



Grant Agreement 823805 MAIL H2020 MSCA RISE 2018

MAIL T5.2 Financial social and technical aspects of the sustainable development of MLs



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Goal

- **Provide sustainability assessment guideline**
- **Develop dedicated workflows for sustainable marginal land management**
 - Financial
 - Economic
 - Social
 - Technical
- **Feasibility analysis for the use of MLs as carbon sinks**
- **Focus on transforming MLs to forests.**



Sustainable Development

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

[*World Commission on Environment and Development, Our Common Future \(1987\)*](#)

Climate change is a threat to sustainable development. Nonetheless, there are many opportunities to link mitigation, adaptation and the pursuit of other societal objectives through integrated responses (high confidence). Successful implementation relies on relevant tools, suitable governance structures and enhanced capacity to respond (medium confidence).

IPCC Climate Change 2014 Synthesis Report



Sustainable Forest Management

“[a] dynamic and evolving concept [that] aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations.”

UN

“Sustainable forest management is the process of managing forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.”

ITTO

“The stewardship and use of forest lands in a way and at a rate that maintains their productivity, biodiversity, productivity, regeneration capacity, vitality and their potential to fulfill now and in the future relevant ecological, economic and social functions at local, national and global levels and that does not cause damage to other ecosystems.”

FOREST EUROPE



Sustainable Forest Management Indicators

- **Dimensions**
 - **Social**
 - **Economic**
 - **Environmental**
- **Six Criteria**
- **34 Quantitative Indicators**
- **11 Qualitative Indicators**

FOREST EUROPE



Sustainable Forest Management Indicators

Criteria	No.	Indicator	Full text
Criterion 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles	C.1	Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles	
	1.1	Forest area	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area
	1.2	Growing stock	Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply
	1.3	Age structure and/or diameter distribution	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply
	1.4	Forest carbon	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products

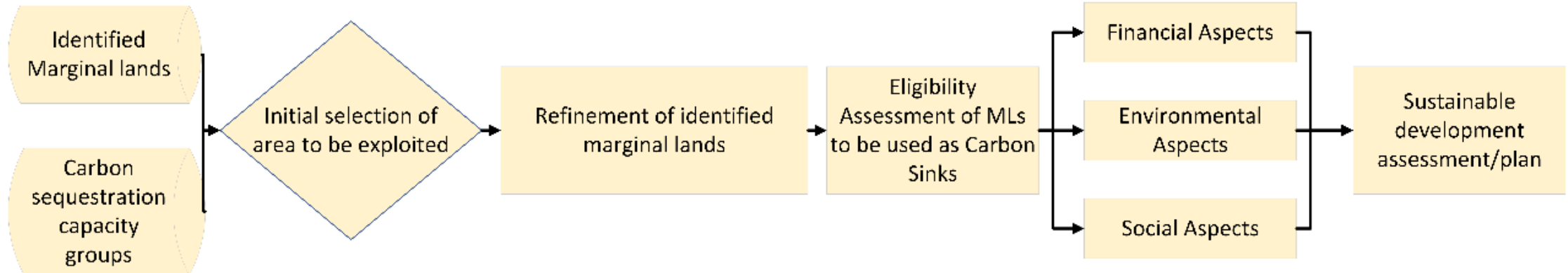


Pan European Guidelines for Afforestation and Reforestation

- 16 General Guidelines
- 10 Ecological Guidelines
- 8 Socio Economic and cultural Guidelines

