IEEM Integrated Economic-Environmental Modeling

The Integrated Economic-Environmental Modeling Platform Project

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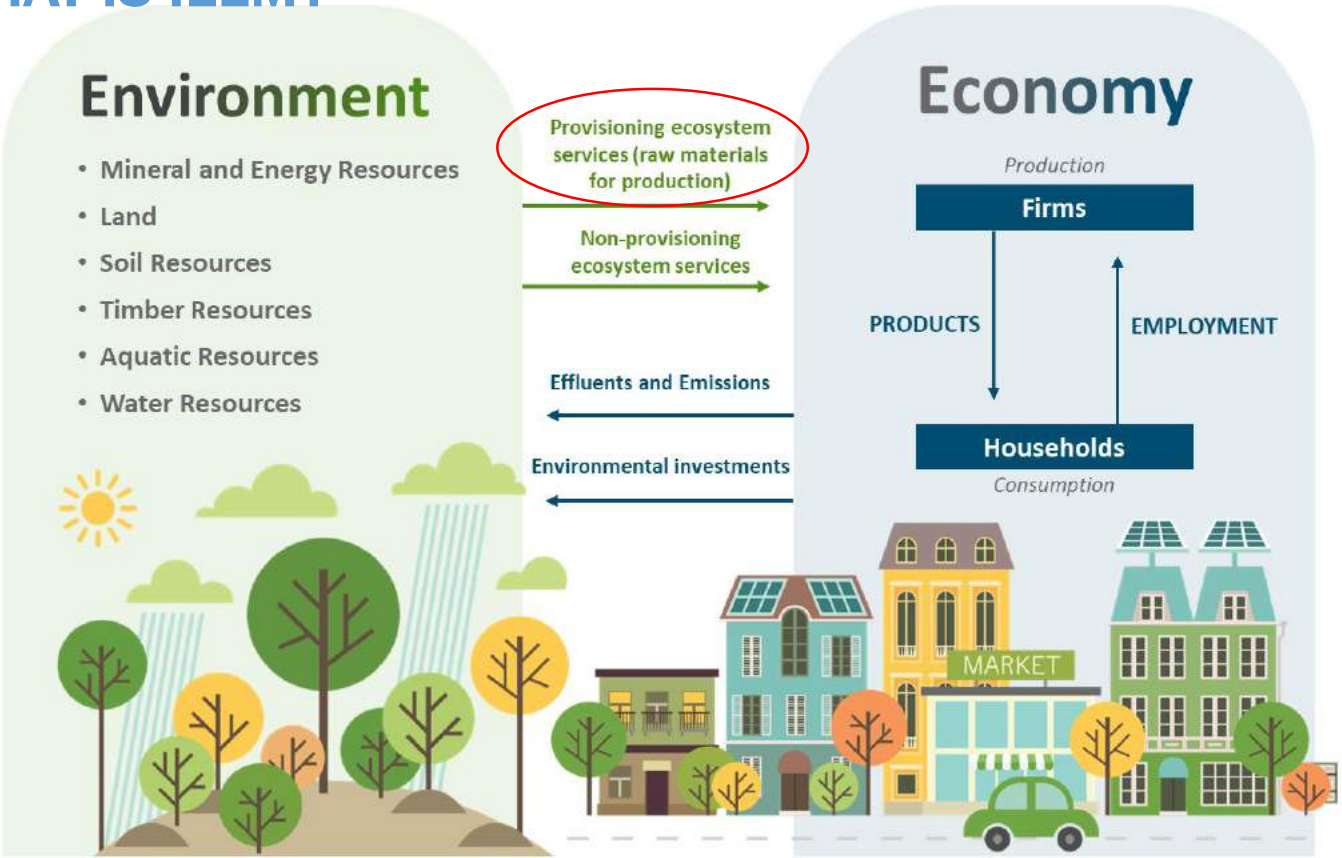
--Our Country Partners.

SECOND FORUM ON NATURAL CAPITAL ACCOUNTING FOR BETTER POLICY
The Hague, November 22-23 2017.

WHAT IS IEEM?


Environment
• Mineral and Energy Resources
• Land
• Soil Resources
• Timber Resources
• Aquatic Resources
• Water Resources
Provisioning ecosystem services (raw materials for production)
Non-provisioning ecosystem services
Effluents and Emissions
Environmental investments
Economy
Production
Firms
PRODUCTS
EMPLOYMENT
Households
Consumption
MARKET

IEEM: WHAT IS NEW?

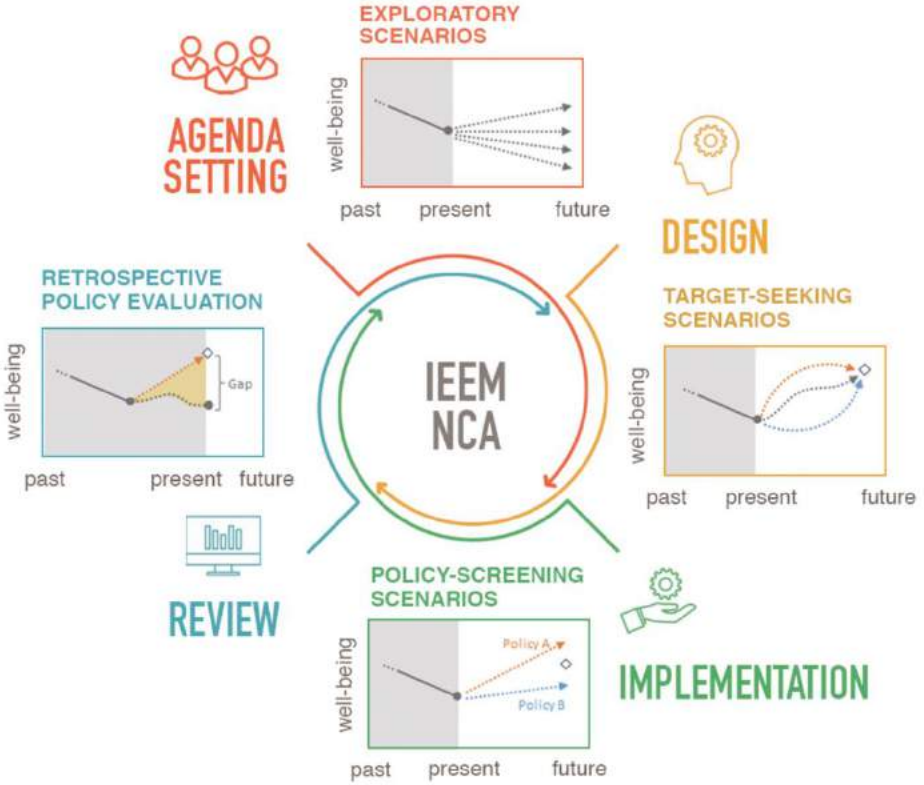
1. Integrates SEEA data in a forward-looking economy-wide framework.
2. Has environmental modeling modules for each environmental resource.
3. Indicators capture impacts on natural capital.
4. Links IEEM with ESM to project scenario-based future ecosystem service supply.

NATURAL CAPITAL

MANUFACTURED CAPITAL

HUMAN CAPITAL

IEEM AND THE POLICY CYCLE



IEEM APPLICATIONS

AN INTEGRATED FRAMEWORK

IEEM-GUA: SUSTAINABLE DEVELOPMENT GOALS

- SDG 2, Zero Hunger, Target 2.3: double agricultural productivity and rural incomes.
- Strategy: increase irrigated agriculture.

