Telecoupling GeoApp: Cloud-based Platform Overview and Widgets

March 12th, 2019

Webinar series

Telecoupling: A New Frontier for Global Sustainability

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Geospatial Data Scientist

Telecoupling: A New Frontier for Global Sustainability

- February 19th, 2019: Telecoupling 101: Concepts, Terminology, and Published Case Studies
- February 26th, 2019: Telecoupling Toolbox: Integrated Tools for Sustainability Science
- **March 12th, 2019: Telecoupling GeoApp: Cloud-based Platform Overview and Widgets**
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WEBINAR REGISTRATION AVAILABLE @

https://telecouplingtoolbox.org/webinar

POLL

Online Presence

- http://csis.msu.edu/telecoupling
- https://telecouplingtoolbox.org/

OPEN COMMUNITY FORUM

slack

Telecoupling Toolbox - Systems Integration Approach

What's in the Toolbox?

Desktop GIS Tools

ArcGIS Toolbox (v2.3)

Web-based GIS Application

GeoApp

Telecoupling Toolbox - ArcGIS Toolbox (v2.3)

Pros

- Full control on layer symbology
- Adjust coordinate projections
- Integrate with other ArcGIS tools
- Can run lengthy processing tasks

Cons

- Windows OS only
- Annual paid license
- Proficiency in ArcGIS required
- Several installation steps (3rd party tools integrations)
- Runtime errors are system-dependent
- Execution time can vary (CPU/RAM)

Telecoupling Toolbox - GeoApp

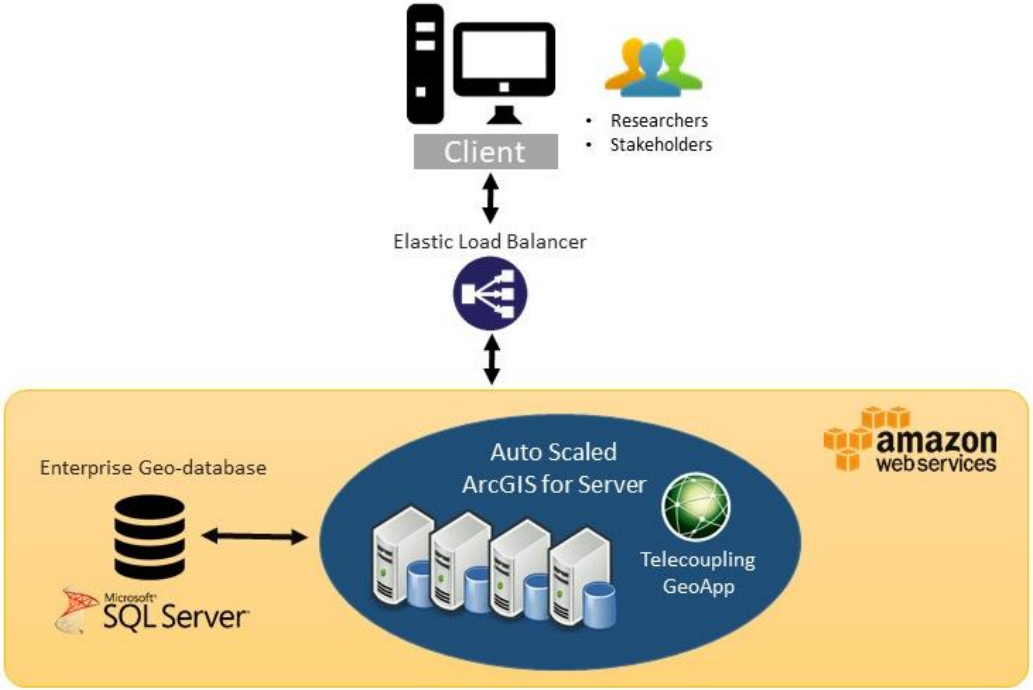
Pros

- No software installation required
- Free and cross-platform
- Same experience for every user
- Scalable - load balance
- Integration with several publicly available GIS layers
- Interactive and dynamic experience
- No GEE authentication

Cons

- Requires internet connection
- Data preprocessing still needed
- Widgets cannot be modified by users
- Layer symbology is fixed
- Users cannot add raster data directly to basemap *(might change soon)*
- Only operational layers are permanent *(browser session cannot restore output layers after re-opening)*

