Low Carbon Emission Development Strategies using Land Use Dynamics Modelling

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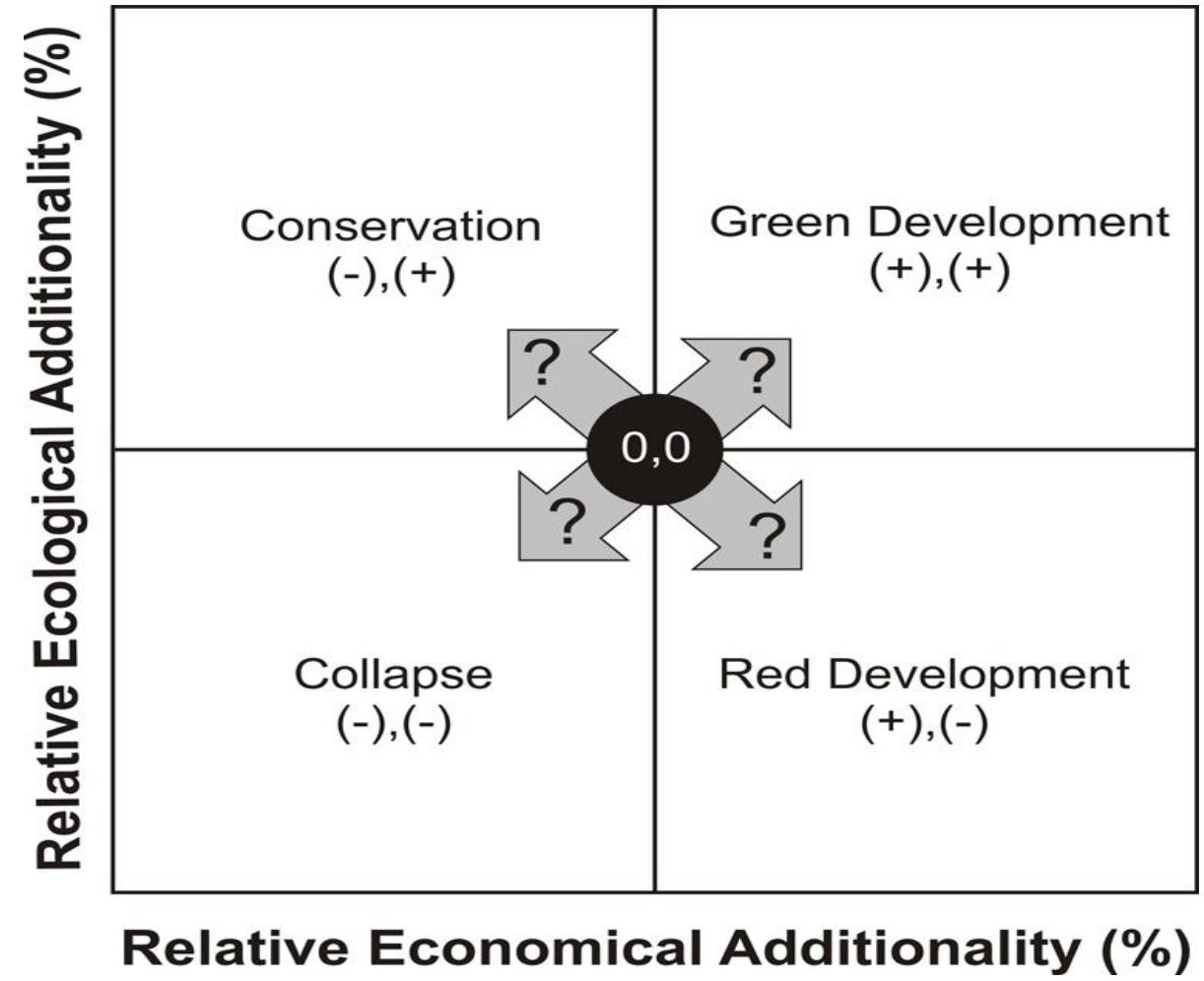
ASB Partnership for the Tropical Forest Margins

4TH SGA ANNUAL MEETING

Forest/Agriculture mosaic landscape

Trade-off analysis between mitigating climate change from AFOLU and economic gain



FALLOW Model: Forest, Agroforest, Low-value Lands or Wasteland?

