SFI Sustainable Forestry Implementation

With support from Federal Ministry of Food and Agriculture by decision of the German Bundestag

Forest policy report **SFI/2025**

Facilitating the planning and implementation of multifunctional sustainable forest management in Ukraine

Viktor Melnychenko

Kyiv, January 2025

About the Project "Sustainable Forestry Implementation" (SFI)

The project "Promotion of multifunctional sustainable forest management planning and implementation in Ukraine" (SFI) is a project established within the framework of the Bilateral Cooperation Programme (BCP) of the Federal Ministry of Food and Agriculture of Germany (BMEL) with the Ministry of Environment and Natural Resources of Ukraine (MENR). It is a continuation of activities started in the forest sector within the German-Ukrainian Agriculture Policy Dialogue (APD) forestry component

The Project is implemented based on an agreement between GFA Group, the general authorised executor of BMEL, and the State Forest Resources Agency of Ukraine (SFRA) since October 2021. On behalf of the GFA Group, the executing agencies - Unique land use GmbH and IAK Agrar Consulting GmbH - are in charge of the implementation jointly with the SFRA.

The project aims to support sustainable forest management planning in Ukraine and has a working focus on the results in the Forest Policy and National Forest Inventory.

Author

Viktor Melnychenko

Contacts

Troitska Str. 22-24,
Irpin, Kyiv region
+38 (067) 964 77 02

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ALS - Airborne laser scanning
BMEL - German Federal Ministry of Food and Agriculture
BWI - German National Forest Inventory
CCF - Close to Nature Forestry
CECBE - Code of economic classification of budget expenditures
CFS - Canadian Forest Service
ENFiN - European Network of National Inventories
EU - European Union
EUTR - EU Timber Trade Regulation
FAO - Food and Agriculture Organisation of the United Nations
GFA - GFA Group
Green Climate Fund (GCF) - UN Green Climate Fund
Horizon Europe - the EU's research and innovation funding programme
IAK - Consulting company
INSPIRE - Infrastructure for Spatial Information in the European Union
KPI - Key performance indicators
METLA - Finnish Forest Research Institute
NFI - National Forest Inventory
nFIESTA - Forest inventory assessment and analysis system
NRCan - Ministry of Natural Resources of Canada
SFI - Sustainable forestry implementation
TSOS - Forecasting the long-term availability of timber resources
UNECE - United Nations Economic Commission for Europe
USAID - United States Agency for International Development
UKRDERZHLISPROEKT - Ukrainian State Forest Management Planning Association
GIS - Geoinformation system
RS - Remote sensing of the Earth
PPP - Public-private partnership
NFI - National Forest Inventory
CNFI - Centre for National Forest Inventory

1. ANALYSIS OF THE ORGANISATIONAL STRUCTURE

1.1. Mapping the current structure

Ukrderzhlisproekt operates under a centralised management model, which includes:

- Central management (policy making, strategic planning, coordination, interaction with government and international organisations, financial management). This structure is responsible for making key decisions and formulating the overall forest management development strategy.
- Regional forestry expeditions (Lviv, Kharkiv, Kyiv, Complex and Ukrainian), which are engaged in forest management in their respective territories. They play a critical role in implementing forest management methodologies and monitoring forest conditions.
- The Centre for National Forest Inventory (CNFI), which collects, monitors and analyses NFI data, develops methodological recommendations and conducts research. Its activities are aimed at providing reliable information about forests and implementing modern methods of forest resource assessment.
- Auxiliary units, which include the economic department, transport department, and the economic service group, providing technical, material and financial support for the institution's activities. Their role is to provide organisational support for all forest management processes.

1.2. Functionality analysis

The current organisational structure of Ukrderzhlisproject has a number of both positive and negative aspects that affect the efficiency of its operations:

Positive aspects:

- An extensive network of regional expeditions, which allows us to cover the entire territory of Ukraine and ensures an integrated approach to forestry.
- A centralised management system that ensures the unity of methodological approaches to forest management, creating stability in decision-making.
- Access to government funding and international technical assistance, enabling long-term initiatives to modernise and improve forest management.
- Extensive experience of the staff in the field of forest management and national forest inventory, which allows us to maintain a high level of professionalism in performing tasks.

Negative aspects:

- The impact of the war on forestry operations, especially in the occupied and frontline regions, which makes it difficult to carry out forestry operations, access certain areas and implement sustainable forest management projects.
- Excessive centralisation of management, which limits the flexibility of regional units and reduces the speed of local decision-making.
- Lack of an integrated digital document management and data analytics system, which makes it difficult to process and use information for planning.
- Insufficient interaction between structural units, which leads to duplication of functions and delays in the execution of tasks.
- Outdated methods of collecting and analysing forest management data, which reduces the efficiency of decision-making and limits the use of the latest technologies.