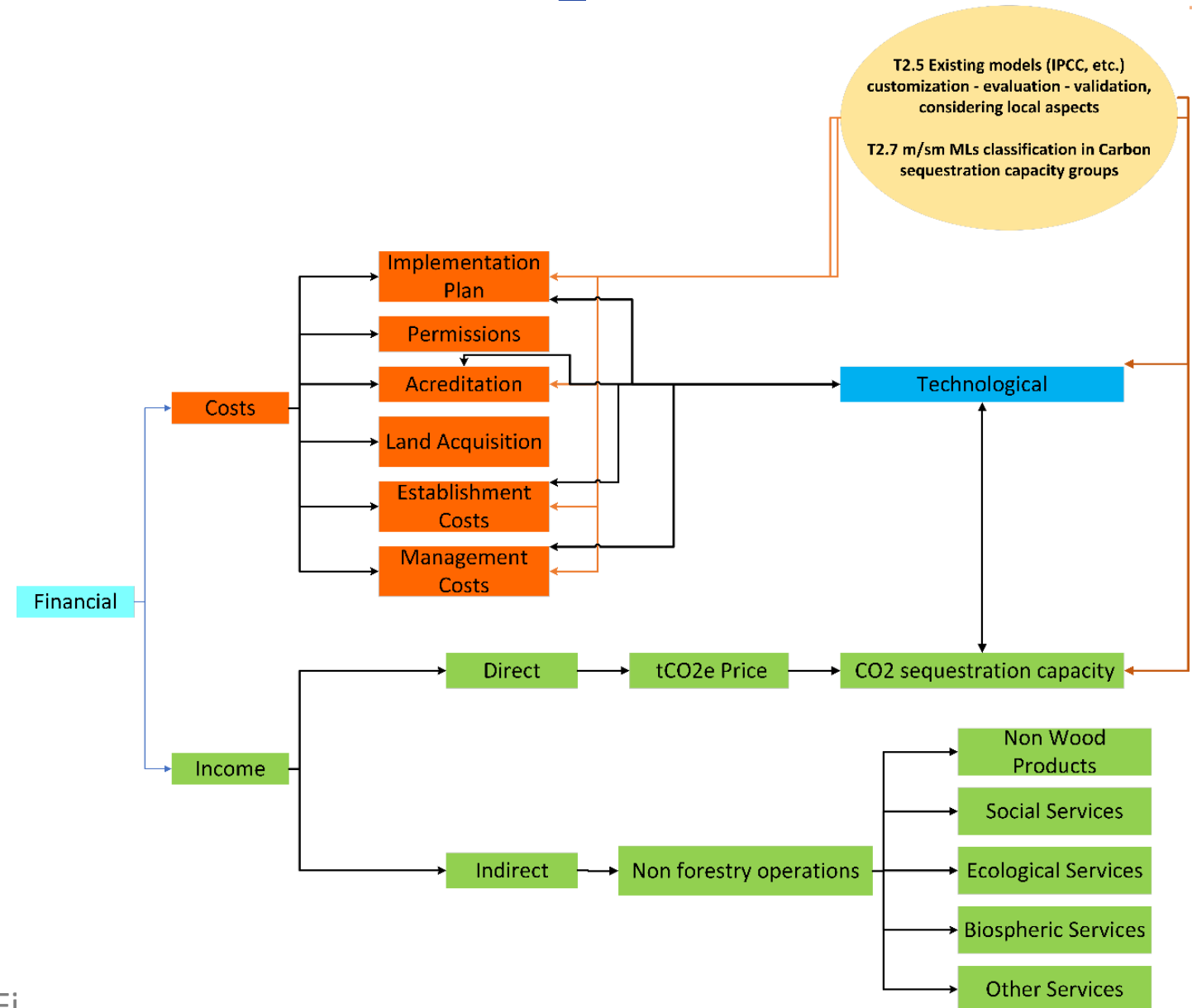
Sustainability assessment workflow

Technological aspects



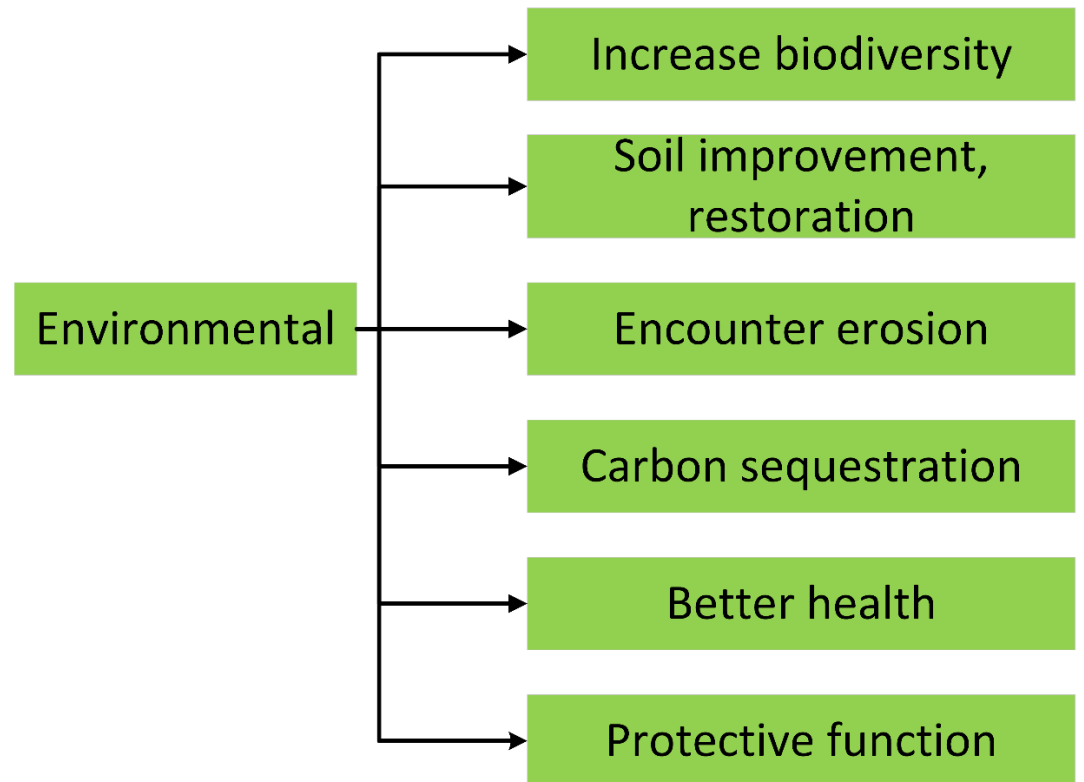


Financial Sustainability Assessment