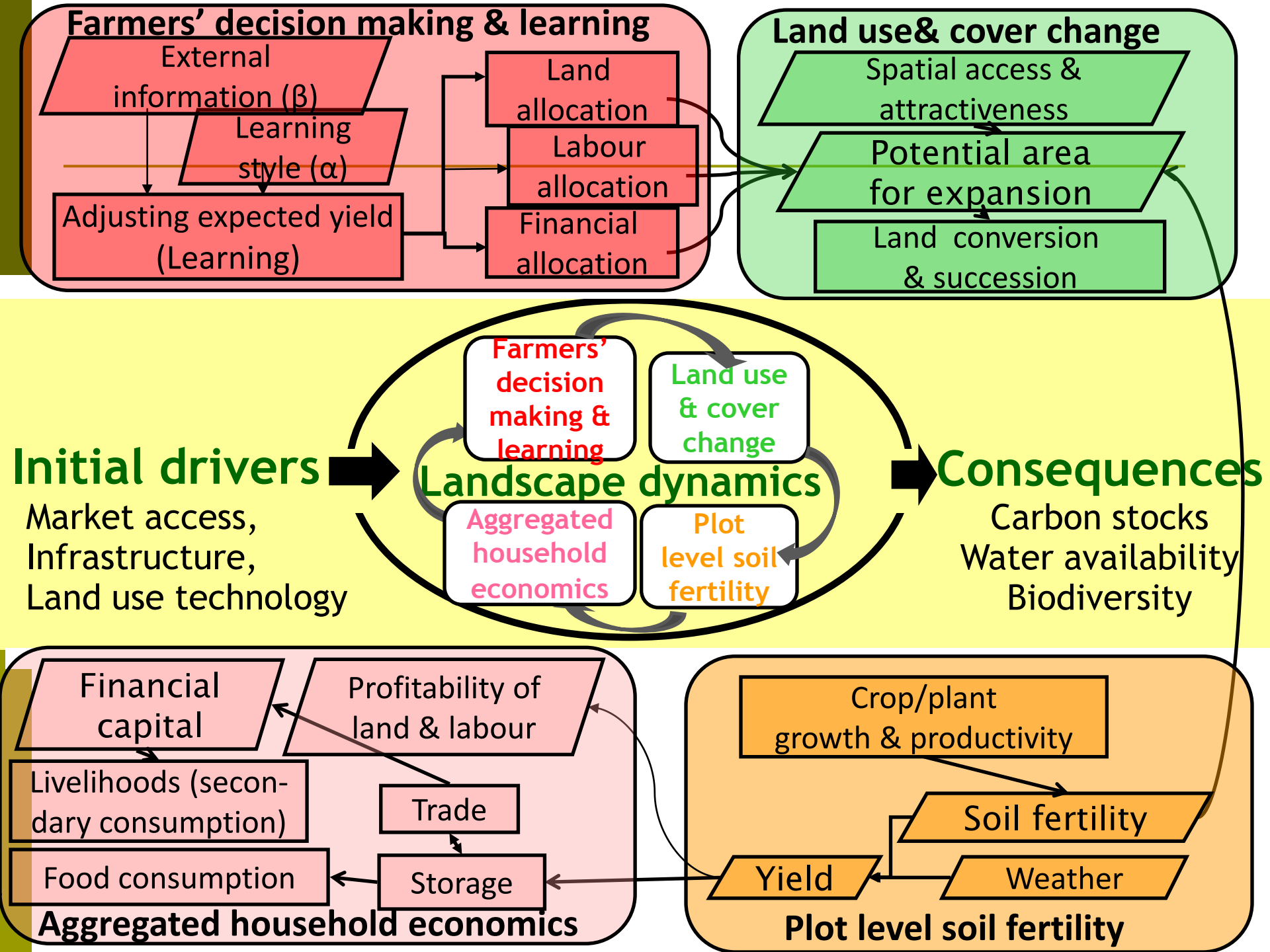
- **Landscape-dynamics model developed by the World Agroforestry Centre-ICRAF**
  - Impact assessment and scenario studies by simulating land-cover changes at landscape level
  - Not only biophysical and socio-economic aspects, but also the ‘knowledge’ of agents as a constraint and as a dynamic property in landscapes
  - Assisting the negotiation process between stakeholders in a changing landscape by visualizing possible/likely consequences of factors