1.3. Identifying strengths and weaknesses

Strengths:

- A broad expert base and experienced specialists, which ensures high-quality forestry operations.
- Implementation of the National Forest Inventory (NFI) system, which provides comprehensive information on forest resources.

Weaknesses:

- Lack of professional specialists in geographic information systems (GIS) and remote sensing (RS), which limits the ability to introduce modern technologies for collecting and analysing forest data.
- Fragmented approaches to managing different forest management processes, which creates difficulties in coordinating activities.
- Lack of an effective HR policy and incentives for young professionals, which hinders the attraction of new staff.
- Insufficient digitalisation of forest management processes, which slows down the introduction of innovations.
- Lack of a clear performance evaluation system (KPIs) in the activities of structural units, which makes it difficult to monitor performance.
- Cooperation with international partners is poorly established, which limits opportunities for learning, attracting international experience and adapting best practices in forest management.

1.4. Providing recommendations

1.4.1 Harmonisation with European standards through the implementation of INSPIRE (Infrastructure for Spatial Information in the European Community) standards for the integration of geospatial data and ensuring data compatibility with European forest management systems.

1.4.2. Development of public-private partnerships (PPPs) to finance digital transformation projects in forest management and support

long-term inventory initiatives. To address these issues, the following set of measures is proposed:

1.4.3. Decentralisation of management by giving more powers to regional expeditions for prompt decision-making.

1.4.5. Integration of digital technologies for forest management, including GIS and satellite monitoring.

1.4.6. Expanding training programmes

- The use of GIS and remote sensing in forest management, which will allow specialists to analyse data more effectively and make informed decisions.
- Methods of data collection and analysis in the NIL, including the use of the latest technologies to obtain accurate and representative data.
- Assessment of carbon flows and ecosystem services, which is critical for assessing changes in forest ecosystems.
- Integrate digital solutions into forest management processes to improve resource management and work planning, including training and internships for staff in digital forest management technologies.

1.4.7. Optimisation of financial support

- Attracting grants from the European Union (EU) and international support, in particular through Horizon Europe, FAO, World Bank, and Green Climate Fund programmes.
- Developing carbon credit mechanisms that will allow for additional financing based on carbon sequestration.
- Create an innovation fund for digital transformation to finance the development and implementation of new methods of forest management and inventory. by attracting international grants and public-private partnerships.

1.4.8. Introduce key performance indicators (KPIs) to assess the performance of structural units and improve management processes.

1.4.9. Expand cooperation with international organisations to implement best practices in forest management.

1.4.10. Transforming the CNFI into a separate entity

- Increase the competitiveness of salaries for the CNFI specialists in order to overcome the staff shortage, especially during the field period.
- Providing financial and administrative autonomy for effective resource management and implementation of international standards.
- Amendments to the statutory documents of "Ukrderzhlisproekt" and development of the Regulation on the CNFI to ensure its organisational independence.

- Attracting international funding through grants from the EU, FAO, World Bank and other programmes.

2. HUMAN RESOURCE DEVELOPMENT PLANS

2.1. Review current staffing plans

Ukrderzhlisproekt operates under a centralised management model, but HR processes remain insufficiently optimised. There is currently a need for a clearer division of responsibilities, updated job descriptions and modernisation of the HR policy in line with European standards.

The main aspects of HR planning include:

- Identification of key specialities required for the effective functioning of the institution.
- Analysis of the need to increase or decrease staff depending on strategic objectives.
- Updating the staff motivation and development system.
- Improve the system of professional development, in particular for working with GIS and remote sensing.

2.2. Analysis of skills and competences

An analysis of the human resources potential of "Ukrderzhlisproekt" shows the presence of strong specialists in the field of forest management, but there are a number of problems that hinder effective work. In particular, there is an insufficient level of digital skills, a lack of specialists in data analysis and remote sensing, and a low level of knowledge of international forest management standards.