Environmental Aspects

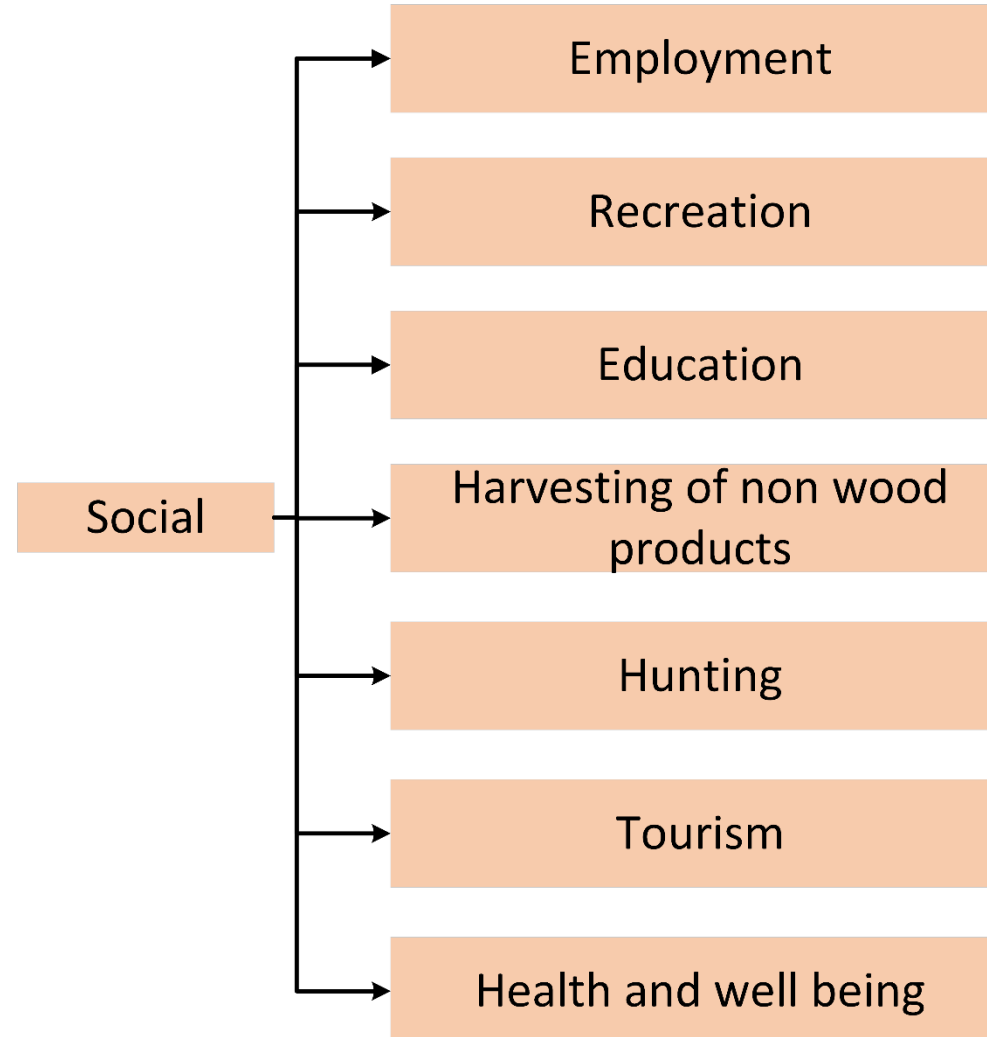


T2.5 Existing models (IPCC, etc.) customization - evaluation - validation, considering local aspects