van Noordwijk, M. 2002. Ecological Modelling, 149: 113-126

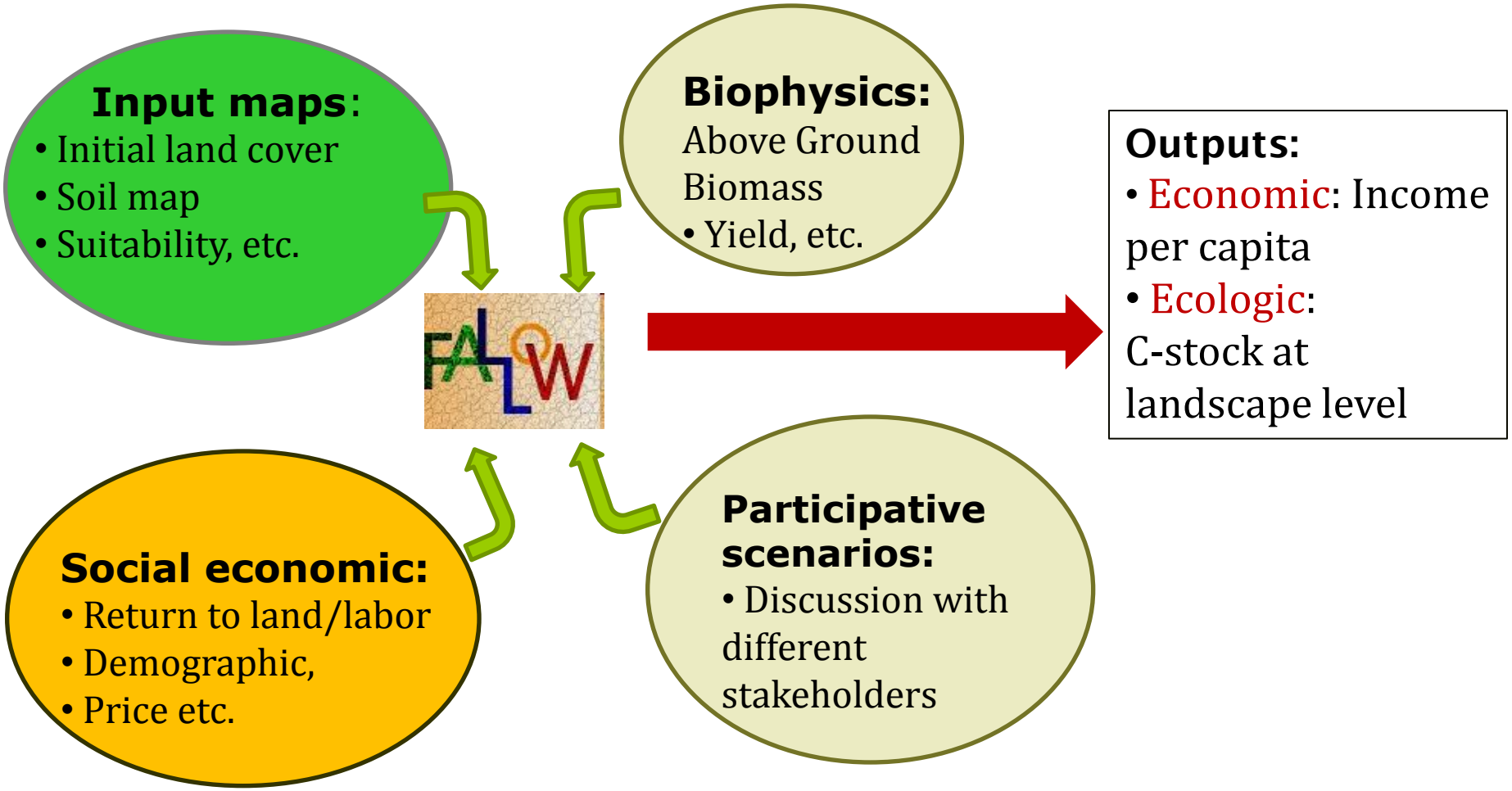
FALLOW Model: Forest, Agroforest, Low-value Lands or Wasteland?

