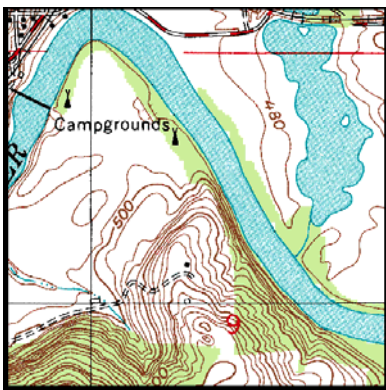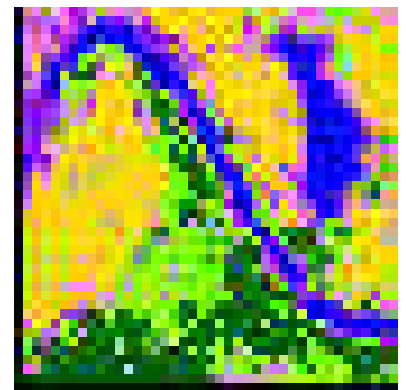# Creating Scenarios &
Simulating the Impacts of Policy:
New possibilities with the
Environmental Services Trading
Simulation (ESTS 3.0) Game

Chetan Agarwal & Ian Powell

Forest Trends

Scope

- What's New with ESTS 3.0
    1. **Modules**
    2. **Functionality**
    3. **Applications**
- Preview of ESTS 3.1
- Options for Use: Diverse Simulation Objectives
- Potential Uses and Users
- Options for Dissemination
- Options for future development
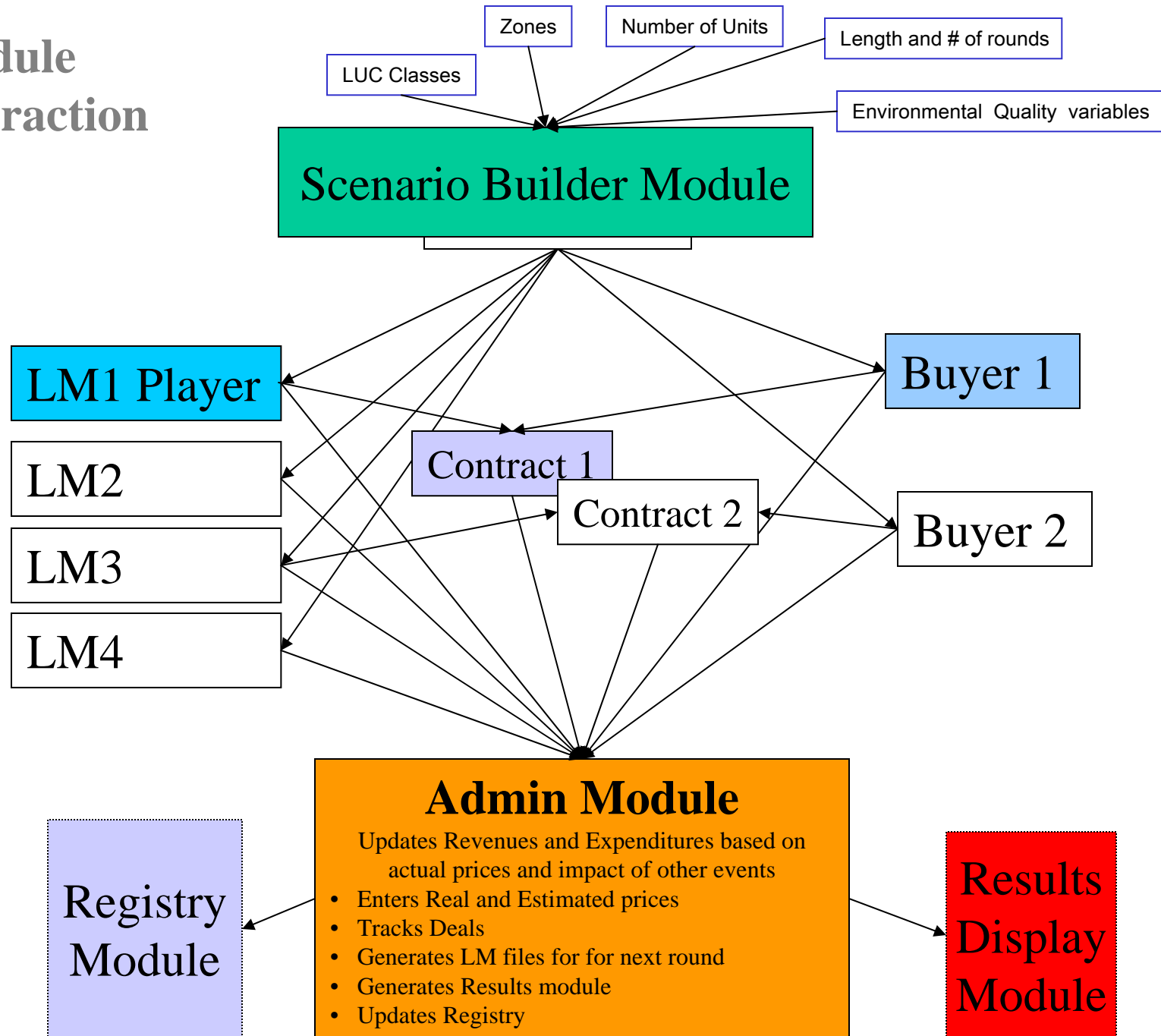
What's New with ESTS 3.0

