assessments on forests by the EEA and its partners. Content managers represent their institutions and take responsibility for a specific part of the information system.

Content management and development are carried out in close partnership between EEA and the Commission Services. This includes more specifically DG-ENV, DG-AGRI, JRC, Eurostat, and EEA (and it’s ETC/ULS and ETC/BD).

The EEA will have editorial control over the content.

All content managers must relate to their representative in the EC Steering Group and feed into the process of coordination through this relationship.

### FISE Advisory Board

Composed of EEA, Commission services and partner representatives it will facilitate linkages, synergies and complementarity with relevant groups and bodies such as UNECE, FAO, Forest Europe, Conventions, EFI, the informal Forest Directors meetings, relevant Commission expert groups etc. The aim is to use existing structures and capacities rather than building new ones.

## Pillar 2: Content management

Part of the content management includes governance. A well organised content management is needed to complement the governance structure. Roles describing responsibilities for bringing new content to the system, approving, updating and revoking content are of decisive importance. The structure should be integrated and flexible to allow fast reaction for necessary changes and to ensure that the FISE is attractive to end users.

One of the main aims of the FISE is to provide one single entry point for accessing forest information to support the EU Forest Information and other forest related policies. FISE is a service rooted in (mostly numerical) data and information on forest resources. It provides easy access to validated and consistent forest-related information and combines the sources of information related to forests as well from other data sources and information systems.

The EEA will contribute substantially on content. A list of potential FISE parameters /content is presented in chapter 5.3. What to include into FISE will be incremental and user-driven. The implementation plan (chapter 4) describes the step-wise phases of content development.

### Data input

The geographical scope of the FISE data flows is the EEA 39 countries (EU28/27, the 5/6 non EU EEA member countries and the 6 cooperating countries (West Balkan). A continuous supply of quality data is needed to allow the EEA to operate FISE.

The selection of available data and information depends on the availability and the requested use for assessment and knowledge. The selection of available data and information is on-going according to a set of data standards. 'Relevant' data meet the following quality data standards: publicly available; representative over time and space; replicable; reproducible; documented; include metadata. The Annex on page 25 presents a first list of data sources ('catalogues', 'warehouses', 'datasets' etc.) that should - or could potentially - be used. Only datasets that meet these standards and that are accessible, will be transferred to the EEA.

EEA acquires data from numerous sources. By far the largest part of data acquired by EEA is secondary acquisition that is obtained through an intermediary (e.g. such as Member States) or obtained from organisations that have already used the data to fulfil their own mandates (E.g. Eurostat). Member States administrations are a main source of information and supporting data for FISE but may not accept new reporting requirements leading to additional costs. Many Member States support the idea of further harmonisation of forest information, though.

Routinely collected information that is part of a national and regional approach is the most valuable and generally highest quality evidence that can be made available. Existing protocols are in place to deal with these national data directly into the European level via the EEA ReportNet. Reportnet also serves pan-European and UN reporting obligations. A small and also growing part of data acquired by EEA is primary data, i.e. data which EEA obtains directly from data providers (businesses and citizens).

Furthermore, the EEA has an established network of environmental data providers known as EIONET[[5]](#footnote-5). This includes member states directly as well as other data aggregators on a regional level.

However, the access to the data and the metadata may occur from a number of other important data and information sources that are relevant to include in the FISE:

A number of regional datasets and data aggregation services may feature in the FISE data access source list. Some of the main contributors are non-EU countries and partners of the UNECE, FAO and Forest Europe.Examples of thematic and regional data warehouses that provide more detailed measurements at a finer scale are datasets from the Alpine and Carpathian Convention e.g. on deadwood.

This means information, maps and data associated with other European Directives, such as biodiversity will be either linked or embedded inside the FISE. The EEA has cross-cutting activities that deal with the different directives that mean similar formats for maps and indicators can be followed, thus bringing coherence when the user jumps between forests and other thematic information.

Likewise for the integration of other EU and global environmental data sets at European level.

To guide its clients, support transparency and keep the confidence or all user groups in the system at high levels, it will be crucial for FISE to clearly distinguish between 'official data/information' and 'modelled data/information'. They should be provided in clearly distinguishable places and must not be mixed in the FISE outputs and products.