Telecoupling Toolbox - GeoApp



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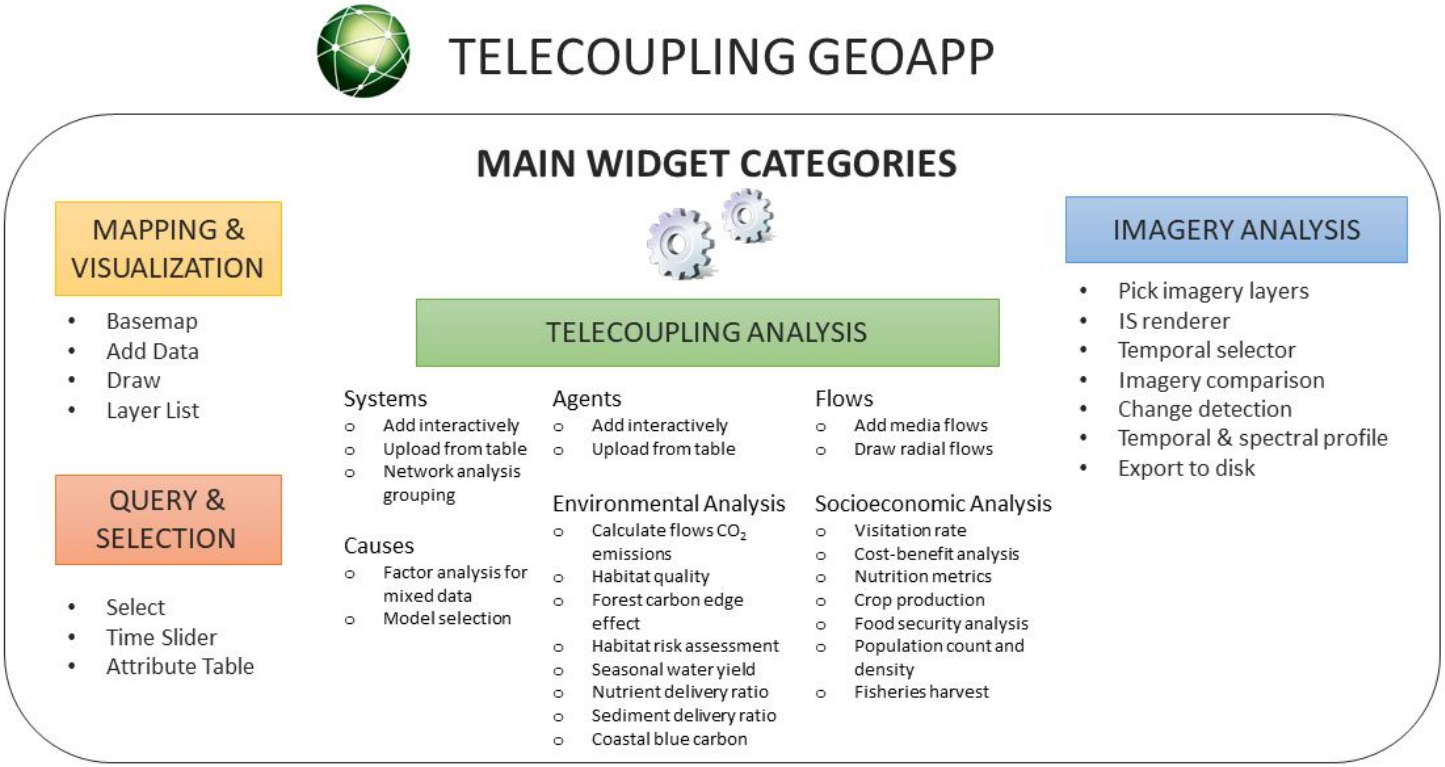