1. **New Modules**

Module	Function
Admin	Automates information transfer between rounds (landscape, financial status and deals)
Registry (& Contract form)	Records environmental agreements and allocates revenue to sellers.
Results	Generated automatically, after each round. Displays landscape-level and team-level financial and LUC results.

What's New with ESTS 3.0

1. **Upgraded Modules**

Module	Function
Scenario Builder (SB)	Designs a new scenario or modify an existing one New: Menu bars & Legend, LUC input form
Land Manager (LM)	Records team level LUC decisions Displays individual landscapes & financial status

Module Interaction

Zones

Number of Units

Length and # of rounds

LUC Classes

Environmental Quality variables

Scenario Builder Module

LM1 Player

Buyer 1

LM2

Contract 1

LM3

Contract 2

Buyer 2

LM4

Admin Module

Updates Revenues and Expenditures based on actual prices and impact of other events
- Enters Real and Estimated prices
- Tracks Deals
- Generates LM files for for next round
- Generates Results module
- Updates Registry

Registry Module

Results Display Module

What's New with ESTS 3.0

2. **New Functionality**

|	
Environmental Quality feedback	Can model LUC impacts on 3 Environmental Quality (EQ) variables of your choice and
Enabling Markets	Ability to assess impact on market functioning; of electronic **contract** forms and a contract **registry**
Remotely Sensed Land Use/Cover (LUC) Maps	Can utilize LUC maps, developed from classified remotely sensed images

What's New with ESTS 3.0

2. **New Functionality:** Adding Flexibility

|	
Estimated prices	Can run "what if" simulations by changing price projections. Game master can specify actual prices and estimated prices seperately
Temporal resolution	Length of rounds is user-defined
Temporal extent	Unlimited # of rounds
User defined LUCs	Can define own LUCs in new LUC input form; and specify LUC units & LUC colours
Team specific Interest rates	Can define interest rates (for both saving and borrowing) separately, for each player