T2.7 m/sm MLs classification in Carbon sequestration capacity groups



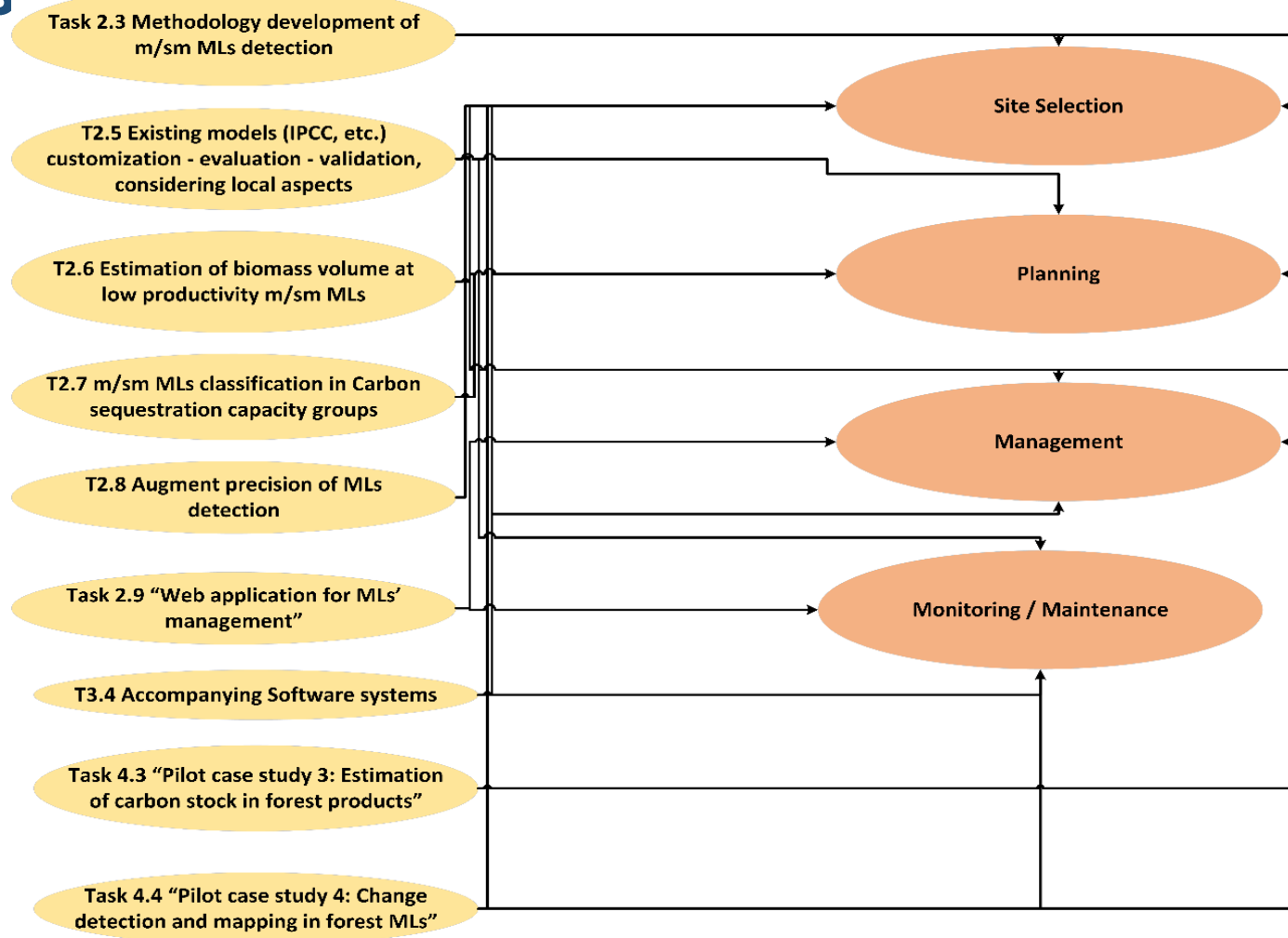
Social Aspects





