# Decisional support system for enhancing forest management efficiency

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Forest management is a complex and dynamic field that requires balancing environmental conservation, economic viability, and regulatory compliance. Effective management of forests ensures sustainable resource use, protects biodiversity, and mitigates climate change impacts. However, forest owners and managers often face challenges in data collection, decision-making, and compliance with legal requirements. Recognizing these challenges, the GO-FOR.TRACK Operational Group has developed an innovative Decisional Support System (DSS) aimed at streamlining forest management practices. This tool integrates spatial data analytics, automation, and ecosystem service evaluation to assist in revising and optimizing forest management plans.

Figure 1: Logotype of INNOVARURALE.

## A technological approach to forest planning

The DSS is a technologically advanced tool that combines geospatial analysis with forest resource management. The system utilizes a comprehensive mapping framework that incorporates various ecosystem service data, including:

- **Carbon sequestration mapping**, which provides insights into the forest's role in capturing and storing carbon dioxide.
- **Biomass distribution assessment**, essential for evaluating sustainable harvesting practices.
- **Forest type classification**, allowing managers to differentiate between diverse forest ecosystems and plan interventions accordingly.

Developed using **the Common International Classification System of Ecosystem Services (CICES),** the DSS enables precise evaluation of the physical and economic value of forest resources. By employing **advanced biophysical models,** the system generates high-resolution maps that serve as a valuable decision-making tool for stakeholders.

One of the DSS's primary strengths is its ability to **offer parcel-level data**, a crucial feature given the regulatory requirements in Italy. Forest management plans in the country must be approved by public authorities and include detailed parcel descriptions. The DSS automates this process by integrating spatial data with regulatory frameworks, ensuring **compliance with forestry laws while minimizing administrative workload.**

## Key benefits for forest owners and managers

The implementation of the DSS introduces numerous advantages for forest owners, managers, and collectives:

1) **Automated report generation:**

- The DSS automates the creation of legally required parcel reports and management plans.
- Reduces time spent on administrative tasks, allowing managers to focus on on-the-ground forest operations.

2) **Enhanced decision-making:**

- The system provides spatial analysis tools to assess forest productivity, conservation value, and ecological impact.
- Facilitates data-driven decision-making, improving long-term sustainability of forest resources.

3) **Cost and time efficiency:**

- By automating documentation and reducing manual data entry, the DSS leads to substantial cost savings.
- Optimizes workflow for forest owners, companies, and environmental groups, ensuring better resource allocation.

4) **Improved knowledge framework:**

- The system fosters an integrated approach to forest planning by linking ecological, economic, and legal perspectives.
- Provides a comprehensive digital archive of past and present forest conditions, aiding in historical trend analysis.

## Implications for sustainable forest management

The DSS plays a pivotal role in fostering sustainable forest management practices by integrating modern technological innovations with traditional silvicultural knowledge.

1) **Climate change mitigation:**

- The system helps monitor carbon sequestration potential, assisting in climate action strategies.
- Supports adaptive forest management, allowing landowners to adjust to changing environmental conditions.

2) **Biodiversity conservation:**

- The ecosystem service maps enable managers to identify areas of high ecological value.
- Ensures that interventions are aligned with biodiversity protection goals.

3) **Regulatory compliance and policy integration:**

- The DSS simplifies the often-cumbersome process of meeting legal forestry requirements.
- Ensures that management plans align with national and EU forestry policies.

## The future of forest management

The GO-FOR.TRACK project's **Decisional Support System** is poised to revolutionize forest management by making it more **data-driven, efficient, and sustainable.** As digital tools become increasingly integrated into natural resource management, innovations like the DSS will play a crucial role in ensuring that forests continue to provide economic, environmental, and social benefits.

## Conclusion

The development of this **Decisional Support System** represents a milestone in modern forestry, offering an innovative solution for forest owners, managers, and collectives. By automating critical processes, enhancing decision-making, and aligning with sustainability goals, this tool is a significant step forward for the forestry sector.

## About FOREST4EU project

The article has been produced in FOREST4EU project as a part of capacity building materials directed to stakeholders across Europe. Whereas innovations developed in the operational groups are typically available locally, FOREST4EU project aims at transferring knowledge and best practices on forestry and agroforestry to stakeholders and operational groups across Europe.

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### Further information

Visit the project page: GO-FOR.TRACK.

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