Remote Sensing based LUC Map
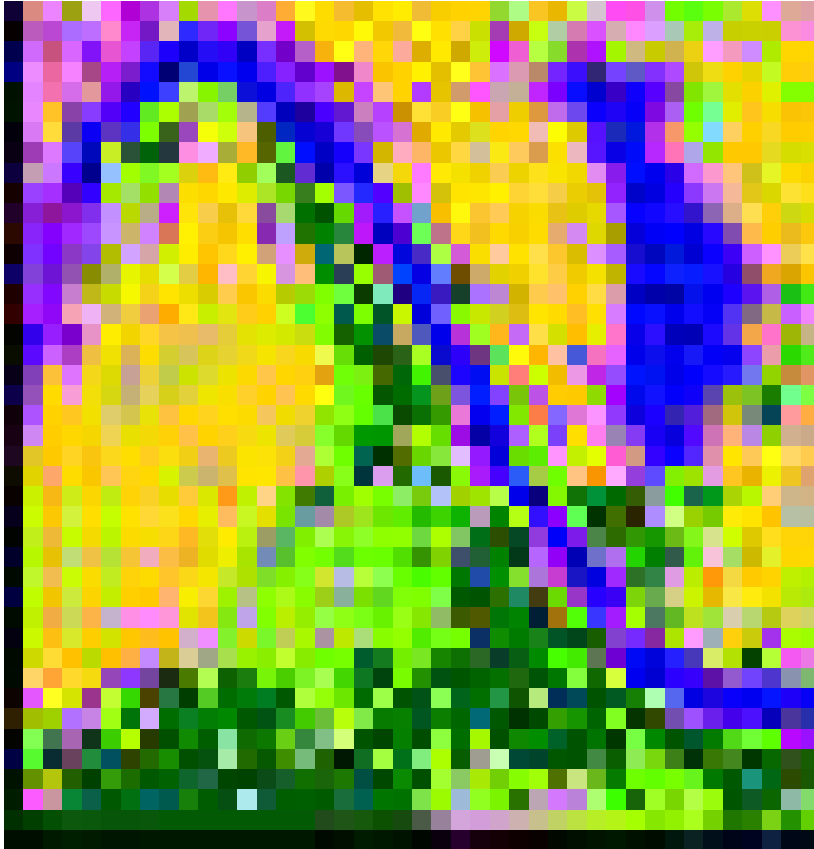
LUC map (40 x 40 pixels)
based on a classified Landsat
RS image
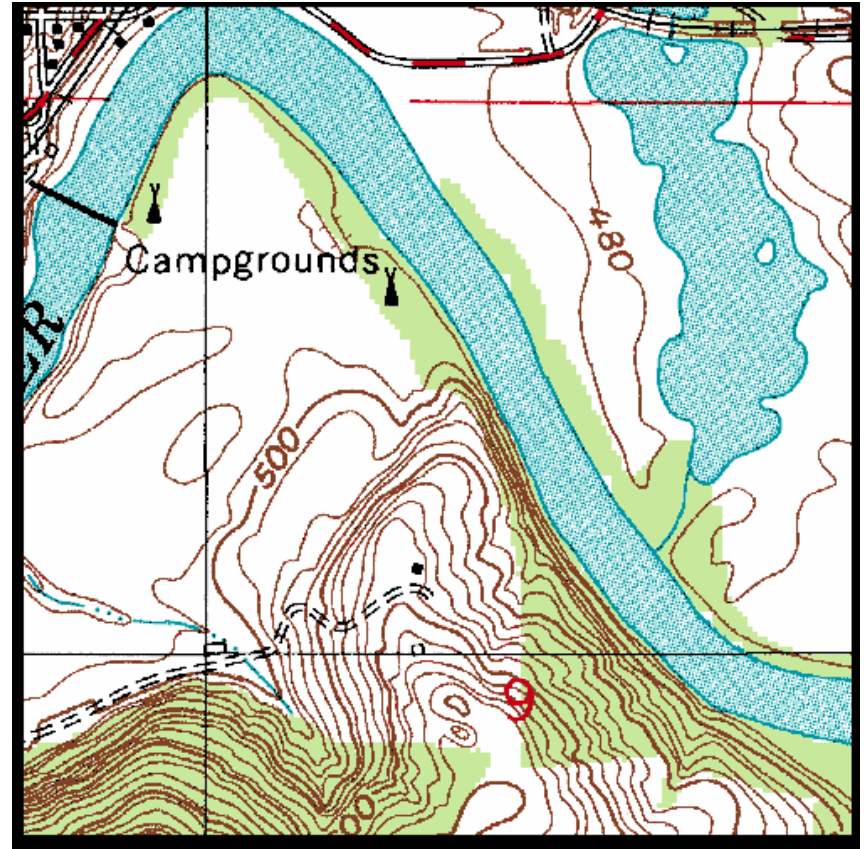
Topographic. Map
(1.2 x 1.2 km)