Increase of irrigated area:
106,300 ha.

Investment:
US$7.95 million

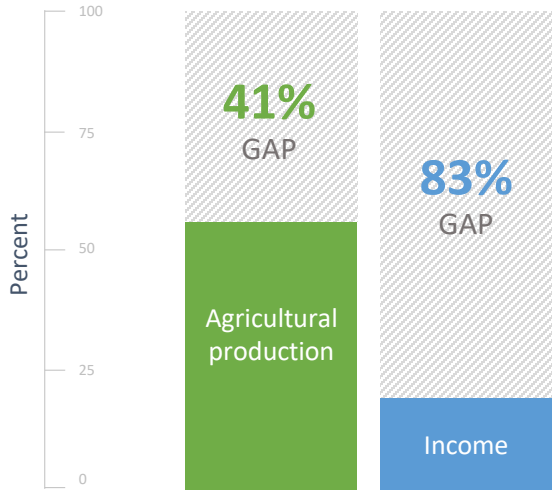
Time horizon:
5 years

SDG

SDG 2, Target 2.3

IEEM-GUA: SUSTAINABLE DEVELOPMENT GOALS

- 41% and 83% gap remain to double agricultural output and income, respectively.
- Poverty impacts: 2.42 million people are lifted from poverty; 100,000 people attributed to investments.



IEEM Integrated Economic-Environmental Modeling

IEEM-GUA: SUSTAINABLE DEVELOPMENT GOALS

Synergies

Certain lines of action (**2-** Zero Hunger) can contribute to various SDGs: **SDG 1-** Eliminating Poverty, and; **SDG 8-** Promoting Sustainable Economic Development and Employment (increase GDP by US$1.37 billion).

Trade-offs

Trade-offs: **SDG 2** implies more deforestation, moving away from **SDG 15-** Sustainable Use of Forests. Increased emissions slows progress on **SDG 13-** Action on Climate Change.

Deforestation ↑ 4,699 ha by 2030.

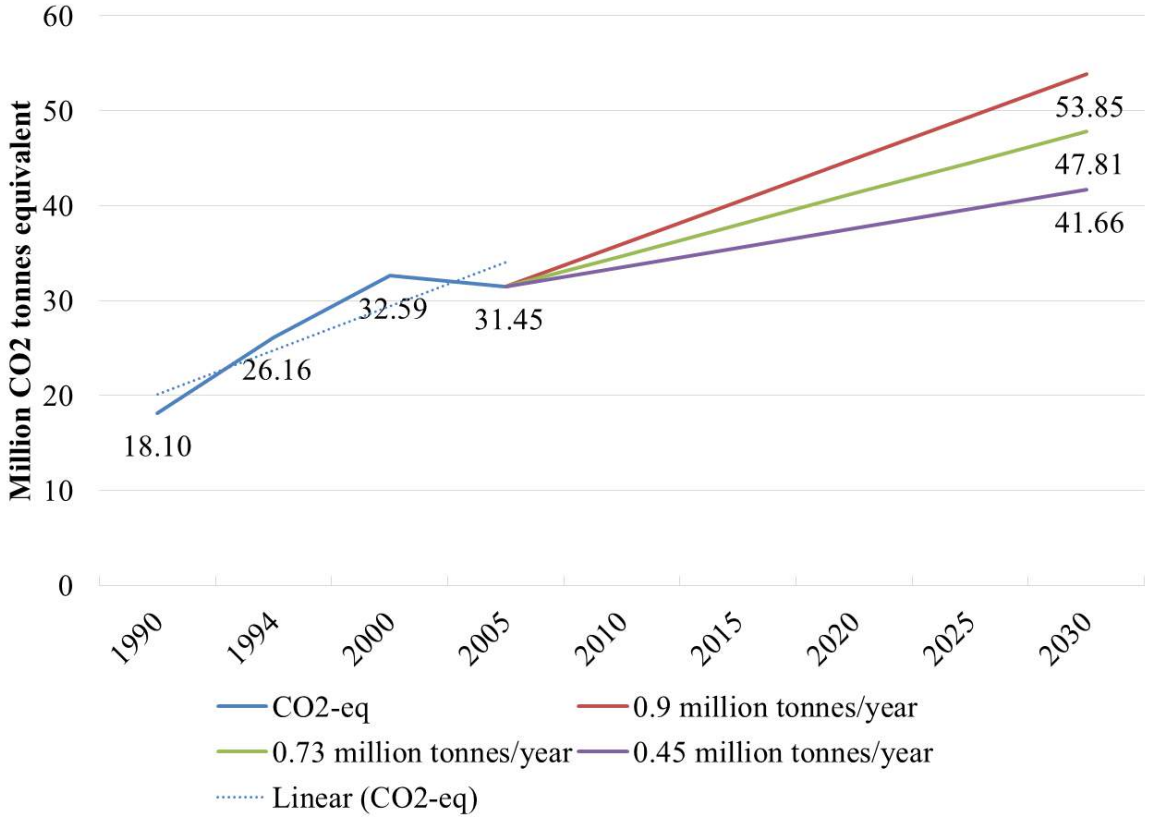
Water consumption ↑ 1,860 ML/capita.

GHG ↑: 642,346 tons CO_2.