### Data processing

Acquired forest data will be transformed into useable datasets and to prepare the suite of routine data products. Data processing comprises the development of value-added products and the production of aggregated European data sets. The ETCs are the main data processors although staff and external consultants also contributes to the data processing.

The EEA has implemented a Common workspace for data processing by staff, consultants and ETCs. This is a shared platform with homogeneous data quality metrics.

### Data dissemination

EEA aims at sharing environmental data and is responsible for a proper handling, dissemination of data as well as a proper acknowledging of the data providers across countries and stakeholders. This is done according to the principles of the Shared Environmental Information System (SEIS).

Information should be managed as close as possible to its source; collected once and shared with others for many purposes; readily available to easily fulfil reporting obligations; readily accessible to end-users at all levels for the design of new policies; accessible to enable comparisons of the environment at the appropriate geographic scale; fully available to the general public, to enable citizen participation; and supported through common, free and open software standards.

Reporting could i.e. comprise text, maps and indicators, data or combinations of these. In addition, most of the information will be delivered through a series of pre-defined reporting sheets, while data may also be defined through reporting sheets but delivered through existing data aggregation channels

#### Official data and information

'Official data/information' includes all information and (mostly numerical) data generated through formally agreed procedures, provided by officially entitled institutions or agencies, and considered by national authorities as an official account of the situation and providing the basis for public policy-making.   
*Examples*: National Forest Inventory Data; Assessments provided by Member States according to Article 12 and 17 of the Nature Directives; ICP forest plot data; LULUCF data provided by Member States; national forest statistic provided in response to the join UNECE/FAO questionnaire.

*Output formats for official data:* FISE users will expect the system to deliver the information which they need in a format which is convenient for them. This will include – but is not limited to – the following output formats, products and services.

* Thematic maps
* Thematic graphs
* Thematic tables
* Fact sheets with explanatory figures and text, based on an indicator, a theme or specific country or region.
* Raw data, provided in a database that can be visualised and downloaded by researchers and other advanced users
* Short assessments and key messages to decision makers in the form of to support decision making involving forest issues (forest base data, LULUCF, forest biodiversity and forest biomass).

Each of these products could be offered both in pre-designed formats - ready for use - and in a more customisable format which allows users e.g. to choose main parameters or geographical units. Also, both online and offline formats should be offered.

#### Modelled data and information

'Modelled data/information' includes all information and data which do not meet the requirements mentioned above, and which often are generated through models, computer scenarios, algorithms etc. designed to answer the question of specific research projects and studies.

*Examples*: Scenarios developed by FP7 and Horizon 2020 research and innovation projects; FISE apps and their outputs developed by the JRC etc.

*Output format of modelled data: tbd – describe the design of the system for researchers (including JRC which continues FISE apps development) to incorporate their results into the system? What type of technical protocol/data control/ policy for that purpose? Etc.*

### Data quality requirements

The EEA data policy defines the legal principles for data exchange. It endorses full availability of publicly financed data within the limits of property rights and legislation and provides guidance on sharing data (<http://www.eea.europa.eu/legal/eea-data-policy>).

The EEA data policy expresses the responsibility for data quality as of data providers. For data produced by the EEA itself this includes the publication of metadata with information on transparency, accuracy, relevance, timeliness, consistency and comparability – also following the Code of Good Practice for European Statistics.

EEA quality standards are based on international standards and principles (ISO, OGC, INSPIRE).

Criteria in relation to timelines, completeness and coherence are set out for Eionet data flows. QC and QA take place at numerous instances in the dataflow, for instance in countries, on submission to EEA, during processing operations and prior to publication. All QA and QC checks are carried out on Eionet data flows are publically described as well as the results of the checks, which are included in the data documentation. Data that have not completed QC routines are flagged as preliminary. The separate Data Quality Framework covers all important data quality aspects, key references are below.

#### Comparable and harmonised information

Forest assessments have a much wider scope providing information on forest ecosystems and resources at global, regional and national level. Special attention is paid to the comparability of the information across countries and to the harmonisation of the variables used for the international reporting. The new needs and expectations on forests have broadened considerable.