Required competencies and their current level:

Competence	Current level	Required level
GIS and remote sensing	Basic	Advanced
Data analysis	Limited	High
AI and automation	Not used	Critical
Assessment of carbon flows	Minimal	Advanced

Sustainable forest management	Medium	High

2.3 Identify training needs

In view of the identified problems, there is an urgent need to implement a training system in the following areas:

1. GIS and remote sensing:
    - The basics of working with GIS in the forestry sector.
    - Use of satellite and aerial imagery for forest inventory.
    - Processing and analysis of spatial data for forest management.
    - Implementation of machine learning methods.
2. Methods of data collection and analysis in the NFI:
    - Improving the methodology for collecting field data.
    - Using drones to map forest areas.
    - Automation of data collection and use of modern software.
    - Analysis of changes in forest resources using artificial intelligence.
3. Assessment of carbon flows and ecosystem services:
    - Methods for calculating the carbon balance of forest ecosystems.
    - Integration of NFI data into international climate reports.
    - Developing carbon credit-based financing programmes.
4. Integrating digital solutions into forest management processes:
    - Use of digital platforms for forest management.
    - Integration of analytical models into forest management planning.

- Improving data exchange mechanisms between government and international agencies.

2.4. Recommendations for the SFI's advisory services for 2024-2027.

Given the current challenges and needs, the SFI project is recommended to focus its advisory support on the following areas:

Training events and expert support:

- Organising trainings on the use of GIS, satellite data and artificial intelligence in the NFI.
- Conducting internships in EU countries to improve the competencies of specialists.

Technological support:

- Providing expert support in the implementation of the NFI digital platform.
- Integration of automated big data analysis algorithms.

Legislative initiatives:

- Advice on the adaptation of Ukrainian regulations to EU standards.
- Assistance in developing a long-term strategy for the development of the NIL.

2.5. Recommendations

Given the complexity of the new forest management procedures and the need for rational use of project resources, it is advisable to focus the project on supporting the development of NFI rather than general forest management tasks. This will help to avoid wasting resources on initiatives with a "blurred perspective and unclear results". In this context, the key areas of focus should be the improvement of the NFI methodology, the introduction of modern data collection and analysis technologies, and the professional development of staff. With this in mind, the following key steps are proposed:

2.5.1. Support for training and professional development of NFI staff

To ensure the high quality of the collection, analysis and interpretation of NFI data, a comprehensive training programme for specialists involved in the inventory process should be implemented. Given the current challenges, the implementation of training initiatives should cover the following key areas:

- Create a basic educational programme for new staff: develop online courses and training modules on the basics of NFI, GIS and remote sensing; introduce a certification programme for specialists working in the field of NFI; introduce practical internships in the field to consolidate the knowledge gained.
- In-depth training for experienced professionals: courses on analysing satellite images and aerial photographs to improve data accuracy; using forest data processing software (QGIS, ArcGIS, ENVI); in-depth study of machine learning methods.
- Exchange of experience with international experts: organisation of study visits to countries that have successfully implemented the NFI (Germany, Finland, Canada, etc.); webinars and joint workshops with international consultants; invitation of foreign and national experts to develop localised training programmes.
- Hands-on training and simulation exercises: modelling fieldwork using drones and satellite data; simulating data collection based on real inventory scenarios; using interactive platforms for real-time analysis of NFI data.
    - Organise training programmes on GIS and remote sensing for employees involved in NFI.
    - Conducting trainings on the use of modern software for analysing NFI data.
    - Involvement of international experts to teach the methodology of collecting and processing NFI data in cooperation with international partners and universities.

2.5.2. Technical support and provision of necessary equipment to the NFI

For effective collection, processing and analysis of data, the NFI needs to upgrade its material and technical base and introduce modern equipment. The main areas of technical support include:

- Purchase and upgrade of equipment: purchase of drones with high-precision sensors for forest monitoring; use of 3D aerial photographs for high-precision forest assessments and stratification.
- Creation of a single digital platform for NFI: development of an integrated database for storing and analysing NFI data; automation of the processes of entering, verifying and validating information; and provision of access to the platform for all interested institutions and experts.
- Implementation of modern analysis algorithms: use of artificial intelligence to automatically detect changes in forest ecosystems; integration of satellite data to predict forest cover dynamics; analysis of biomass and carbon fluxes based on NFI data.
- Testing and adaptation of equipment to Ukrainian conditions: pilot studies using new equipment in different natural zones; adaptation of NFI methods to the specifics of Ukrainian forest ecosystems; identification of optimal approaches to data collection and processing in the field.

- Purchase and implementation of equipment for satellite monitoring and aerial photography.
- Providing software for processing spatial data and integrating it into a single digital platform of the NFI.
- Supporting the development of a digital platform for storing and analysing NFI data through grants and government programmes for forestry development.