IEEM APPLICATIONS

ECONOMY-WIDE VS. PARTIAL ANALYSIS

IEEM-GUA AND THE NDCs

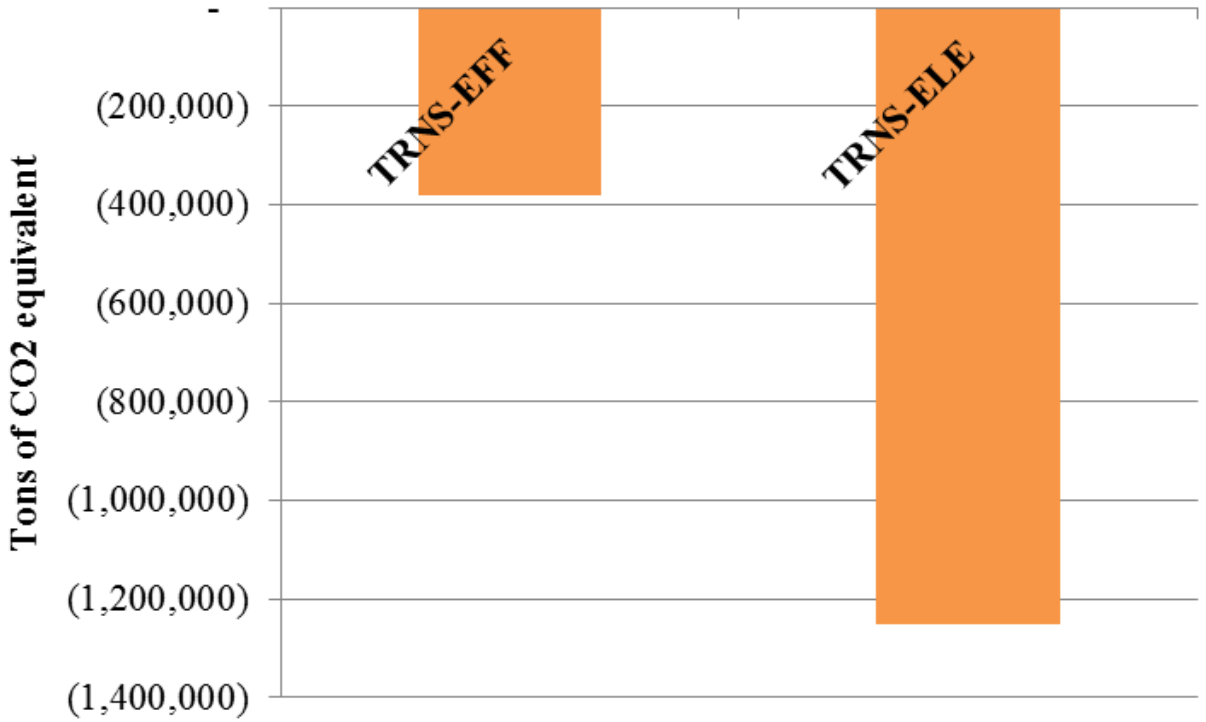


- Guatemala responsible for <0.1% of global emissions.
- BAU= 53.85 million tons CO2 equivalent in 2030.
- Reduce emissions 11.2%, by 6.04 M tons CO2 equivalent.
- Target sectors: forestry, agriculture and transport sectors.

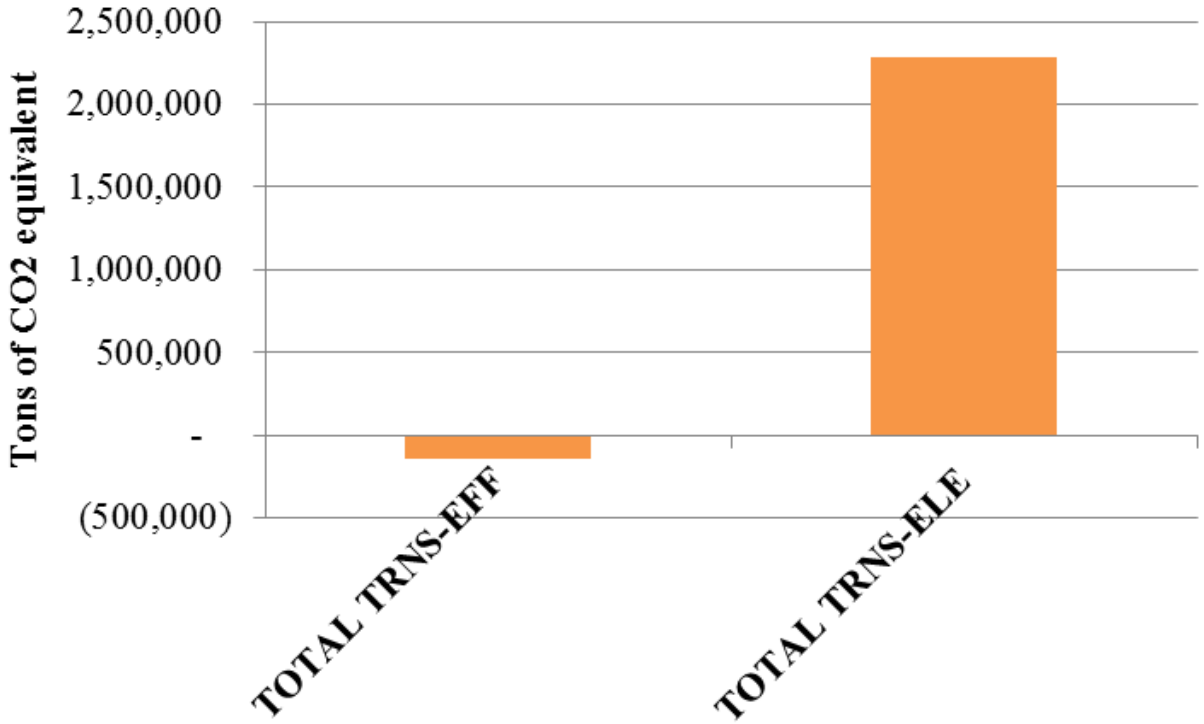
TRANSPORT SECTOR INTERVENTION

- TRNS-EFF: 15% increase efficiency in fossil fuel combustion in transport (freight shipping) sector.
- TRNS-ELE: Substitute 15% of fossil-fuel based energy with electricity in transport sector (same number of terajoules generated).

TRANSPORT SECTOR EMISSIONS BY 2030



ECONOMY-WIDE EMISSIONS BY 2030



IEEM-GUA: FUELWOOD SECTOR INTERVENTION

- Fuelwood supplies 57% of Guatemala's national energy consumption.
- Issues: deforestation; 10 million m^3 deficit; 5,000 premature deaths per year, and; 1% GDP loss.

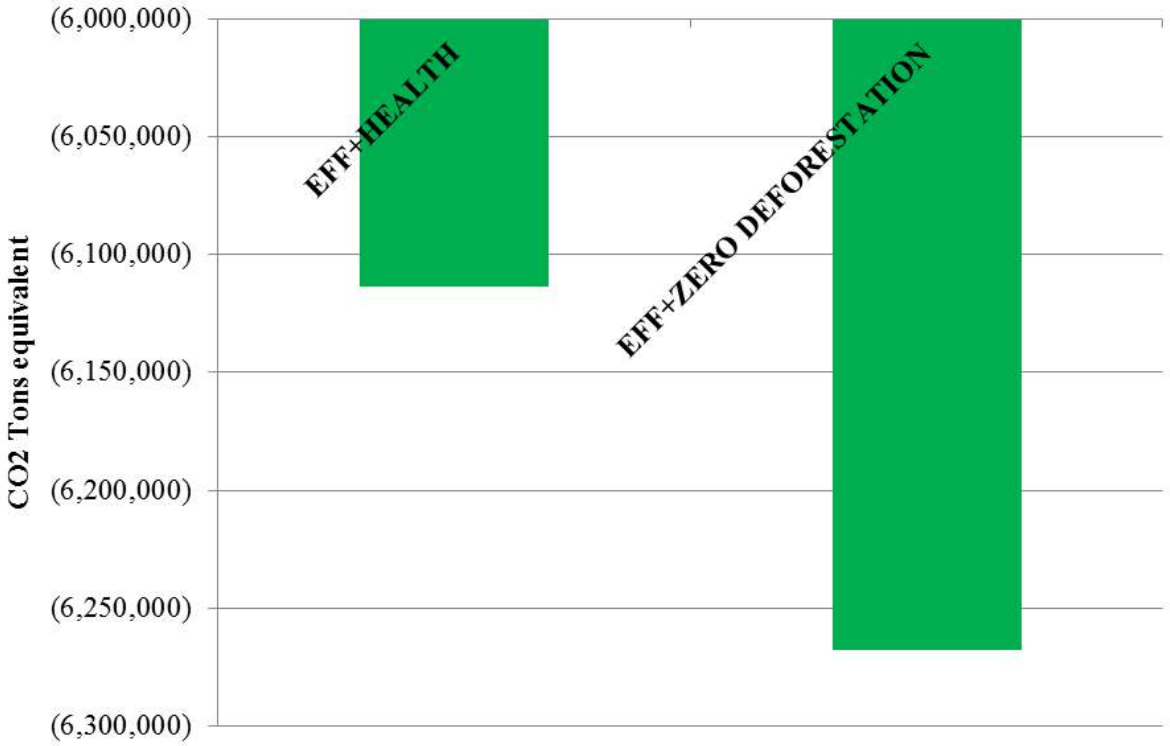
EFFICIENCY + HEALTH

25% more efficient fuelwood cookstoves; health benefits agricultural labor productivity.