A first main harmonisation effort has been conducted by the FAO for the forest resource assessments at global level. Several initiatives have followed up such as the COST Actions E43 and FP1001 among others. Outcomes of these actions include refined and new definitions characterised as reference definitions. Existing approaches of harmonisation will be applied on the FISE datasets. Harmonised data will be available on FISE but will not replace the reported country data and information: the original data flows will be available from FISE.

The FISE follows the data policy of the EEA (http://www.eea.europa.eu/legal/eea-data-policy). As an important point, the EEA expects the data providers to follow the principle that all data and products, financed with public means should be fully available for use by public bodies, and that these data should be made available for others to use with as few restrictions as possible. The data provider shall clearly specify intellectual property rights, use or re-use conditions, including statistical confidentiality, and quality statements in metadata information for each type of data (metadata, raster/image data etc.). EEA accepts and encourages data provided from crowd sourcing and citizen science. EEA will make use of this type of data in its products and services where it judges that it is appropriate to do so and taking into account the available information on the quality of data.

Another aspect is how to ensure the interoperability of systems, display data which are not commensurable (EFDAC, EFFIS, SoEF, Art 12/17 assessments), and comparability of data across themes and sources … *not finalised – requires more detail*

The user needs will define the content of FISE, taking into account the supply side (data availability). The information is mainly generated at country level by governmental organisations (ministries and public agencies), research institutes and practitioners. A core information source is the Copernicus land services in particular the forest services (High Resolution Forest Layers, Riparian areas).

Data validation also through feedback function/functional mailbox for users to correct wrong data, propose new sources etc.

The next step is to develop a business plan based on this concept paper and the agreed content of FISE. The business plan supports the detailed description of the FISE IT architecture and infrastructure and thus the description of the corresponding maintenance of the system.

## Pillar 3: Business plan

### FISE IT infrastructure

The FISE infrastructure is owned by the EEA and will have the following EEA infrastructure:

* CMS : Plone 4.3.7
* Database : ZODB 2.13
* Maps : ArcGIS via EEA web map server
* User authentication via EIONET LDAP accounts

The content will be (to be discussed):

General and basic information accessed as answers to general questions regarding the state of forests

Forest topics including health, production, pressures and ecosystem services

Forest data and maps to be downloaded

Indicators: indicators sheets / fact sheets

Interactive tools and resources (apps)

Share your information allows any interested user to propose new contents to be uploaded to the FISE via the EIONET account to log in. Content would be like reports, information portals, tools, projects, case studies, ect.

Functionalities

Database search functions

Map based search functions

Download

Viewer – tables, graphs, maps

### FISE IT architecture

The EEA architecture is built to support typical data and information flows as displayed below. IT infrastructure deals with hardware and basic services needed to meet the user requirements for FISE. This includes:

* Server capacity and storage
* Physical setup with power, cooling etc.
* Security settings in common with other systems and according to the settings of the hosting organisation
* System administration in terms of updating the system, bring bug fixes to the system, update the operating system, basic testing of compatibility (e.g. is FISE compatible with new version of LINUX);
* Setting requirements to the hosted system (e.g. the used version of Java has a security problem) – this requirements usually have high priority

Sufficient resources must be allocated for system administration. Costs for renewing servers, changes caused by security issues or tasks for testing and updating needs to be calculated and brought forward by the hosting organisation for budget discussions to the steering group at the right time to be integrated in future planning and budget allocation.

Key elements of the EEA architecture for data management are

* Reportnet as the data acquisition system,
* The common workspace to process national data into European data sets
* the EEA data warehouse from which data and data related products are been published.



Figure x. ***Highlighted architecture components of data/information management at EEA***

Data contributing to indicators are prepared within the indicator management system (IMS). These building blocks are underpinned by a spatial data infrastructure, by the increased use of cloud computing services which are further described in the ICT strategy.

A key concept is to avoid building new or specific solutions from scratch because this does not enable the EEA to leverage past investments or existing resources.

For data publication, EEA uses a limited number of standardised software tools, and publishes own web services as well as information platforms owned by Commission services.

EEA currently hosts and maintains an increasing number of thematic websites (e.g. WISE, BISE, ePRTR, ClimateADAPT, Copernicus land) on behalf of several Commission services (ENV, CLIMA, REGIO, MARE, GROW). Over time, these websites and their content need to be brought stepwise into alignment with EEA architecture and structured approaches to agreement on service levels and ownership put in place.