- **Landscape-dynamics model developed by the World Agroforestry Centre-ICRAF**
  - Spatially explicit model developed in PC-Raster; agent-based learning and decision making
  - Time step: annual
  - Spatial unit: ha of land (default)

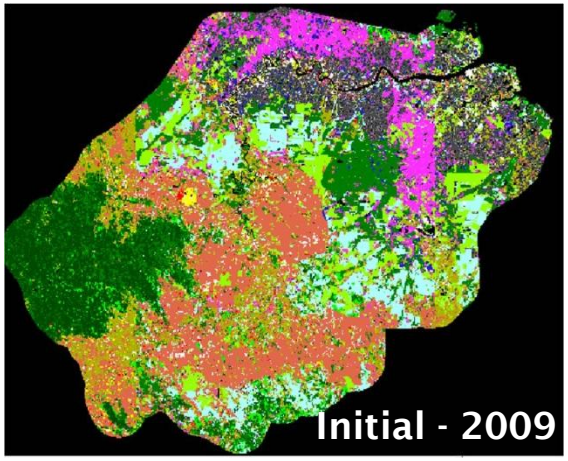
van Noordwijk, M. 2002. Ecological Modelling, 149: 113-126

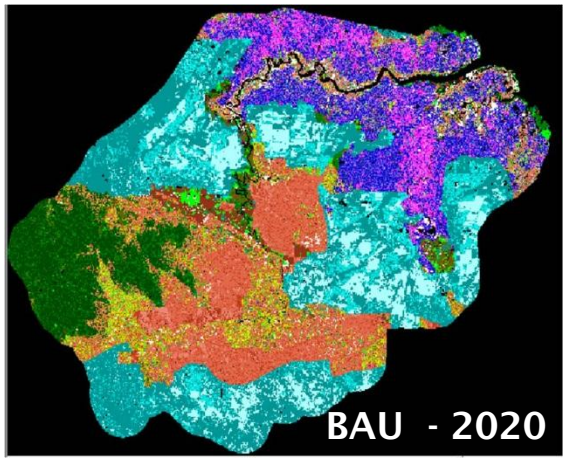

Farmers' decision making & learning
External information (β)
Learning style (α)
Adjusting expected yield (Learning)
Land allocation
Labour allocation
Financial allocation
Land use& cover change
Spatial access & attractiveness
Potential area for expansion
Land conversion & succession
Initial drivers
Market access,
Infrastructure,
Land use technology
Farmers' decision making & learning
Land use & cover change
Landscape dynamics
Aggregated household economics
Plot level soil fertility
Consequences
Carbon stocks
Water availability
Biodiversity
Financial capital
Profitability of land & labour
Livelihoods (secon-dary consumption)
Trade
Food consumption
Storage
Aggregated household economics
Crop/plant growth & productivity
Soil fertility
Yield
Weather
Plot level soil fertility