EFFICIENCY + ZERO DEFORESTATION

efficiency + health, with complementary strategy of zero deforestation.

ECONOMY-WIDE EMISSIONS



IEEM APPLICATIONS

INDICATORS THAT CAPTURE NATURAL CAPITAL IMPACTS

POST-CONFLICT LAND-USE TRAJECTORIES IN COLOMBIA

- Baseline: historical deforestation trend of 240,000 ha/yr between 2000 and 2013.[1]

DEFOR-INC:

16% increase in deforestation between 2018-2030.

DEFOR-DEC:

75% reduction in rate of deforestation between 2018-2030; better monitoring and enforcement.

DEFOR-DEC-TFP:

DEFOR - DEC + five percentage point increase in total factor productivity for agriculture between 2018 y 2022; 12.5% above baseline between 2022-2030.

Source: [1.] World Bank, 2015.

RESULTS: GDP

GDP, difference between baseline (1 USD: 3,012 COP).

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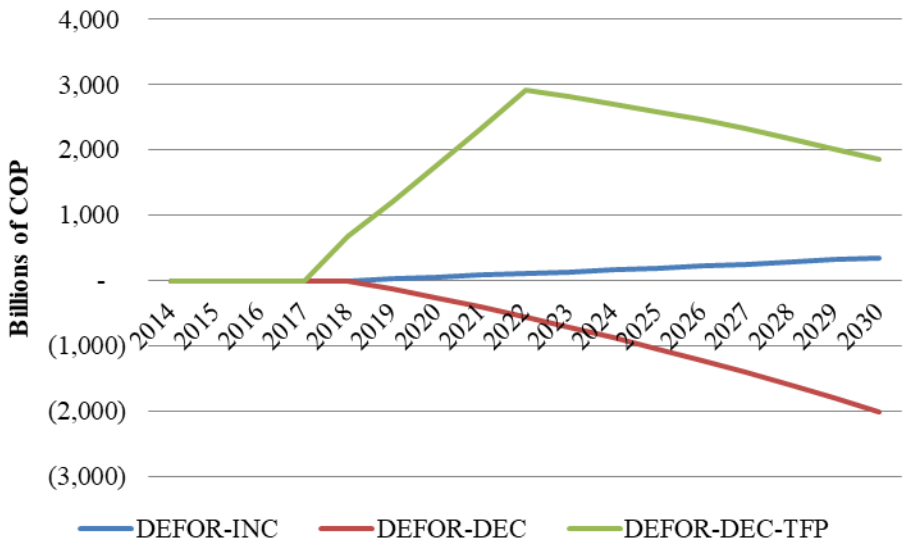
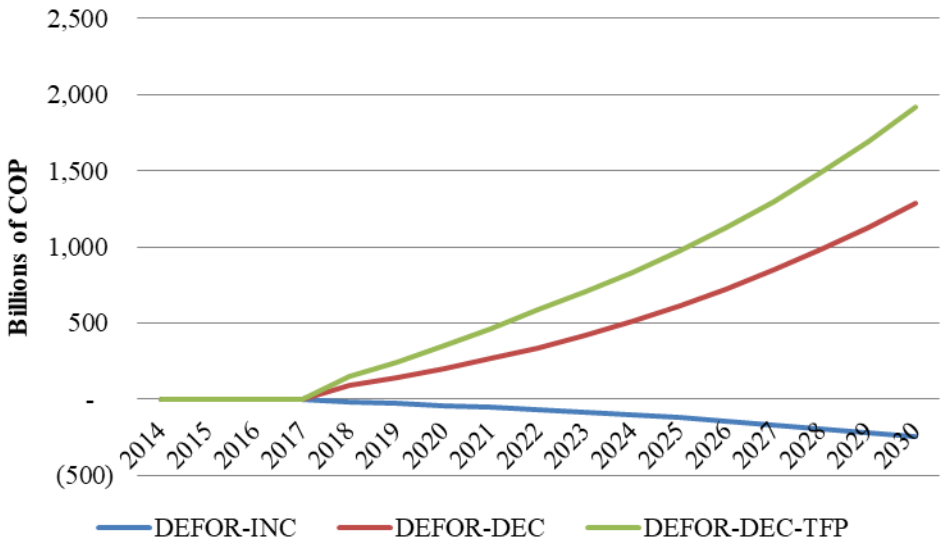
- In 2030 DEFOR-INC: 348 B COP;
- DEFOR-DEC: -2,006 B COP;
- DEFOR-DEC-TFP: 1,853 B COP.



RESULTS: GENUINE SAVINGS

Genuine savings, difference from baseline.

- By 2030 DEFOR-INC: -482 B COP;
- DEFOR-DEC: 2,391 B COP;
- DEFOR-DEC-TFP: 3,383 B COP.



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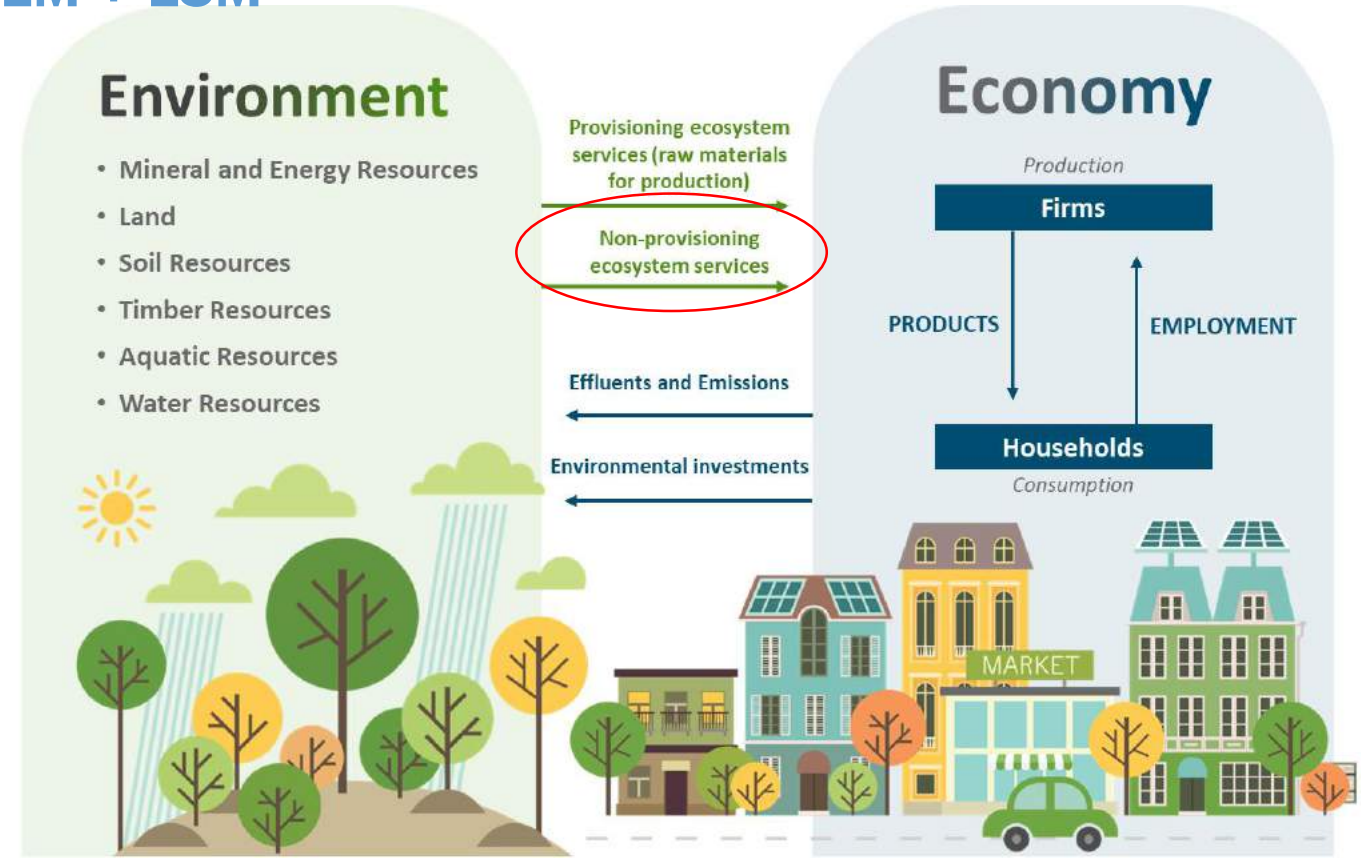
SDG 2, Target 2.3