## Maintenance of FISE

A stable structure is needed to operate and to ensure the proper functioning of the FISE. The tasks include technical maintenance to e.g. quickly and efficiently respond on reported bugs and screening of necessary changes in basic components which might have an impact on the system (e.g. version of operating system, security patches).

User support/Helpdesk. Users and partners (EC and member countries, ect.) need support to access information from and use the FISE for their own work. The Helpdesk functionality will e.g. respond to questions from users, requirement, complaint or any feedback and is assured that an answer will be provided in short time – even if the actual bug fixing will need more time. Timely and polite user interaction by a helpdesk is crucial for information systems like FISE with users infrequently accessing the information system but when they do, it is with a real need to find specific information.

A list of requirements has to be maintained to serve as an input for the steering group on further development needs, through helpdesk and the webmaster, which could be the same person/institution). This list has to be regularly reported to the appropriate governance body (in case of FISE: the steering group).

The technical maintainer estimates the necessary resource allocation/budget per year for the operational service.

The EEA work is included and described in the Annual Management Plan

The FISE IT maintenance is carried out by the EEA staff and supported by EEA IT framework contracts and ETC/ULS and ETC/BD. This comprises user testing of new or improved functionalities and the retrospective adjustment of existing content to new functionalities.

All content types of FISE are maintained and updated by the EEA with the support of the ETC/ULS. The task includes on a regular basis to:

* Update the information available on the platform
* Improve the display and accessibility of information
* Undertake dissemination actions

Content comes from DG ENV projects, EEA and ETC/ULS and ETC/BD activities, country pages, international databases, European projects, research organisations.

**Work plan 2017 – 2030 ->**

This section describes the ongoing activities to build up FISE. Notwithstanding the ambitious long-term goal for FISE, the system should be set up and further developed step by step, through an incremental learning-by doing approach, and always giving priority to quality (measured as user response and satisfaction!) over quantity.

The approach is incremental starting with the information system based on basic quantitative and easy to access information from forest-related data flows by member countries. Access to the information system and the data goes through a portal.

The development of FISE follows quickly a finalised and agreed upon FISE concept paper and business plan.

**Development phase 1 (2017- 2019):**

This phase includes

**In 2017**: **In 2018: In** 2019: Focus on the addition of forest bioeconomy and carbon data

**2017 Work plan**

The work plan includes the development of the present concept paper and a business plan for its implementation, plus the transfer of FISE from the JRC with an initial version of the system published online by the end of the year.

* Drafting of FISE – project description (DG ENV+EEA)
* Agreement EEA and COM
* Presentation of concept to forest expert meeting (tbc)
* Governance agreement (EEA, COM, JRC, UNECE, FAO, Forest Europe, ..)
* Budget allocation and budget solutions for the years 2017 and 2018, eventually 2019 (charge back?)
* Design of the FISE portal (EEA)
* Publication of the FISE portal with the following structural contents
  + Forests in Europe
  + Forest topics
  + Data and maps
  + Indicators

**2018 - 2019 Work plan**

Further work depending on resources would include consolidation of the systemand inclusion of additional forest base data (e.g. area, tree species composition, including definitions) and forest nature and biodiversity data (e.g. protected areas, FCS, Article 12/17 assessments):

* Expanding the FISE content with a focus on parts that are related to the EU Forest Strategy
* Publishing FISE content related to forest ecosystem services and natural capital issues (with the JRC)
* Establish the links to COPERNICUS
* Coordination with the FAO-FRA and UNECE as well as Forest Europe and regional conventions
* Coordination with other European platform initiatives e.g. EFI
* Development of a European Indicator Library
* Development of a European Photo Library
* Launch of the website

**Development phase 2 (2020 - )**

**2020 – 2030 Work plan**

* FISE content update and improvement, including the country reports to the 2020 processes (if agreed)
* Integration of data into FISE

This e second phase would comprise expanding forest data and information to meet the EU Forest Strategy and other policy needs (such as the Biodiversity Strategy) and allow for EEA assessments on forests and forest related issues to build up the EEA knowledge base.

With increased needs and depending on the system's success, it may make sense to develop a web-based entry point for forests in Europe and a corresponding infrastructure for sharing information to the forest community on the forest ecosystems at EEA level.

