

Decision Analysis for Agroforestry: Supporting Sustainable Agricultural Decisions

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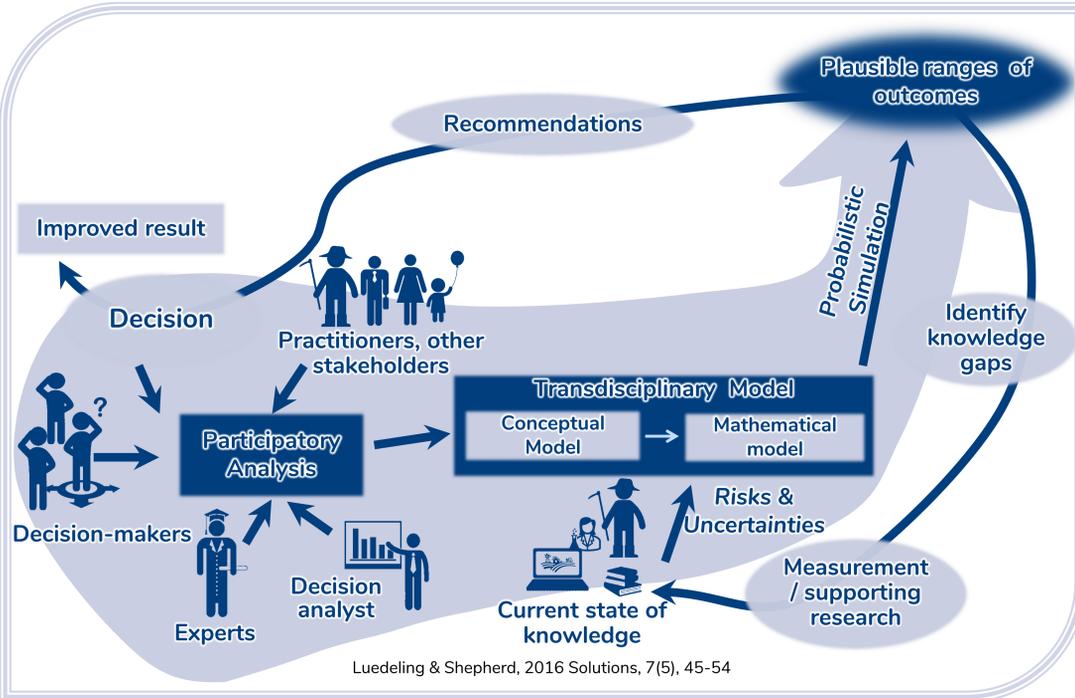
Decision Analysis approach

- Holistic Decision Analysis framework
- Co-develop models that explicitly incorporate uncertainty and risk
- Addresses knowledge gaps, risks and uncertainty by integrating expert knowledge
- Conceptualize the decision with an overview of system variables
- Translate the conceptual model into a mathematical one using R

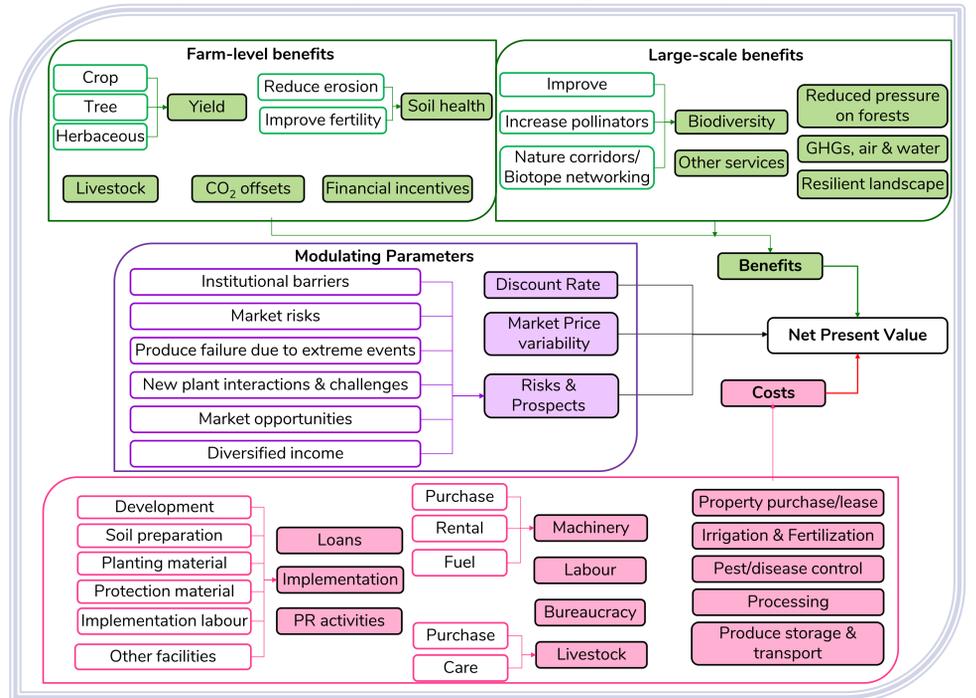
Agroforestry

- Agroforestry is an integrated land-use system that combines trees or shrubs with crops and/or livestock within a farm unit
- Agroforestry offers major ecological and socio-economic benefits
- Adoption remains limited due to uncertainties in system design, management, investment, and policy support

Schematic representation of the Decision Analysis approach



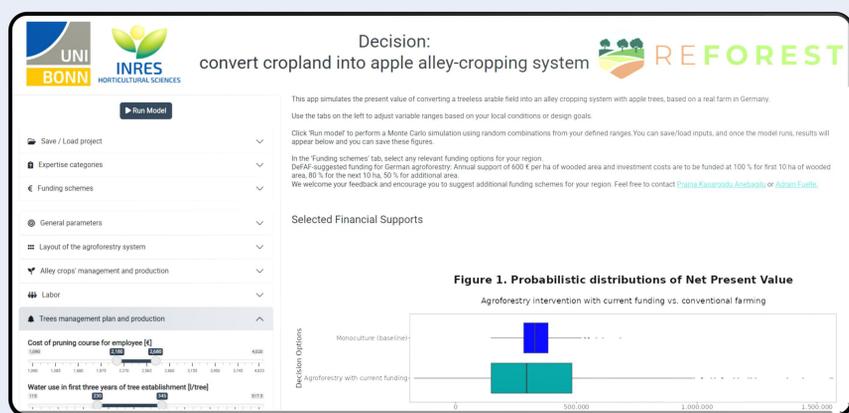
Graphical Conceptual model of Agroforestry Systems



Decision: adopt Agroforestry or continue with Monoculture?

Dynamic Management Tool - Catalogue of Agroforestry Systems

- Long-term viability of transitioning from monoculture to agroforestry
- Grounded in real-world case studies
- Embedded with region-specific financial support -> understand the impact of policy support
- Probabilistic simulation of investment value of converting outcomes in terms of Net Present Value (NPV)
- User-defined parameter value ranges -> realistic picture of risks & opportunities
- Evolution of annual cash flow over the simulated period
- Optional Expected Value of Perfect Information (EVPI) analysis



An alley cropping system with apple trees, based on a real farm in Germany



A walnut alley cropping system with vegetable crop rotation, based on the Living Lab in Flanders, Belgium



A fruit tree system with multiple species, honey production, and a traditional orchard meadow, based on a plan for an agroforestry farm in Germany



A silvopastoral agroforestry system, as planned for one of the Living Labs in England. In addition, two agroforestry concepts are compared



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