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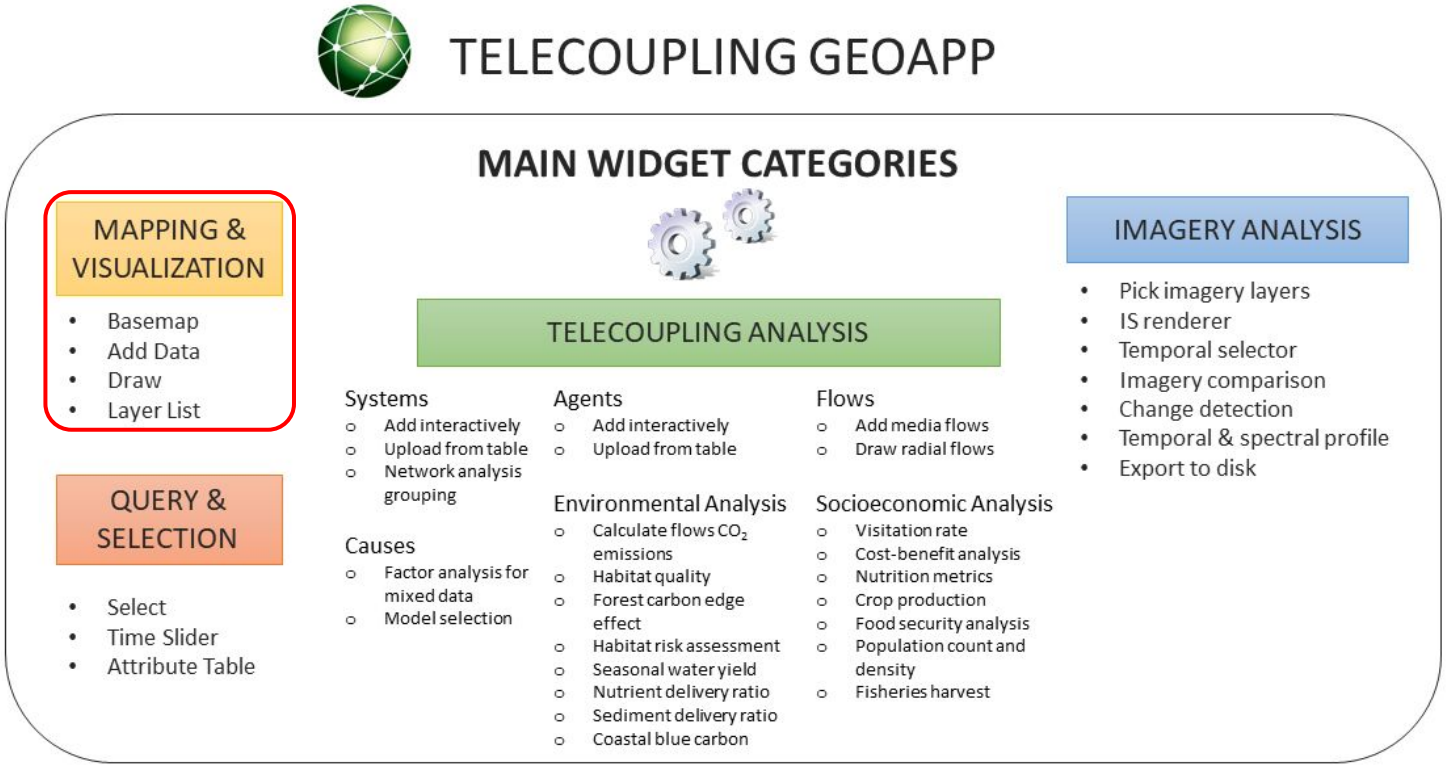

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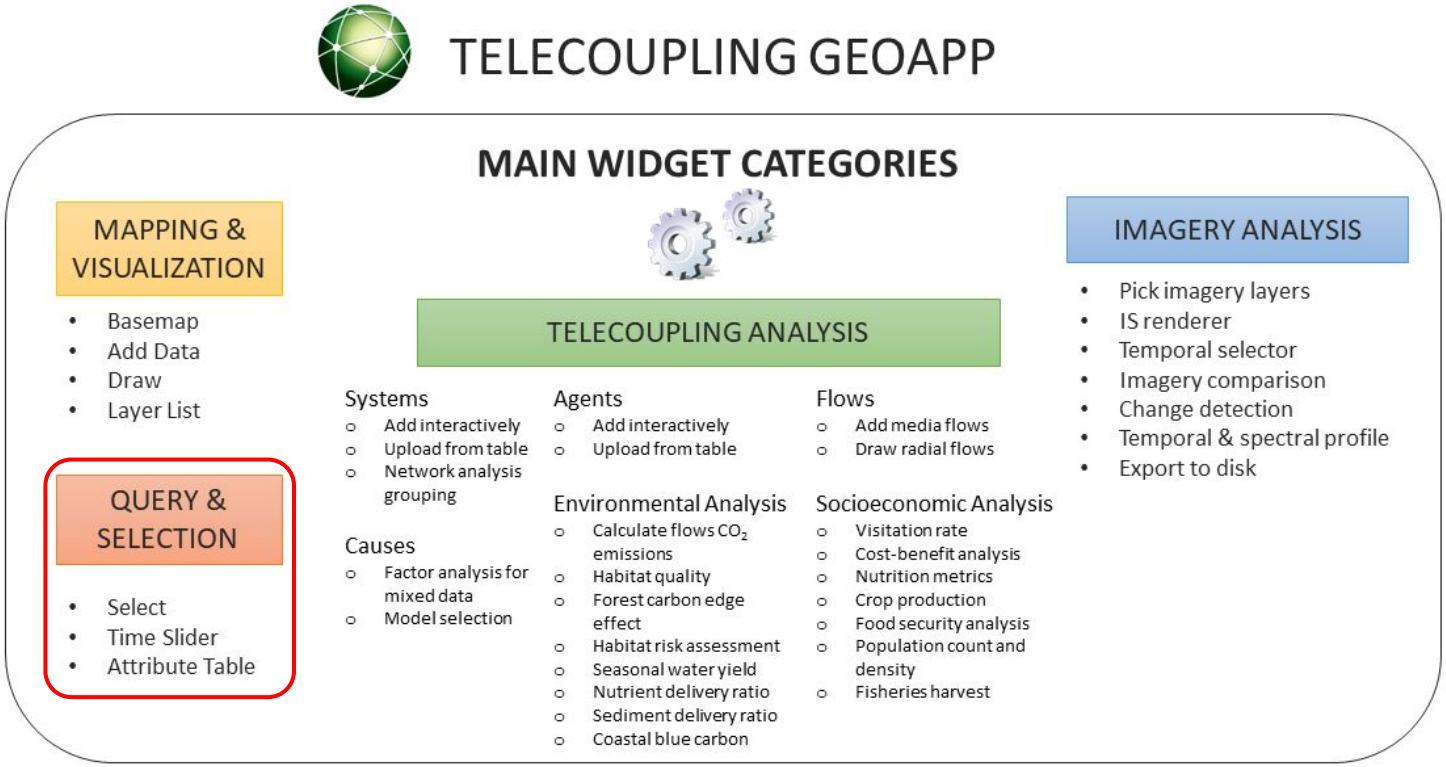