A gateway to broader user oriented information on forest related policies at European level such as policies, legislation and supporting activities related to EU Forest Strategy, and forest related EU policies, pan- European and global policies (SDGs);

The topics support the assessment of the state and trends of forest ecosystems, habitats, genetic diversity, forest biomass, land use, land cover changes and forests (LULUCF), forest resilience and adaptation to climate change, protection and maintenance of forest biodiversity; greenhouse gas emissions/removals.

The portal will expand if successful and user driven to comprise country data flows (data and information on forests based on member state reporting to a large extent based on the National forest inventories and other monitoring networks of relevance to forests). These data and information will allow calculating the needed indicators regularly in a timely and reproducible, robust, representative, comparable, etc,). The data flows will link to other EU and pan-European sources of information (COPERNICUS, SEIS, INSPIRE, and e.g. JRC, EuroStat, COM, UNECE, FAO, Forest Europe)

The most relevant information products (indicators, reports and assessments) are easily accessible, disseminated and highlighted under the FISE portal; they are accepted as key products by the FISE partners. These information products play also an important role in supporting of policy development, implementation, assessment and review. They also feed into integrated assessments.

*Table 1: Example of forest relevant indicators, assessments, questions:*

|  |
| --- |
| 1. Fragmentation/ connectivity |
| 1. Diameter (dbh) |
| 1. Age |
| 1. Height |
| 1. Fellings (SEBI 017-higher spatial resolution needed |
| 1. Removals: SEBI 017 (higher spatial resolution needed) |
| 1. Annual increment: SEBI017 (higher spatial resolution needed) |
| 1. Growing stock: SEBI017 (higher spatial resolution needed) |
| 1. Deadwood: SEBI018 (higher spatial resolution needed) |
| 1. Socio-economic indicators related to forest bioeconomy governance |
| 1. Ownership |

Use and assessments based on FISE

The information will be applied to e.g. assessments of carbon stocks, biomass (e.g. JRC approach), LULUCF (MS and JRC approach), area designated to biodiversity conservation/protection, area under management plans and/or certification ( ~), changes in the extent of water-related ecosystems over time; area of HNV forest, area and typology of urban forests and trees, area relevant for LULUCF 🡪 afforestation, reforestation, deforestation and natural regrowth, area of old growth forest, area of agroforestry, This information will complement assessments on land management, ecosystem services, water retention and use and other cross-sectoral analysis.

Examples of questions to be answered based on FISE (not exhaustive) would include basic questions such as:

* What is the area of forest in the EU, EEA and pan-European regions? According to different data sources and definitions?
* What is the number of forest species and habitat in favourable conservation status?
* Where have afforestation/deforestation/reforestation taken place in Europe, at what rate?

And more complex questions such as:

* What volume and quality can forests in the EU sustainably supply, e.g. which demands can be met and which choices have to be made?
* What are the limits to supply?
* What are the current demands for forests in the EU in terms of ecosystem services and where are the conflicts between the demands?

Another aspect of the FISE will be the compilation and repository of important European and EU-wide research projects related to forests, forest ecosystem services, improving the science-policy interface.

The information should allow for cross-national/regional comparisons and links to information available from European countries in particular from monitoring networks at country level such as National Forest inventories and ICP-Forests, as well as forest fact sheets for EEA Member States. This means that the FISE should links to Europe- wide networks supporting information sharing across national borders EIONET for forests and agriculture (?), European Topic Centre DG JRC, DG Eurostat, DG ENV, UNECE, FAO,

In addition to these entry points the FISE home page could provide news on forests for the European and global level using news feeds from key stakeholders.

**Budget**

2017

The expected tentative budget would be ­­­­\_\_\_\_\_\_\_\_ € plus \_\_\_\_\_\_\_ € allocated at the JRC.