Image credits: Laura A. Carlson

LUC Map and Legend
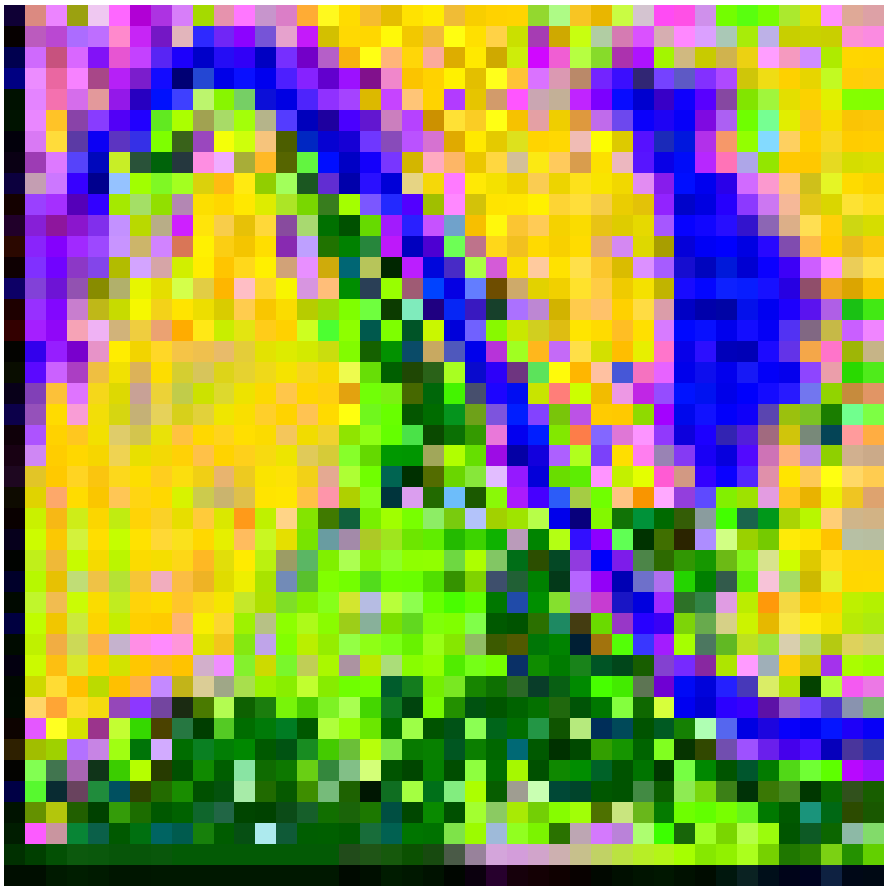
(1.2 km² 40 x 40 pixels)

1		agriculture/row crop
2		pasture/grassland
3		residential
4		commercial
5		advanced secondary succession
6		initial secondary succession
7		water

Image credits: Laura A. Carlson

What's New with ESTS 3.0

3.   **Applications** updated in ESTS 3.0

- •Australia Scenario

- •Atlantic Forest Scenario (Teresopolis version)

- •Atlantic Forest Scenario (Univ. of Maryland version)

Preview of ESTS 3.1

Forest Stock monitoring

- Harvest tracking
- Automatic transition between defined forest classes

Larger landscape

- More than 100 x 100 pixels

Editing of global maps between rounds

- Change tenure (transfer ownership)
- Zones (shifting riverbed & floodplain)
- Registry (shifting markets etc)

Options for Use:
Diverse Simulation Objectives

- **Simulate LUC change** with / without env. service markets

- **Simulate env. service markets** with / without enabling market institutions, e.g. registry, standards, regulation, written contracts

- **Compare impacts and outcomes** of multiple policy options

- **Simulate equity impacts** for low-income stakeholders

- **Create scenarios** for new locations and forest types

Potential Uses and Users

Uses & Users	Description
Illustrate markets for Investment Funds	Illustrate impact of markets and market institutions on landscape and company revenues
Role Play for decision makers (US State Dept.)	Illustrate attraction of illegal LUCs in tropical landscapes
Education / Graduate level (UMD)	Test multiple policy options for securing env. services
Illustrate local incentives (USFS-International Programs)	Illustrate community incentives for fire prevention in Indonesia

Options for Dissemination

A Copyright and disseminate freeware

B Copyright and disseminate freeware selectively

C Copyright and disseminate for a fee

D Copyright and charge for specific scenarios and training service

E Copyright and sell off rights to software

Options for Future Development

1. Develop a Library of Applications (with existing software - different locations and objectives…)	US$ 1.5k –15k
2. Enhance functionality in ESTS (& put interactive version on the web)	US$ 25k – 50k
3. Develop vector GIS interface	US$ 40k – 80k
4. Develop a computer game version (3-D, high graphics)	with a gaming company

for updates & info.

- Check the Katoomba and FT websites

  http://www.katoomba.org

  http://www. forest-trends.org

- Contact FT

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