IEEM + ESM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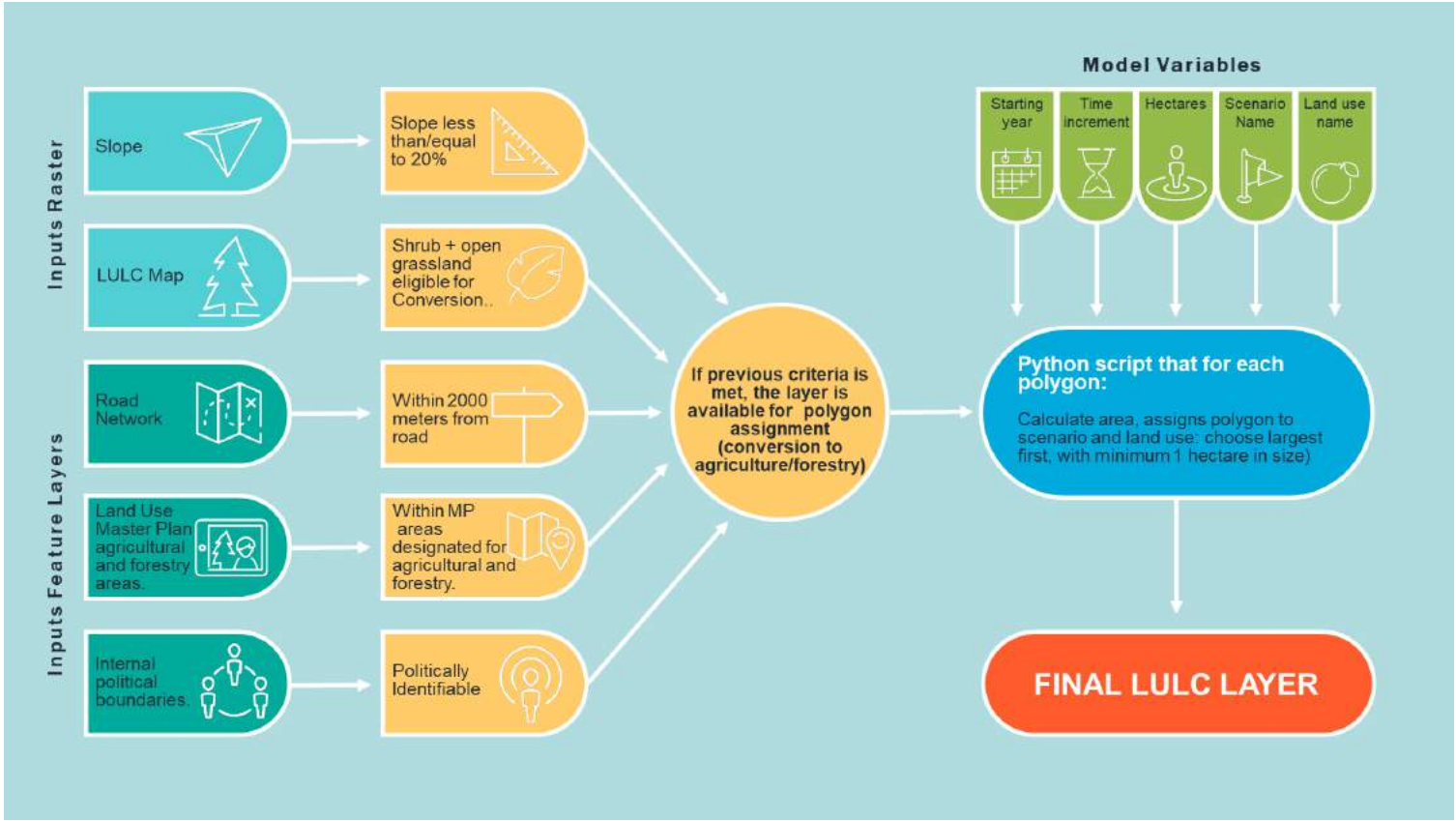