2.5.3. Optimisation of the methodology for collecting and analysing NFI data

In order to improve the accuracy and representativeness of the NFI data, the existing methodological approaches should be reviewed. Key measures include:

- Standardisation of data collection methods: implementation of uniform data collection standards in accordance with international recommendations of ENFiN, FAO and UNECE; development of unified protocols for data collection in the field; use of digital forms for recording and storing information.
- Automation of data verification and validation processes: implementation of algorithms for automatic analysis of collected information; transition to digital data quality checks without the need for manual input; integration of remote sensing methods to quickly check the correctness of data.
- Use of artificial intelligence and machine learning: implementation of algorithms for predicting changes in forest resources based on historical data; optimisation of methods for analysing biodiversity and assessing the ecological state of forests.
    - Creating a unified system for collecting field data.
    - Automation of data verification and validation processes.
    - Introducing the latest machine learning methods to assess changes in forest resources by training new staff and upgrading the skills of current staff.

2.5.4. Expanding international cooperation for the development of NFI

Leveraging international expertise and partnerships is critical for the development of NFI in Ukraine. Key steps in this direction include:

- Exchange of experience with countries that have successfully implemented SFI: studying data collection and analysis methods in Germany, Finland, Canada, etc.; implementation of adapted approaches to NFI based on international recommendations; attending international conferences and engaging in international projects in the field of forest inventory.

- Conducting joint international projects: cooperation with international organisations (FAO, ENFiN and UNECE) to implement pilot studies; organising training programmes for the exchange of specialists between countries; using international funding to implement strategic initiatives in the field of NFI.
- Involvement of international consultants and experts: cooperation with leading scientific institutions to adapt the latest technologies; organisation of consultation meetings with international experts to improve the NFI methodology; launch of technical support programmes from international donors and partner organisations.
    - Exchange of experience with countries that have successfully implemented the NFI (Germany, Finland, Canada, etc.).
    - Conducting joint projects to implement international best practices in forest inventory.
    - Support from international organisations (FAO, ENFiN and UNECE) in standardising NFI processes to share experiences and adapt best practices in forest management.

3. A VISION OF THE EFFECTIVE ADVISORY IMPACT OF NFI

3.1. Revising the concept of NFI development

The National Forest Inventory is a key tool for assessing the state of Ukraine's forest resources. For its effective functioning, a comprehensive revision of the methodology and the introduction of advanced technologies are required. Key aspects of revising the concept of NFI development:

- Improve the data collection methodology in line with EU and FAO standards, including modernising classification systems, increasing the representativeness of samples and introducing automated data checks.
- Use GIS and remote sensing technologies to improve the accuracy of results. This will significantly reduce the cost of fieldwork and enhance the ability to monitor changes in forest resources in real time, especially in occupied or hard-to-reach areas.
- Optimisation of data collection, processing and analysis through the introduction of automated data collection systems, the use of satellite imagery, drones and aerial photographs to verify field data.
- Integration of inventory data into the state forest management system, creation of a single portal for access to NFI data to be used by all stakeholders for decision-making.

3.2. Identification of key international expertise needs for the NFI

To ensure the high quality of NFI processes, international expertise is required, including:

- Cooperation with leading international institutions, including Bundeswaldinventur (BWI, Germany), METLA (Finland), NRCan (Canada), FAO, ENFiN and UNECE.
- Conducting joint training programmes and internships to improve staff skills aimed at adapting international methodologies to Ukrainian conditions.

- Use of best international practices to improve the inventory methodology, including the introduction of new approaches to modelling forest growth and ecosystem functions.

3.3 Suggestions for improving the legal framework for NFI

The legal framework for NFI in Ukraine needs to be harmonised with European standards and modern approaches to forest policy. Main suggestions for improvement:

- Updating regulations in line with the EU Forestry Strategy 2030, including updating fieldwork guidelines, introducing digital document management and implementing data quality control mechanisms.
- Enshrine in law the requirements for regular conduct and updating of NFI data, which will guarantee the stability of the data collection and analysis process.
- Implementation of INSPIRE standards to ensure interoperability of geospatial data and its integration into the national environmental information system.
- Developing mechanisms for financing NFI through international funds (FAO, Horizon Europe, Green Climate Fund) to ensure the continuous development of the inventory programme.

3.4. Recommendations for the SFI's advisory services for 2024-2027.

Given the current challenges and needs, the SFI project is recommended to focus its advisory support on the following areas:

1. Training events and expert support:
    - Organising trainings on the use of GIS, satellite data and artificial intelligence in the NFI.
    - Conducting internships in EU countries to improve the competencies of specialists.
2. Technological support:

- Providing expert support in the implementation of the NFI digital platform.
- Integration of automated big data analysis algorithms.