Technological Aspects

Technological Aspects

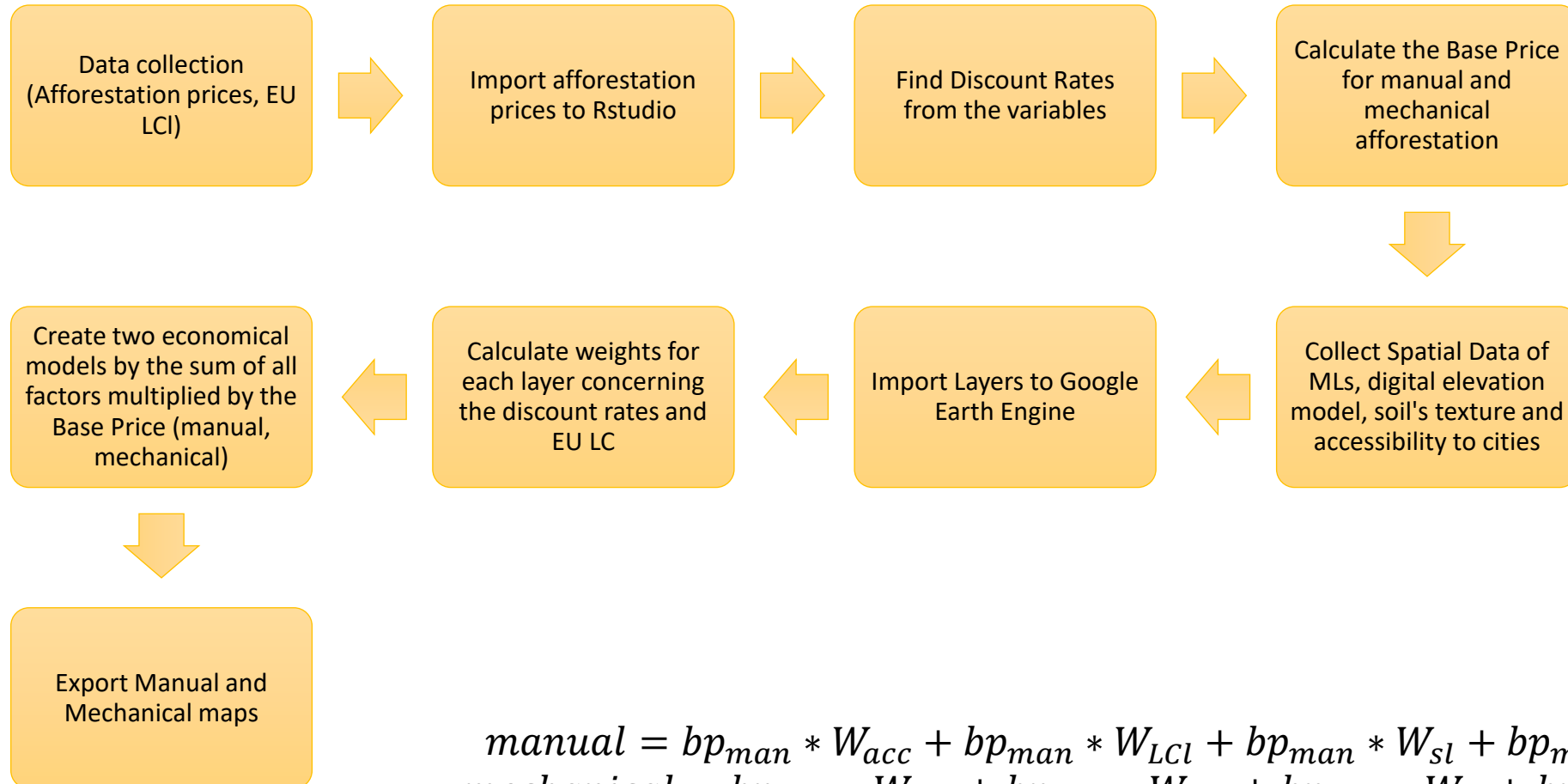




Financial Sustainability Assessment (Income)