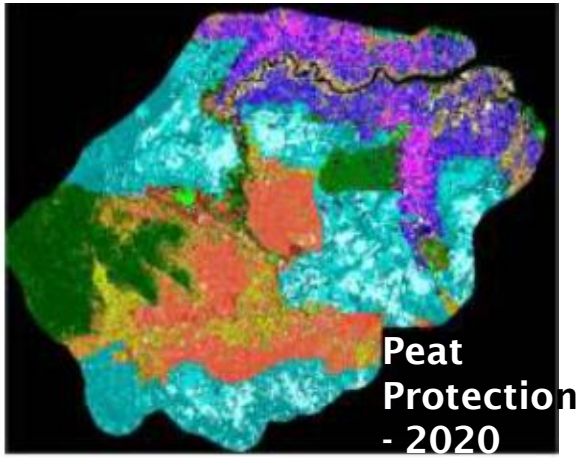
Input parameters for FALLOW model

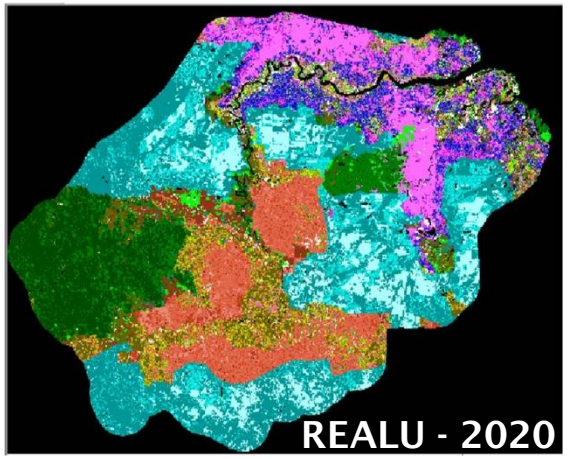


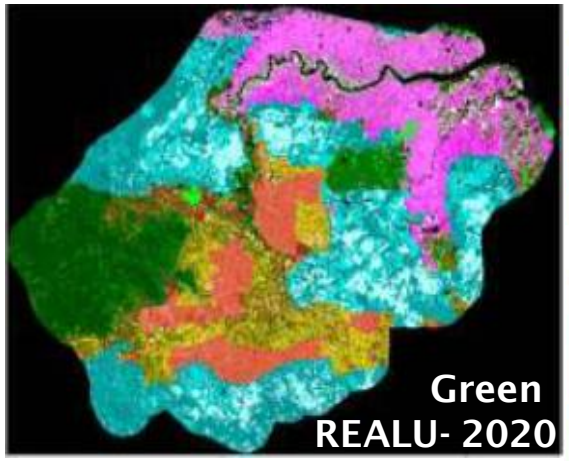
Simulated Land-use scenarios - 2020

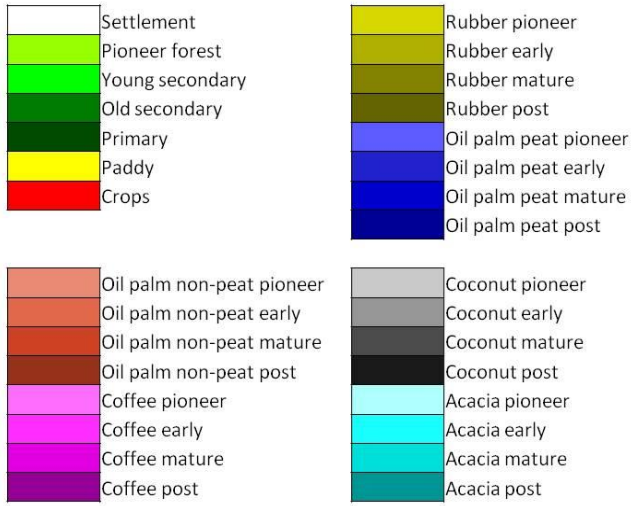




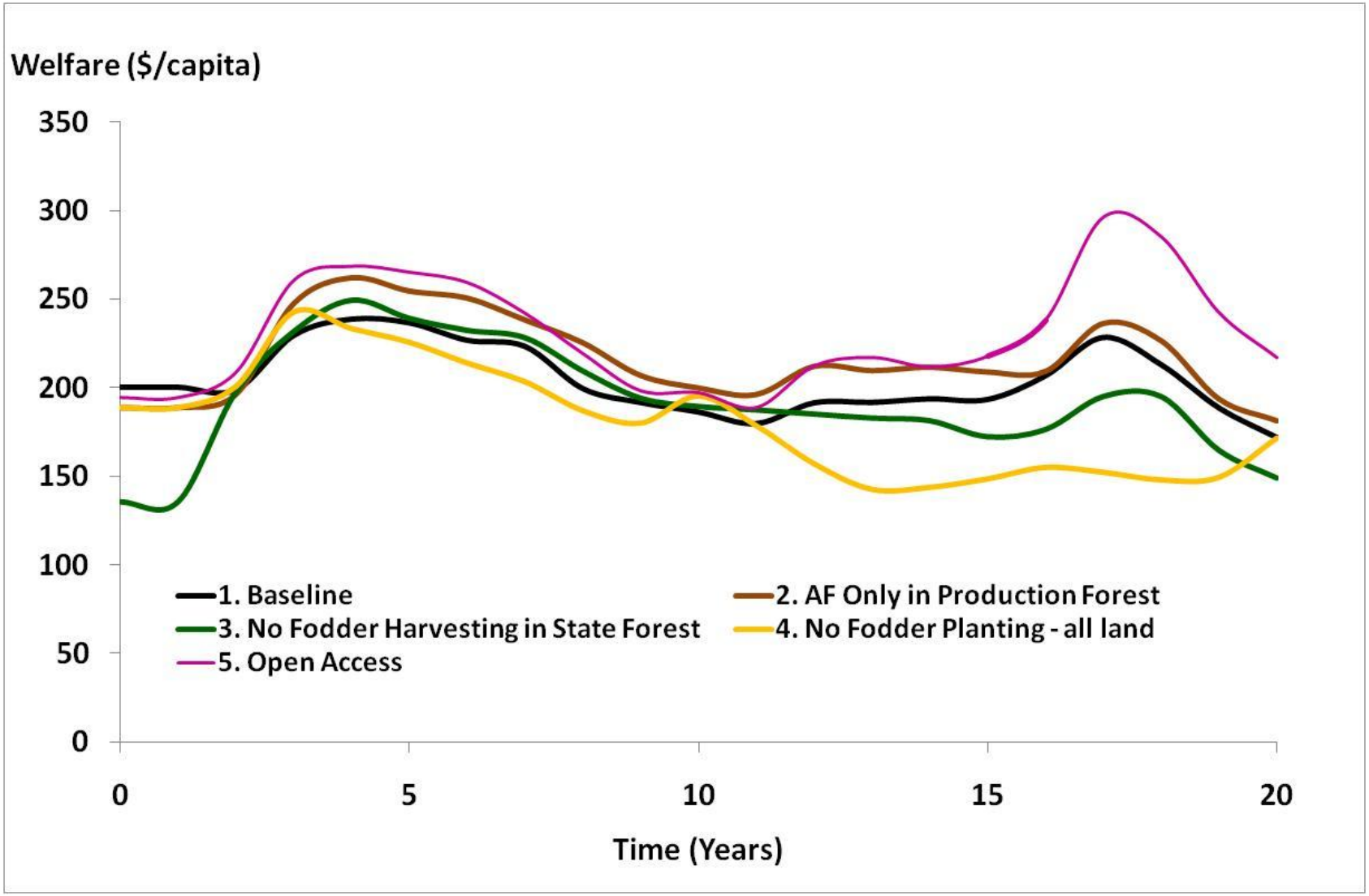