3. Legislative initiatives:

    - Advice on the adaptation of Ukrainian regulations to EU standards.
    - Assistance in the development of a long-term strategy for the development of the NFI in Ukraine.

4. REVIEW OF FOREST MANAGEMENT PLANNING WORKING PROCEDURES FOR THE INTRODUCTION OF NEW MULTIFUNCTIONAL NATURE-BASED PLANNING AND CONTROL OF FOREST MANAGEMENT

4.1 Overview of current procedures

At present, forest management planning in Ukraine is carried out according to classical methods focused on the intensive use of forest resources. The main characteristics of these procedures are:

- A long cycle of updating forest management plans that does not take into account rapid environmental changes and current challenges.
- Limited use of GIS and remote sensing in forest monitoring, which reduces the ability to respond quickly to changes, especially in hard-to-reach and occupied territories.
- Insufficient implementation of the principles of multifunctional forest management, including environmental, social and economic aspects.
- Dependence on manual inventory methods, which require significant resources and are less efficient than digital technologies.

4.2 Analysis of efficiency and effectiveness

Analysing current procedures, we can identify several key problems:

- Low adaptability to climate change: lack of forest management strategies aimed at making forests resilient to ecosystem changes.
- Lack of an integrated approach to forest management that takes into account both environmental and socio-economic aspects.
- Limited funding and technological support, which hinders the implementation of modern management methods.

4.3. Conformity assessment

Given the EU requirements and principles of sustainable development, it is necessary to review the compliance of current forest management planing procedures with international standards. Key areas for improvement:

- Transition to the Continuous Cover Forest Management approach, which is actively used in Germany and other EU countries.
- Use of remote sensing to analyse changes in forest cover, especially in hard-to-reach regions.
- Development of a digital forest management platform for automated data collection and analysis.

4.4. Analysing strategic planning

Timber Supply Outlook Study (TSOS) as an element of strategic planning An important component of strategic forestry analysis is TSOS, a study that allows forecasting the state of forest resources and assessing their availability in the medium and long term. Similar approaches are widely used in Germany, in particular, with the participation of expert Heino Polley. The inclusion of TSOS in integrated planning will not only analyse the current state of forests, but also develop scenarios for their further use, which is important for decision-making at the state level.

Current strategic research in the field of forest planning. The forest management reform process envisages a number of important studies, including:

- Timber Supply Outlook Study - Forecasting the long-term availability of timber resources.
- Development of legislative initiatives to integrate remote sensing into the legal framework for forest monitoring - Draft laws related to the implementation of RS-Inventory into the legislative framework on NFI or Forest Monitoring.
- Strategy for comprehensive (organisational, technical and financial) implementation of NFI in the organisational structure of the State Forest Resources Agency.

- Improvements of NFI field data collection and data base management.
- Development of an e-learning course on NFI and remote sensing methodology - e-training course for NFI/RS-Inventory methodology.
- Update RS-Inventory (improve calibration and long-term analysis of changes in forest cover) (2025).
- Optimisation of NFI methodology, considering RS-approaches.
- Options for implementation of modern NFI/RS-Inventory approaches for forest management, namely monitoring of forest resource development (SE Forests of Ukraine).

It is important to note that the study "Proposals for ToR on analysis of NFI results and optimisation of NFI field parameters" is not yet included in this list, but it is critical for further optimisation of the NFI process.

4.5. Providing recommendations

To date, various international organisations have supported forest management reforms, including the Food and Agriculture Organisation (FAO).

In this context, it is important to ensure synergies between different initiatives to avoid duplication of work and increase the efficiency of financial and technical resources. The SFI project is an important but not the only initiative in the field of forest management planning. Therefore, it is worth coordinating efforts with other international organisations and government agencies.

In addition, the allocation of Ukrderzhlisproekt's own funds for the implementation of new forest management planning methods is problematic, which highlights the need to find additional sources of funding through international projects and government programmes.

The SFI project can provide assistance in the following areas:

1. Training and internships: Organisation of training programmes in Germany (based on the example of the Forest Expert Programme), involvement of Ukrainian specialists in courses on nature-based forestry.

2. Technological support: Development of digital infrastructure, creation of an integrated platform for forest management, implementation of GIS and satellite monitoring systems.
3. Expert assistance: Provision of international consultants to develop a methodology for nature-based forestry and assess the current state of Ukrainian forests.
4. Financial support: Assistance in attracting grants and international funding to support the digitalisation and modernisation of forestry.
5. Strategic planning: Facilitate the development of a national strategy for nature-based forest management, including the adaptation of Ukrainian legislation to EU standards.