Costs (-)		Income (+)	
Type	Value	Type	Value
Permissions		Carbon Units	
Accreditation		Non-Wood Goods	
Afforestation implementation plan		Biospheric Services	
Land Cost		Social Services	
Establishment		Ecological Services	
Management/Maintenance costs		Other Services	
Total			
Project Income			

Feasibility Analysis/ Afforestation model



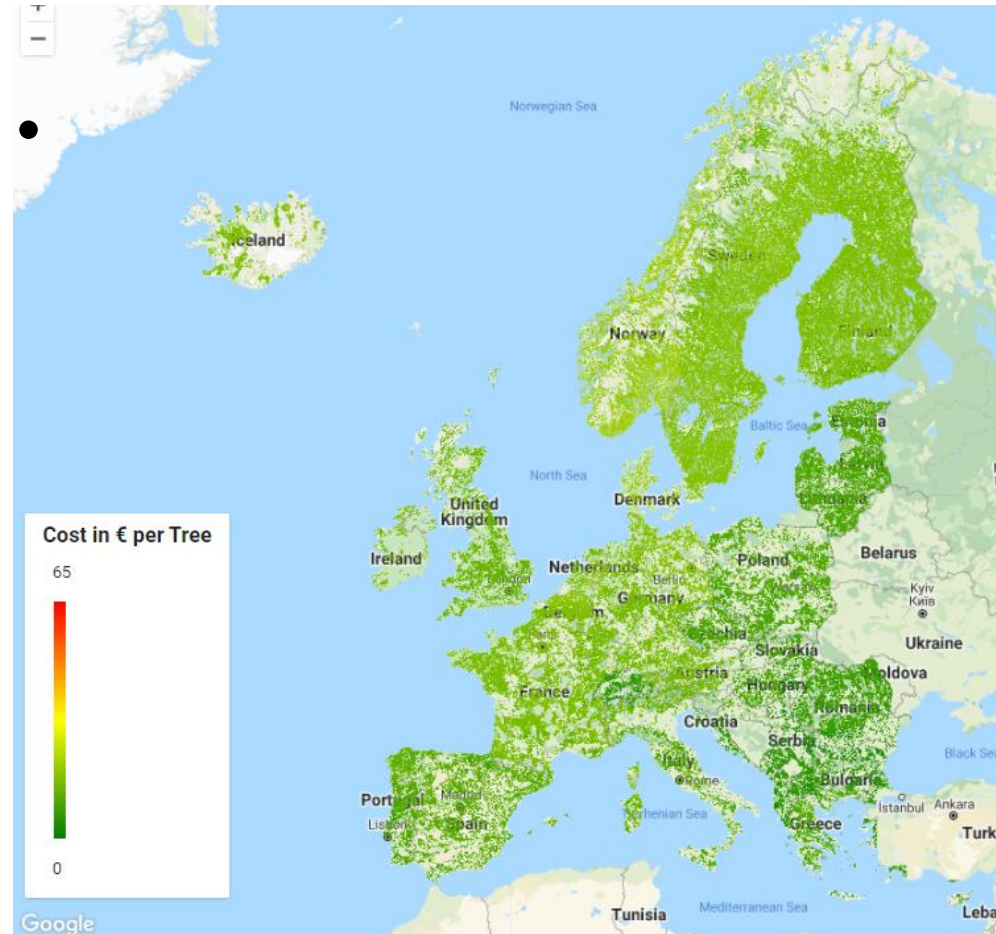
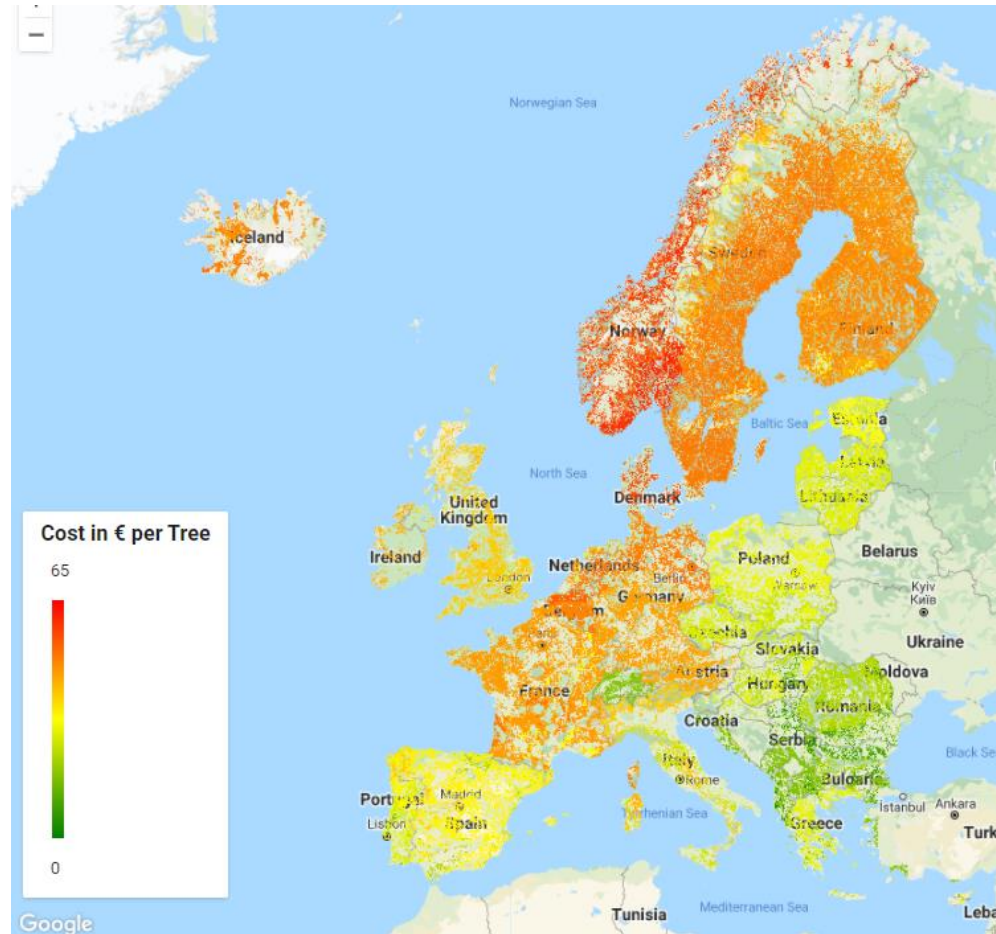
$$\begin{aligned}
 manual &= bp_{man} * W_{acc} + bp_{man} * W_{LCI} + bp_{man} * W_{sl} + bp_{man} * W_{soil} \\
 mechanical &= bp_{mec} * W_{acc} + bp_{mec} * W_{LCI} + bp_{mec} * W_{sl} + bp_{mec} * W_{soil}
 \end{aligned}$$