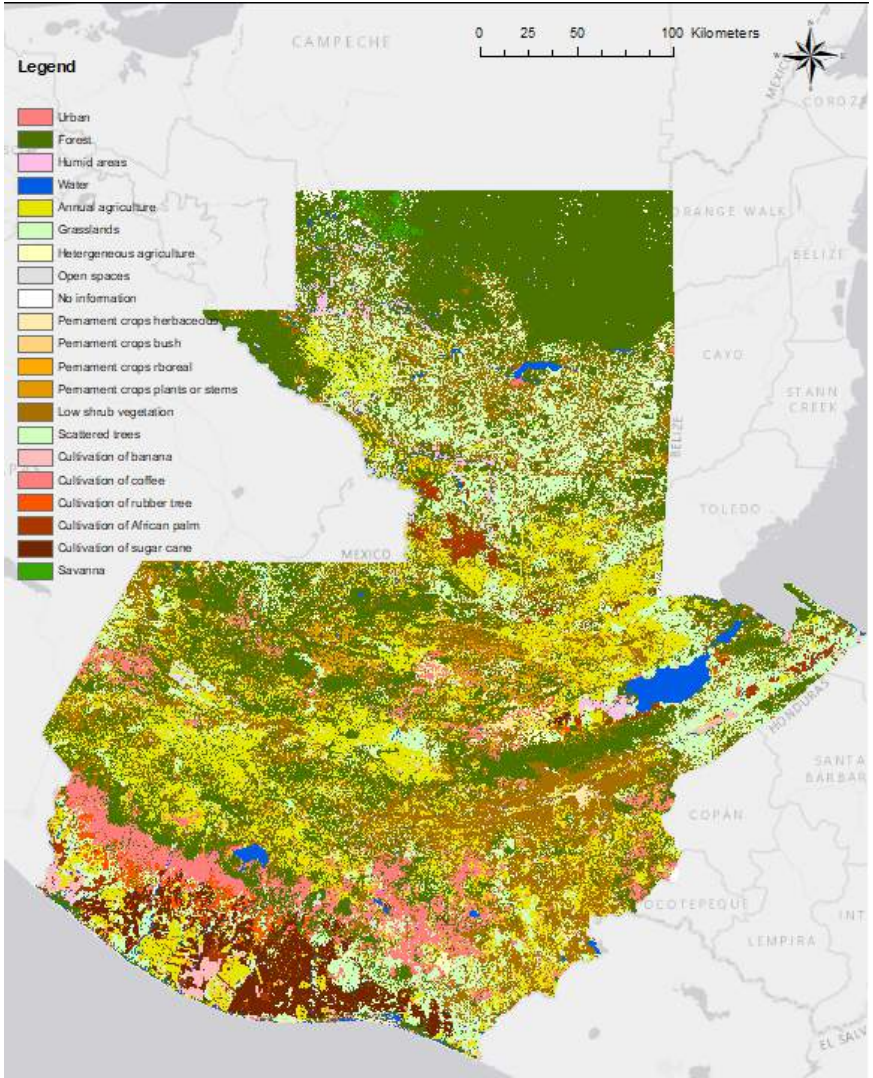
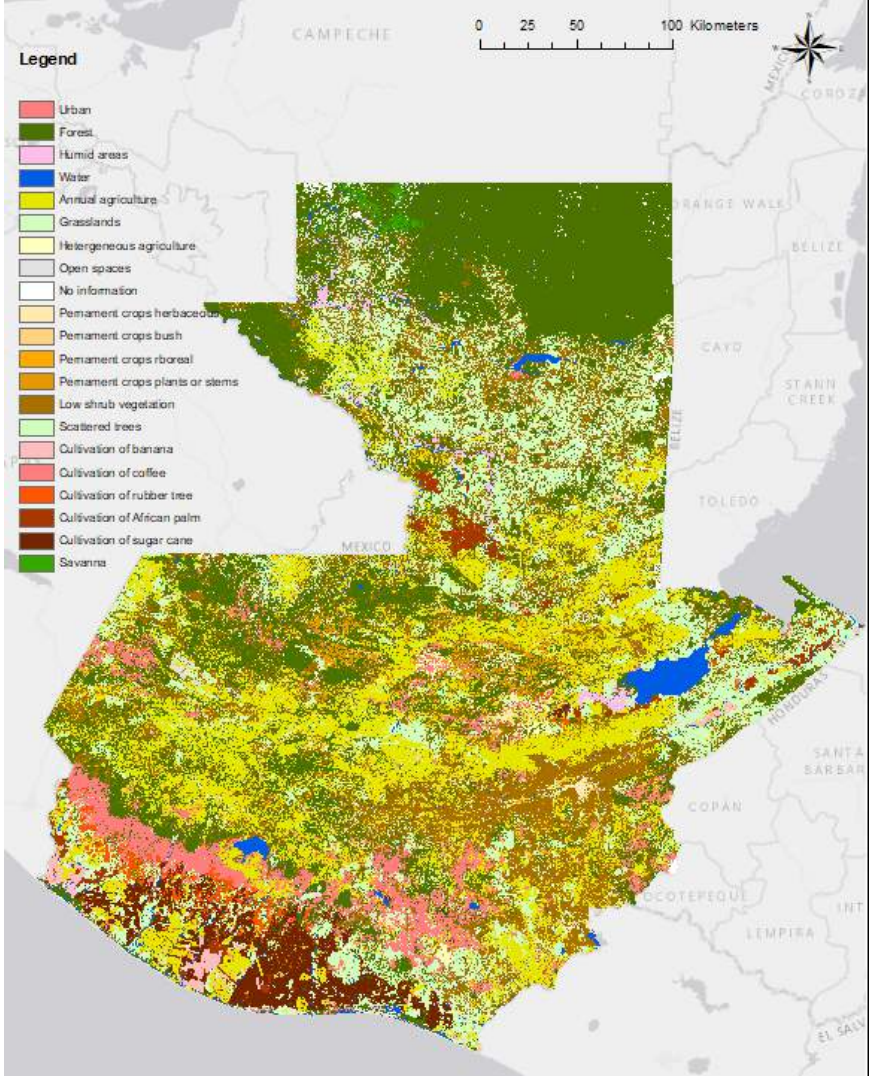
LAND USE LAND COVER MODEL