2018

Tentative budget: \_\_\_\_\_\_\_ €

2019 – 2030

**\_\_\_\_\_\_**€ / year

**Resources**

The budget is intended to be allocated to 6 man-years at EEA:

|  |  |  |
| --- | --- | --- |
| Resource needed | Days p.a. | Euros |
| 1. Related to IT infrastructure   Work: system administration and adjusting needs for FISE specifically (e.g. reorganise disk space, monitoring performance and access, system security, etc.) and infrastructure aspects like overall security setting, physical implementation (servers, disk space, etc.) and integration of FISE in EEA settings.   * 1. IT System administration: **30 days p.a.** (2-3 days per month)development and data infrastructure, web services –   2. Infrastructure (20 KEuro p.a.): replacing hardware, **20 days p.a.** of working time for the infrastructure manager in EEA to integrate in concept and set necessary agreements as host e.g. security settings, priority in EEA infrastructure or alike. | 30  20 | 20000 |
| 1. Related to IT infrastructure   Work: system administration and adjusting needs for FISE specifically (e.g. reorganise disk space, monitoring performance and access, system security, etc.) and infrastructureaspects like overall security setting, physical implementation (servers, disk space, etc.) and integration of FISE in EEA settings.   * 1. IT System administration: **30 days p.a.** (2-3 days per month)development and data infrastructure, web services –   2. Infrastructure (20 KEuro p.a.): replacing hardware, **20 days p.a.** of working time for the infrastructure manager in EEA to integrate in concept and set necessary agreements as host e.g. security settings, priority in EEA infrastructure or alike. | 30  20 | 20000 |
| 1. Related to system maintenance, interfaces and helpdesk function   Work: bug fixing and minor adjustments (new versions of software components, changes in frames). Integration of FISE as an EEA maintained system and allocate resources. User support/helpdesk   * 1. Technical maintenance: **30 days p.a.** (minimum 2-3 days a month) for monitoring the system, discussion with thematic experts on technical options, training for content managers on how to use specific features.   2. User support helpdesk – internal service minimum **60 days p.a** (5 days per month) to answer questions from users as well as from content contributors; sorting requests and forward to the expert responsible   3. User support helpdesk – external service through contractors: 30 KEuro p.a. (calculation 500 Euro per day) in a framework contract with external provider | 30  60 | 30000 |
| 1. Related to content management    1. Content manager (data manager /project officer) for EEA part of FISE: 90 days p.a. (minimum are 7 days a month) for checking and producing context descriptions; even more days if major new content is to be integrated    2. Content manager DG ENV: 60 days p.a. (minimum 5 days a month) for approval of contributions | 90  60 |  |
| 1. Related to governance    1. IT coordinator with 50 days (4 days a month) to participate in meetings and to analyse requirements    2. EEA content coordinator with 40 days (3 days per month) to participate in meetings and work on open questions related to EEA provided content, planning of resources for content management, contacts and coordinate contributions    3. DG ENV chair in the FISE steering group with 30 days p.a. (2 days a month) to participate in meetings and identify topic for discussion; decide on involvement of additional stakeholders; overall lead and decision on open issues related to publishing of content. | 50  40  30 |  |
| 1. Related to assessments    1. Data manager (project officer) for content and data flows with countries, e.g. supporting  European Forest Bureau Network (of NFI-s)  foreseen by EU Forest Strategy – 1 CA in NSS3    2. Analyst for forest ecosystem indicators and assessment, incorporation of Copernicus forest, supporting EU Biodiversity strategy target 3B, liaising with UN/ECE, cooperating with JRC forest services and LIFE, and with LULUCF accounting  – 1 CA in NSS3 (FG IV)    3. Analyst for systemic assessments e.g. forest resources in green economy, bioenergy, green growth, EU footprint and any related transitions, 1 CA in IEA |  |  |

**Risks**

No budget or not sufficient support from the European Commission

No sufficient capacities at the EEA

No entire transparent collaboration with partners resulting in duplication of access to the same data source leading to inappropriate resource efficiency and confusion of users.

A FISE Business Plan will be developed in line with the identified priorities, deliveries and milestones and supported by adequate resources. It will be annexed to the Concept note and consist in a rolling plan to be regularly revisited and reviewed.

The FISE Implementation Plans have to be formulated according to the strategic guidance of the current Concept paper and the Strategic group. They will be prepared for a specific period of time, as agreed at the strategic level by the Steering Group.

