My Sustainable Forest

USER'S GUIDE #2
WOOD DENSITY RANKING

- **Forest owners, associations, and industries, wishing to take more efficient strategic business decisions can directly benefit from MySustainableForest products. The *Wood Density Ranking* product is co-designed with the end-user as to adjust it to the user's specific needs.**
- **Remotely sensed data applied to forest inventory can quickly generate the cartography of basic wood density maps while reducing costs.**
- **The *Wood Density Ranking* product predicts basic wood density properties using a mathematical model based on satellite, climatic, and physiographic data.**

The challenge

Basic wood density is the dry matter content of wood per unit of volume, a key wood quality most relevant for the pulp industry: when density increases, raw wood volume demands are lower and yields are higher. Basic wood density influences product quality and industrial processing. Precise estimations of wood density are thus extremely relevant for planning harvesting operations.

To date, wood density ranking maps are obtained through substantial field works at sub-stand level. Moreover, strategic harvesting decisions may require one-time wood density cartography, which can updated every two or three years under request.

The product in a nutshell

With the ***Wood Density Ranking*** product you can:

- Obtain basic wood density properties at sub-stand level, which can be periodically updated.
- Take more efficient strategic business decisions before clear-cuts.
- Improve the accuracy of other derived forest cartography, such as **ground biomass** and **CO_2 stock**, or **forest mass susceptibility** to climate change.
- Complete the wood characterization of your forest with the MySustainableForest products **wood stiffness** and **strength class**, designed for timber.

MySustainableForest solution

MySustainableForest (MSF) is a geo-information portfolio of products aiming to support silvicultural activities and sustainable forest management. The products are based on satellite data, climatic data, physiographic data and sonic non-invasive measurements.

The ***Wood Density Ranking*** product makes uses of a series of relevant data which influence tree wood density, including growing conditions, photosynthetic activity, nutrient uptake, crown size, climate, and physiography. These inputs are used in a mathematical model that relates them to basic wood density measured from sampling cores for a given species, range of ages and region.

The output of this model is a predicted value of basic wood density for a given combination of these factors. Thanks to the integration of satellite, physiographic and climatic based data into the model, this products allows you to obtain precise wood density estimations reducing costs and time, and measuring them repeatedly, at high spatial resolutions and for extended areas.

What do I need to provide?

MSF-branded ***Wood Density Ranking*** product is currently limited to *Eucalyptus globulus* forest plantations with ages ranging from 8 to 20 years from Galicia (Spain) and North of Portugal. Preliminary algorithms were also developed for *Quercus robur* and *Picea abies* stands in Czech Republic. The user has to provide only the geo-location of the **Area of Interest (AOI)**, through coordinates or a GIS vector layer.

To generate wood density estimations, the MSF platform will make use of additional multispectral and multitemporal satellite images (Sentinel-2 images of the previous growing seasons, resolution of 10 meters/pixel), as well as climatic and physiographic data obtained from open-access maps and databases.

What will I obtain?

The ***Wood Density Ranking*** map will provide you a classification of stands in your AOI into wood density ranked areas.

The classification file is accessible through the MySustainableForest platform. The information can be downloaded to any OGC standard GIS viewer with a Web Map Service. Product files are metadated.

Full technical specifications are available at MySustainableForest website.

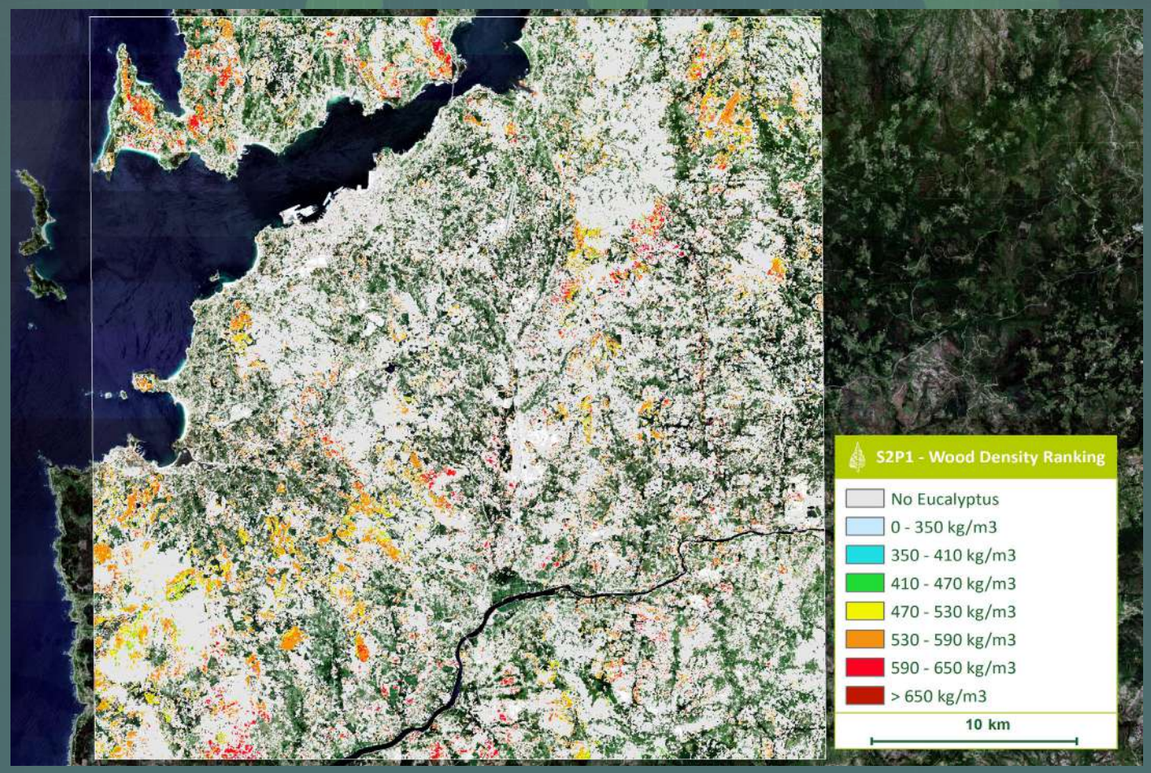

Image 1. (above). *Wood Density Ranking product overview. Sample mapping of Vigo-Baixo Miño-O Condado, Galicia, Spain.*

Image 2 (right). *Example of picea core extraction to analyse a wide range of tree wood characteristics, including its basic density.*

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