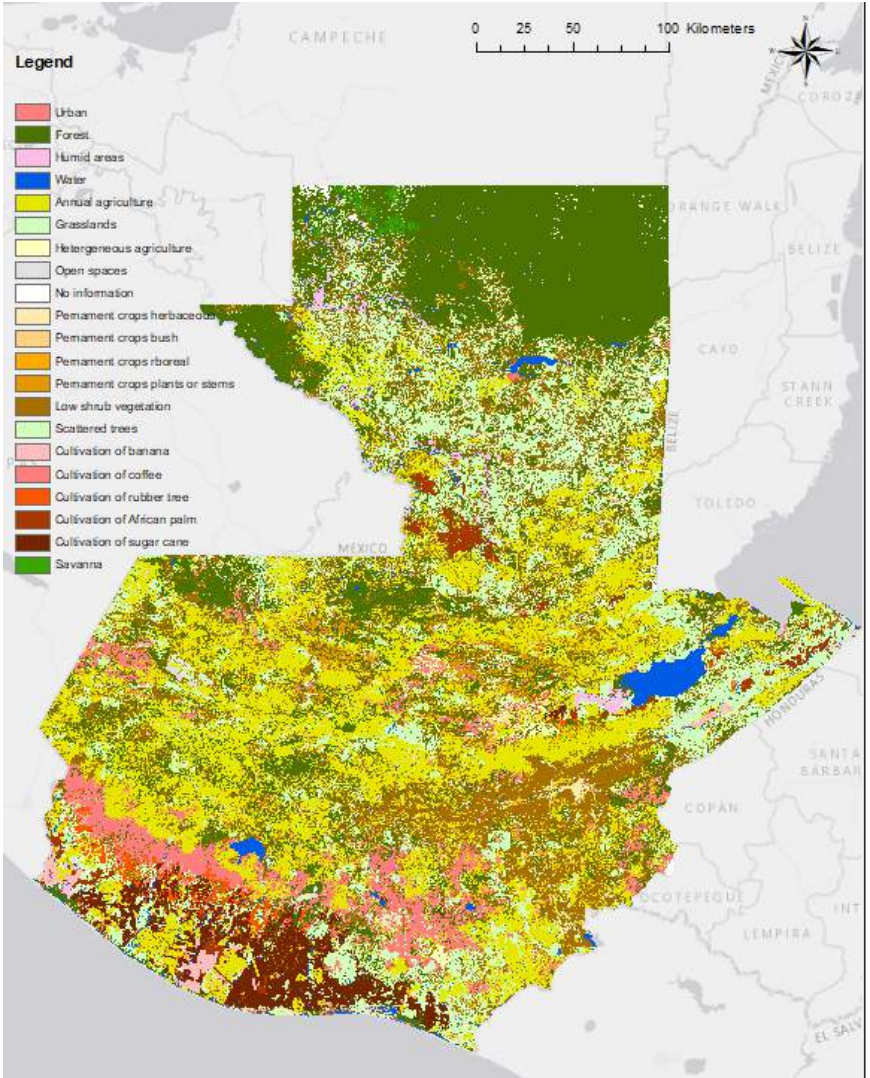




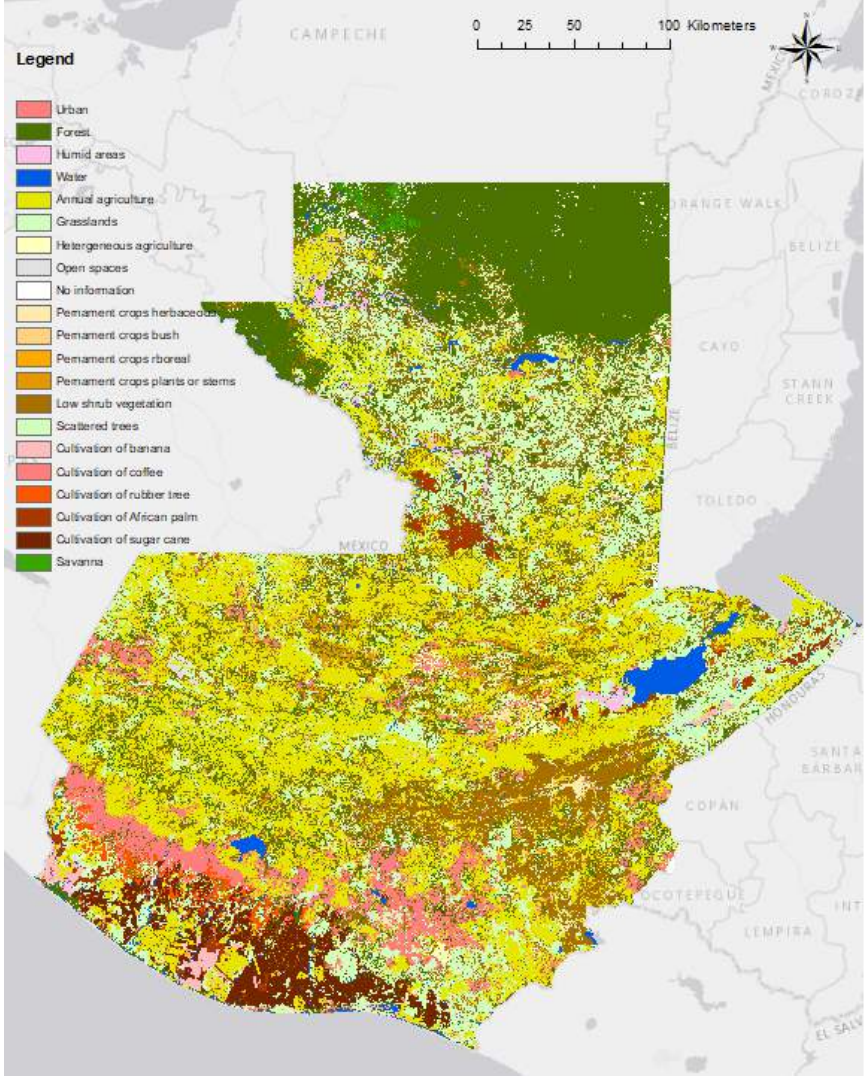
IRRIG
LULC in 2015



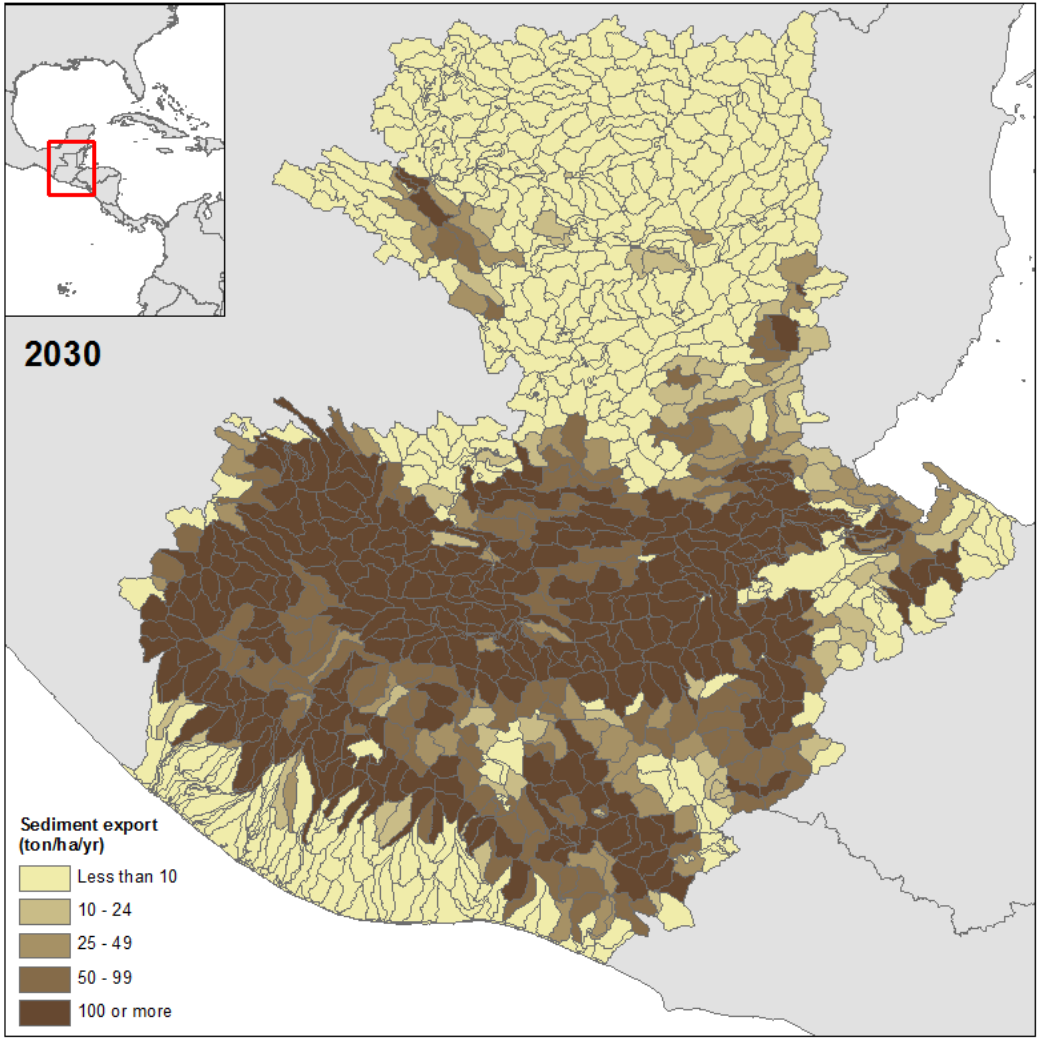
IRRIG
LULC in 2020



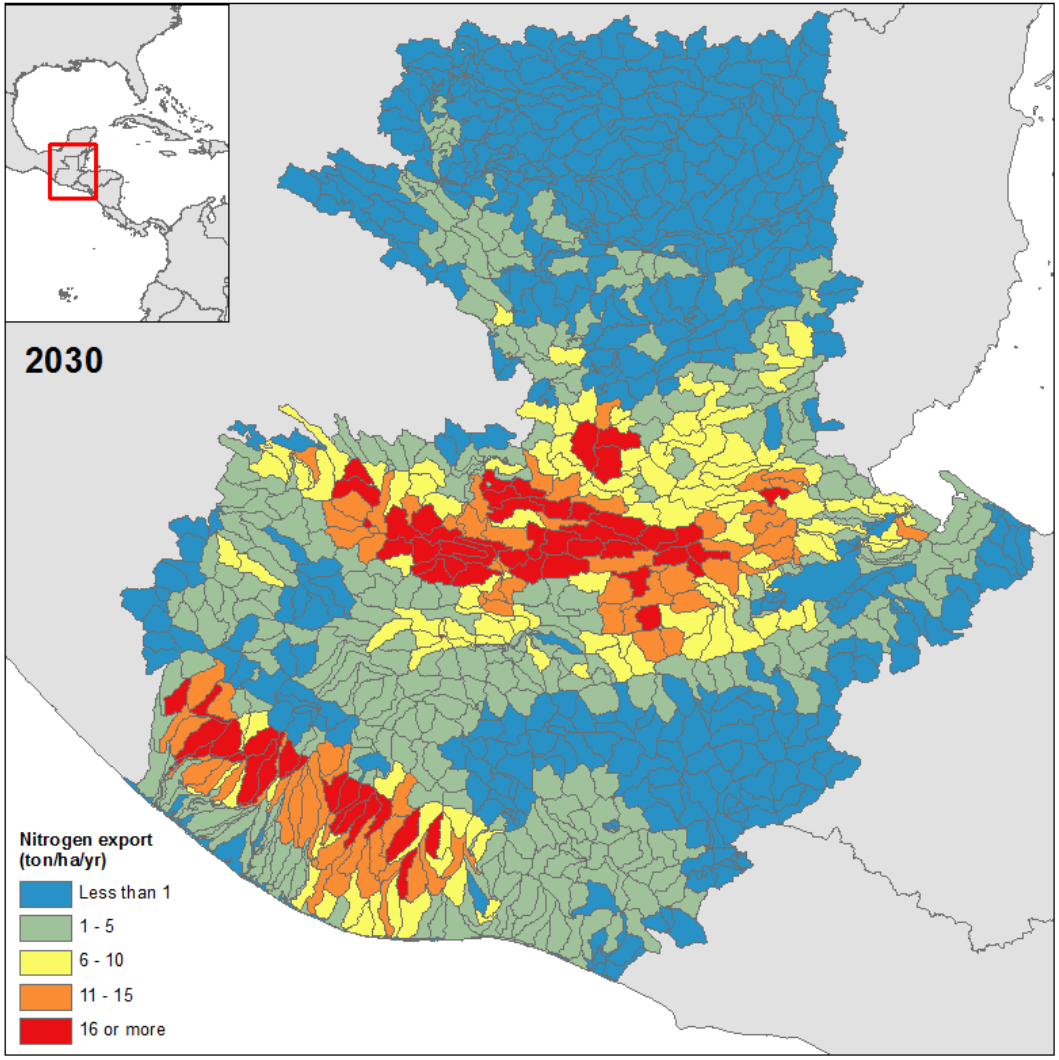
IRRIG
LULC in 2025



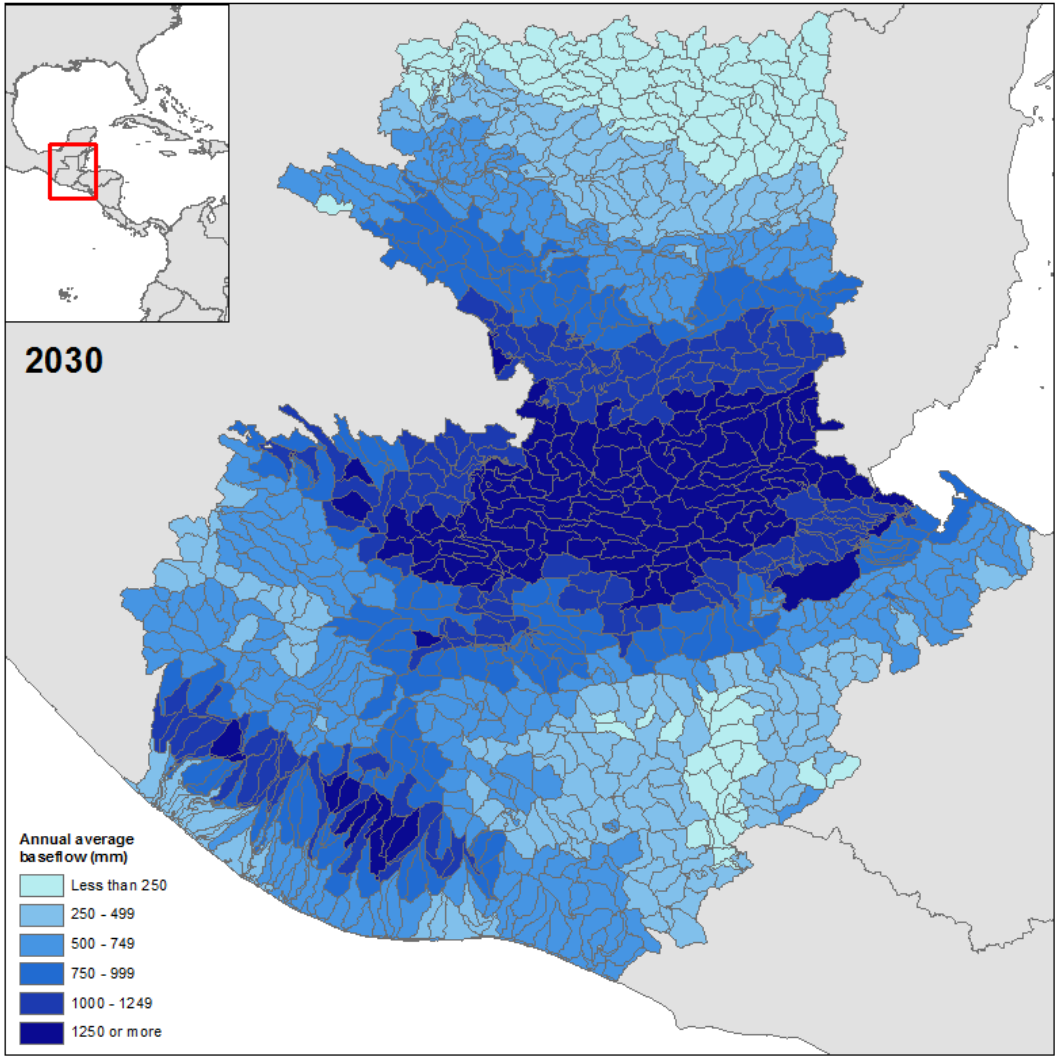
IRRIG
LULC in 2030



IRRIG
Sediment export
ton/ha/yr
in 2030



IRRIG
Nitrogen export
ton/ha/yr
in 2030



IRRIG
Average annual baseflow
mm
in 2030

TAKE HOME- IEEM:

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Thank you.

For more information, contact:

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