Results

Manual Labour

Mechanical





European Commission (3 billion trees strategy)

- Estimates were produced based on a density of 1500 trees per hectare, requiring two million hectares of land and a seedling price of 0.52 EUR.
- The costs are for the year 2020, and there are no assumptions about the species or leaf type, biogeographic conditions, or local situations.
- In practice, costs can vary greatly depending on site characteristics like as terrain and access, water availability, proper species selection, soil conditions, and preparation and maintenance methods.
- These costs are lower than the EU average of 4 000 EUR per hectare under CAP (European Commission, 2019).
- Costs can increase to and even exceed 10,000 EUR per hectare in certain circumstances (European Economic Interest Grouping, 2018).



Increasing Carbon Sequestration Strategies

- Sustainable raw wood and non-wood materials and products for a sustainable climate-neutrality
- Skills development and empowerment for a sustainable forest-based bioeconomy
- Protecting, restoring and enlarging EU's forests
 - Adaptive forest restoration
 - Ecosystem-based management techniques



Increasing Carbon Sequestration Strategies

- **Site Selection**
 - Land cover, soil properties, geography, geomorphology
- **Species Selection**
 - Biodiversity maintenance, monocultures, polycultures, resilient species (fire, diseases, extreme weather events)
- **Long-Term Management**
 - consideration in wood harvesting, nitrogen inputs, protection from diseases, wildfires, extreme weather events, Monitoring, Reporting, Data Collection



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Thank you for your attention!



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