The FISE Concept paper will need to be periodically revisited and revised by the Strategic Group to accommodate new policy developments and needs, but only immediately before a new Implementation Plan is to be prepared. These revisions will be clearly versioned and dated

# Annexes

## Annex I: FISE in the EU Forest Strategy

EU Forest Strategy (2013)

'The Commission and the Member States will:

* set up of the Forest Information System of Europe by collecting harmonised Europe-wide information on the multifunctional role of forests and forest resources and integrating diverse information systems (e.g. EFFIS) and data platforms (e.g. EFDAC) into a dynamic modular system that combines data and models into applications;
* align EU forest information so that it is primarily based on data collected by Member States with EU data architecture requirements such as INSPIRE, SEIS and Copernicus, and follow international and regional processes;
* promote the further development of the EU database of forest reproductive material, including hyperlinks to national registers and maps;
* improve, make comparable and share forest information and monitoring, building on successful experiences such as EFFIS, forest health, EU forestry statistics and the EFDAC.

In close consultation with stakeholders, the Commission will:

* develop several modules, e.g. on forests and natural disturbances like fires and pests, forest and the bio–economy, forests and climate change and forest and ecosystem services that could contribute to the EU’s forestry statistics and Integrated Environmental and Economic Accounting for Forests.'

Council Conclusions on the EU Forest Strategy (2014)

'12. SUPPORTS the strengthening of the forest knowledge base for well-informed policy and decision-making through the development of a Forest Information System for Europe, as well as by sharing of best practices and seeking to integrate relevant national forest information activities at EU, regional and global levels, and CALLS on the Commission and the Member States to continue to contribute where relevant and in a cost-effective manner to the development of a Forest Information System for Europe, and to improve data availability where necessary on key ecological, economic and social parameters of forests, as well as on forest-based industries, based on concrete data needs and clarified sources of financing;

26. INVITES the Commission, in close cooperation with the Member States and stakeholders, to explore various options for better coordination of EU policies relating to […] harmonised forest information […]'

EP report on the EU Forest Strategy (2015)

'61. Takes the view that extending the forest-related knowledge basis is of crucial importance to research and that reliable information is essential for the implementation of the forest strategy;

62. Notes the availability of information and monitoring resources via the Copernicus programme and other space initiatives at European level, and recommends increasing the use of these resources and tools;

63. Notes that national forest inventories represent a comprehensive monitoring tool for assessing forestry stocks and take regional considerations into account while also responding to demands for less red tape and lower costs;

64. Welcomes the Commission’s efforts to establish a European forest information system based on national data and initiatives to improve the comparability of new and existing data, and hopes in this regard to see a reinforcement of the analysis of data on the economy and employment in the forest and woodworking sectors;

65. Recommends, in particular, that there should be more long-term data sets to help the understanding of trends in forestry and its adaptation to climate change;'

Multi-annual Implementation Plan of the new EU Forest Strategy (2015)

Priority area nº5: What forests do we have and how are they changing?

'The main action under this priority concerns the development of a Forest Information System for Europe (FISE), with the aim to collect harmonised information on the multifunctional role of forests and on forest resources, integrating diverse information systems and data platforms. Several modules will be developed (i.e. forests and natural disturbances, forests and the bioeconomy, forests and climate change and forest and ecosystem services), building on the available EU forestry statistics and forest accounts (Eurostat). The EU Framework Programme for Research and Innovation Horizon 2020 and LIFE + will also contribute to FISE objectives.

Other actions refer to the development of the EU database of forest reproductive material and to the MAES, including forests. '

## Annex II: Typical user needs

*Draft ! This table will have to be improved and fine-tuned as the discussion on the final FISE concept progresses*

|  |  |
| --- | --- |
| Global and international agencies and organisations |  |
| EU institutions | * Information on forest ecosystem services, conditions and their trends * Assessment of policy effectiveness and impacts in various parameters (e.g. carbon sink, biodiversity, growing stock, ownership…) * Information relevant for compliance checking with EU legislation * Support to policy developments in forest related fields * Implementation of other policies related to forests |
| National governments and authorities | * Access information from neighbouring countries on forest environment * Comparative assessment on implementation and state of the environment with other countries * Access to European level information and aggregated summary information |
| (Non-research) professionals and experts | * information on state of, and changes in forest conditions and implementation of EU policies * Easy access to reference documents * Sharing of data, e.g. via national, European or international associations for comparison of performance indicators |
| Scientists, researchers | * Information and data relevant for their studies * Dissemination portal for studies of European relevance * Share data and information resulting from their scientific work |
| Wider public and media | * Access to information on state of the environment on the area where they live or travel * Performance of their region or country in relation to others |

