Methods

The economic, environmental and social results of the Land-use Planner are based on simple and reproducible calculations with the downloadable data file. The quality of results reflects the quality of input data. The data and parameters can be updated and the results can be recalculated at any time. The fixed calculation assumptions, which limit the tool's complexity, are specified in the help texts. For example, the choice of a period of 20 years for natural forest regeneration of fallow areas that are not returned to farming.

Indicators in the comparative results page (multiple scenarios)

1. Forest land. The percentage of territory covered by forests at the end of the considered period.
2. Net benefits. The sum of the annual net benefits (annual benefits - annual costs) of each scenario in present value (according to the chosen discount rate), for each of the three actor categories. This includes all crop, livestock and forest products (including the value attributed to carbon, see below), labour costs (family and wage), and the cross-cutting costs of implementation.
3. Commodity production. Production index of crop products in value (only annual and perennial crop categories) and livestock.
4. Labour. List of scenarios that reduce wage and/or family employment and/or the productivity of family labour. 1 job = 230 annual work days.
5. Biodiversity. Change in the total biodiversity level over the period under consideration. The biodiversity levels of all land uses are aggregated proportionately to their respective areas.
6. CO2 emissions. Accumulated net carbon dioxide emissions resulting from land use and land-use change over the period (see carbon calculations below). Negative values indicate a net CO2 sequestration.
7. Access to green markets. List of scenarios that are able to halt deforestation and stabilize forest cover and biodiversity to at least 80% of their initial levels, with the year when this is achieved. It is from this year that a possible bonus on the price (see Settings of the page Results) for some sensitive crop products is applied.
8. Food security. Traffic light classification. Green: the production of crops that are important for food security increases in calories per capita. Yellow: increase in total but decrease per capita. Red: decrease in total quantity and per capita.

Indicators in the results page by scenario

1. Economic sustainability. Only scenarios whose total costs exceed the total benefits (undiscounted values) are classified as not profitable. Scenarios, in which net benefits with a 10% discount rate are achieved, are considered to be very profitable.
2. Forest land. Percentage of the territory covered with forests at the beginning and end of the period.
3. Commodity production and deforestation. Production index of crop products in value (only annual and perennial crop categories) and livestock.
4. Share of benefits. Distribution of total benefits between three actor categories (annual benefits - annual costs) in present value (according to the chosen discount rate).
5. Food security. The change in per capita production of crops indicated as important to food security. Traffic light (see above).
6. Labour. Change in total family and paid jobs. Traffic light. Green: net creation of paid and family jobs, with an increase in productivity of family labour. Red: loss of these two types of jobs; or if family labour alone increases but its productivity decreases (increased hardship). Yellow: all other situations.
7. Green markets. Traffic light. Green: scenario in which deforestation is ended and forest land and biodiversity is stabilized to at least 80% of their initial levels. The year when this is achieved is indicated. Yellow: halting of deforestation but with a loss of more than 20% of the initial levels of forest land and/or biodiversity. Red: no halting of deforestation.
8. CO2 emissions. Traffic light. Green: carbon neutral scenario in which the sequestration of CO2 exceeds its emissions. Yellow: net CO2 emissions but lower than in other scenario(s). Red: highest CO2 emissions.

Details of carbon-related calculations

Carbon stocks are in tonnes of carbon (tC) and emissions are in tonnes of carbon dioxide (tCO2). 1tC= 44/12 tCO2. Carbon dioxide emissions (or sequestration) represent a cost (or benefit), according to the adjustable price of tCO2, which is integrated into the cost-benefit calculation. This carbon cost, or benefit, is distributed between the local populations, the State and the other stakeholders at a rate of 25%, 25% and 50% respectively, as it is considered that most of the cost-benefits of carbon affect the international community. Two sources of emissions (or sequestration): land use (emissions from cattle raising in particular; and sequestration fixed at 1.8 tCO2 per tree added in agroforestry), and land-use change (deforestation, degradation and other land-use changes). Carbon stocks from annual crops are always set at 0. Carbon stocks from perennial crops are set at 0 only in the specific calculation of emissions of deforestation and degradation (REDD+).