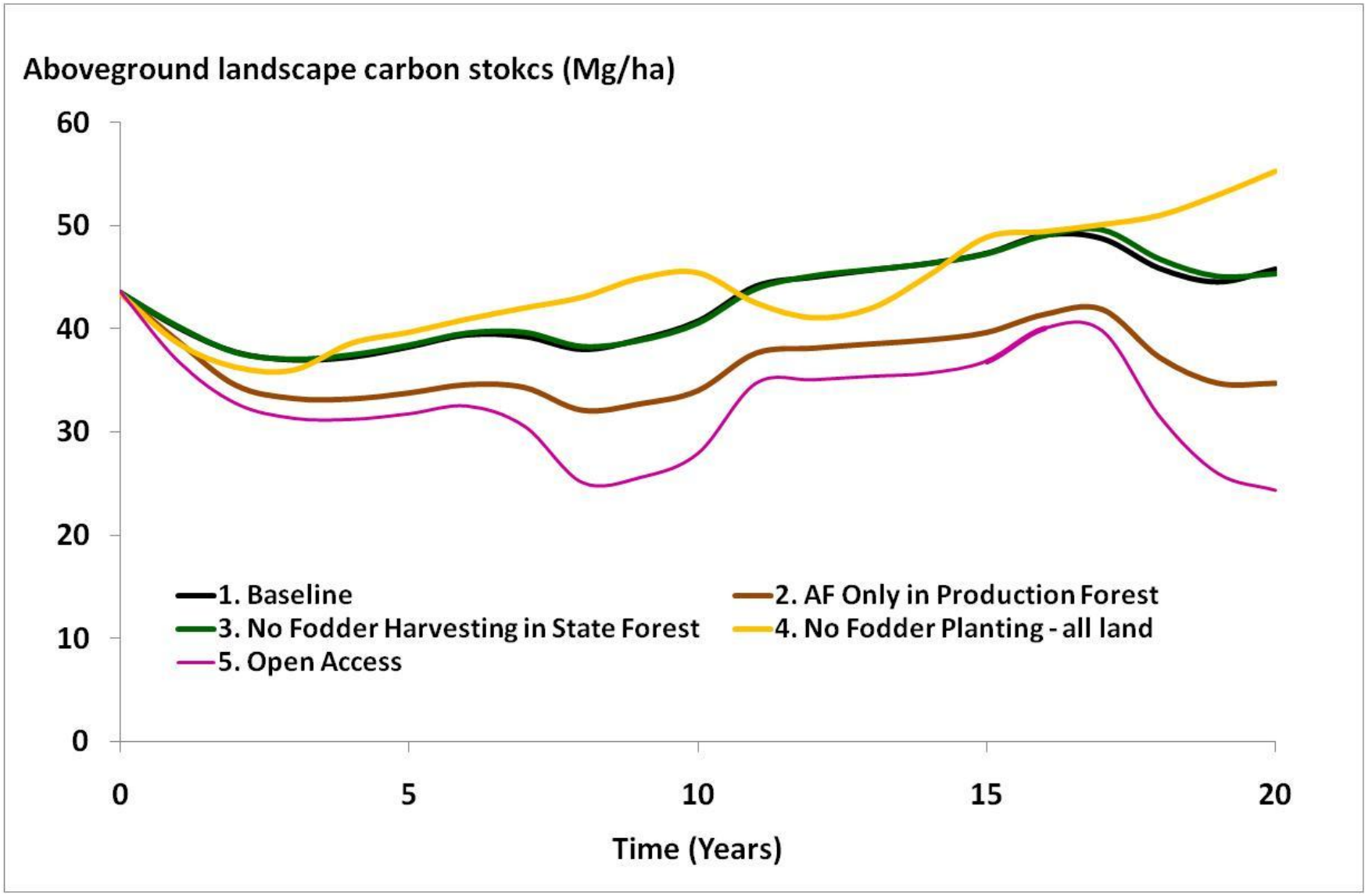




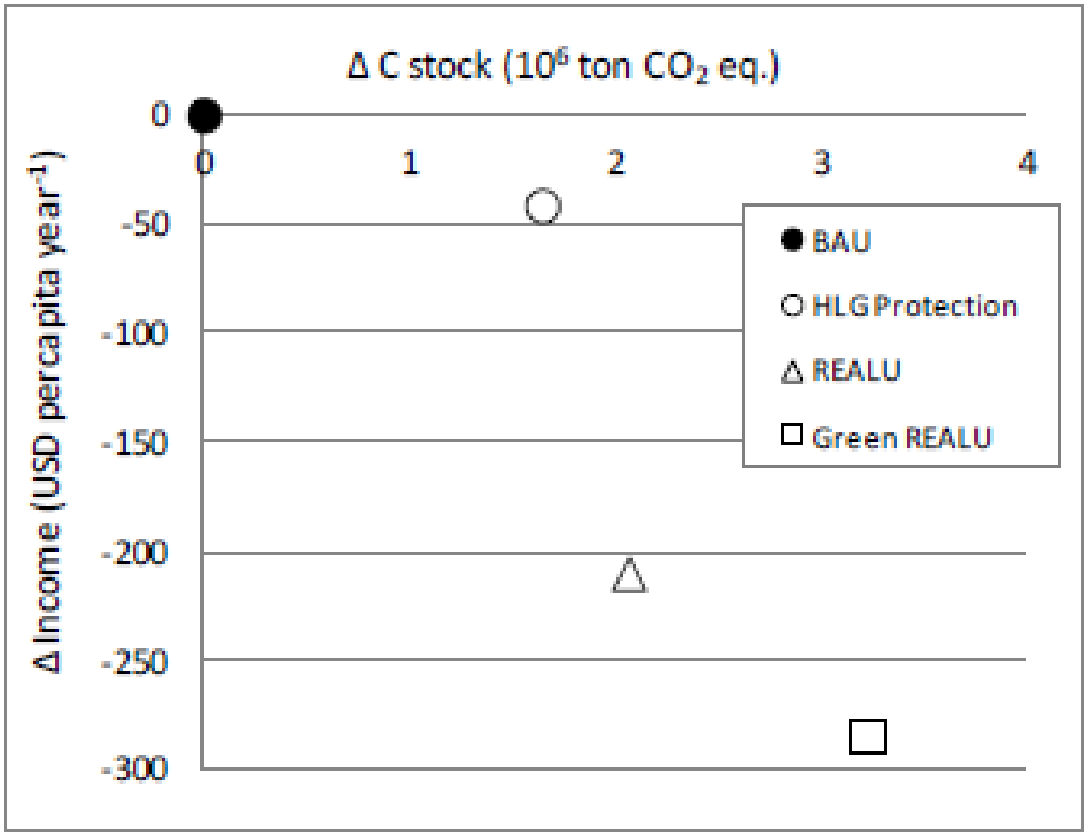
Economic impacts owing to scenario implementation



Impacts on carbon



Trade-off between different scenarios



Reducing the potential loss in income

- Getting compensation from external sources (e.g. reward due to the C storage achieved and the level of C emission avoided)
- Creating a more sustainable way through other sources of income that involves more efforts from the local people in the landscape

Thank You!

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