## Annex III: Potential FISE parameters

*Draft ! At this stage of the discussion, this annex can only provide an indicative listing of the type of parameters and information which FISE should provide. A final choice can only be made when the resource availabilities are clearer and after an in-depth consultation with other Commission services (or possibly/alternatively at the first Steering Group meeting).*

Context data

* land area
* population (total)
* population density
* population growth rate
* percentage of rural population
* GDP per capita
* annual growth rate of GDP

Forest base data

* forest area (total, in percent of total land area, and per capita)
* Forest area change (net change in forest area), broken down as rate of afforestation (planting), rate of spontaneous forest expansion (areas overgrown by forest), and rate of deforestation (conversion from forest to other land use)
* Forest types and protection status: e.g. plantation area, natural forest area, protected forest area (including % of land area strictly protected i.e. non-intervention management)
* Area under forest management plans (the area of forest which is managed in accordance with a formal, national management plan over five years or more)

Forest based bioeconomy

* Net annual increment, total annual harvest, total annual removals, foreseen increase in wood mobilisation for energy uses (National RE action plans)
* Production, trade and consumptionofindustrial roundwood (production, imports, exports consumption); sawnwood (production, imports, exports consumption); wood-based panels (production, imports, exports consumption); pulp for paper; paper and paperboard

Forest nature and biodiversity

Article 12/17 assessments, forest bird index, include more details

Forest carbon sink

= LUCUCF data

Forest condition

* % of forest land damaged by fires, floods, storms
* Crown condition, discolouration
* Phenology
* Fragmentation

## Annex IV: Main data sources for the further development of FISE

|  |  |
| --- | --- |
| National Forest Inventory (NFI) data | Countries with an open access policy provide raw data. JRC framework contract allows purchasing aggregated data from NFIs in other countries, if required (located in EFDAC) |
| COPERNICUS |  |
| European Forest Fire Information System (EFFIS) | Full integration into FISE not a priority. A link will be enough. |
| Forest Europe 'State of Europe's Forests 2015' | Possibility to obtain data currently published in a UNECE database? The 2015 FE data in the paper report contain many errors. |
| Natura 2000 data | Reporting on the Habitats and Birds Directives (Articles 17 and 12 assessments); Forests in Natura 2000 sites (available in Natura 2000 viewer, which should also make numerical data available, which is not currently the case) |
| ICP Forest data | Available in EFDAC. Includes N deposition and concentrations etc Use if data will require agreement with ICP. |
| Other forest biodiversity datasets provided by MS | Forest bird indicators, both national and EU, to be developed by the European Bird Census Council (EBCC) |
| DG SANTE data | Data and geographical information e.g. on forest pests and epidemics; Forest Reproductive Material Information System (FOREMATIS) |
| EUFGIS – European information system on forest genetic resources | Includes EUFORGEN databases on forest genetic resources in Europe |
| CAP indicators | See <http://ec.europa.eu/agriculture/cap-indicators/index_en.htm> |
| EUROSTAT data | E.g. wood production and trade for EU-28 and other large producers (sourced from FAOSTAT); annual statistics on renewables: gross inland energy consumption of renewable energy, i.a. solid biomass (wood) and "other biomass and municipal waste; Forest accounts for physical and monetary value of services |
| European Tree Species Atlas | Data in EFDAC |
| EFI database of forest models |  |

## Annex V: EEA data quality standards

*To be completed*

1. EC/2152/2003, see <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l28125&from=EN> [↑](#footnote-ref-1)
2. International Co-operative Programme on the Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests), see <http://icp-forests.net/> [↑](#footnote-ref-2)
3. This will require close coordination with the planned Bioeconomy Knowledge Centre (including through the JRC Bioeconomy ISG) to realise synergies and avoid overlaps. The Knowledge Centre will carry out work in relation to several parameters and data which are also relevant for FISE. [↑](#footnote-ref-3)
4. Following the Brexit decision, the UK is likely to turn from an EU member state into one of the non-EU EEA member countries. [↑](#footnote-ref-4)
5. EIONET (European Environment Information and Observation Network) [↑](#footnote-ref-5)