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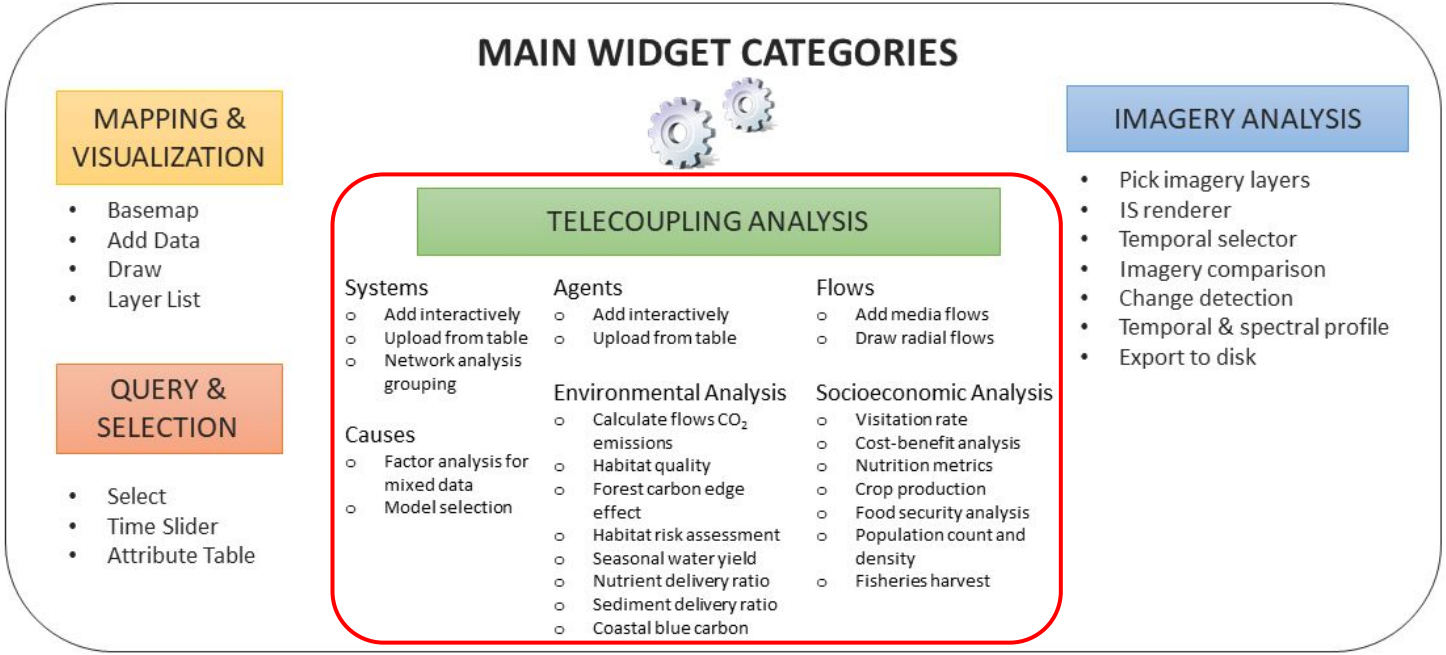

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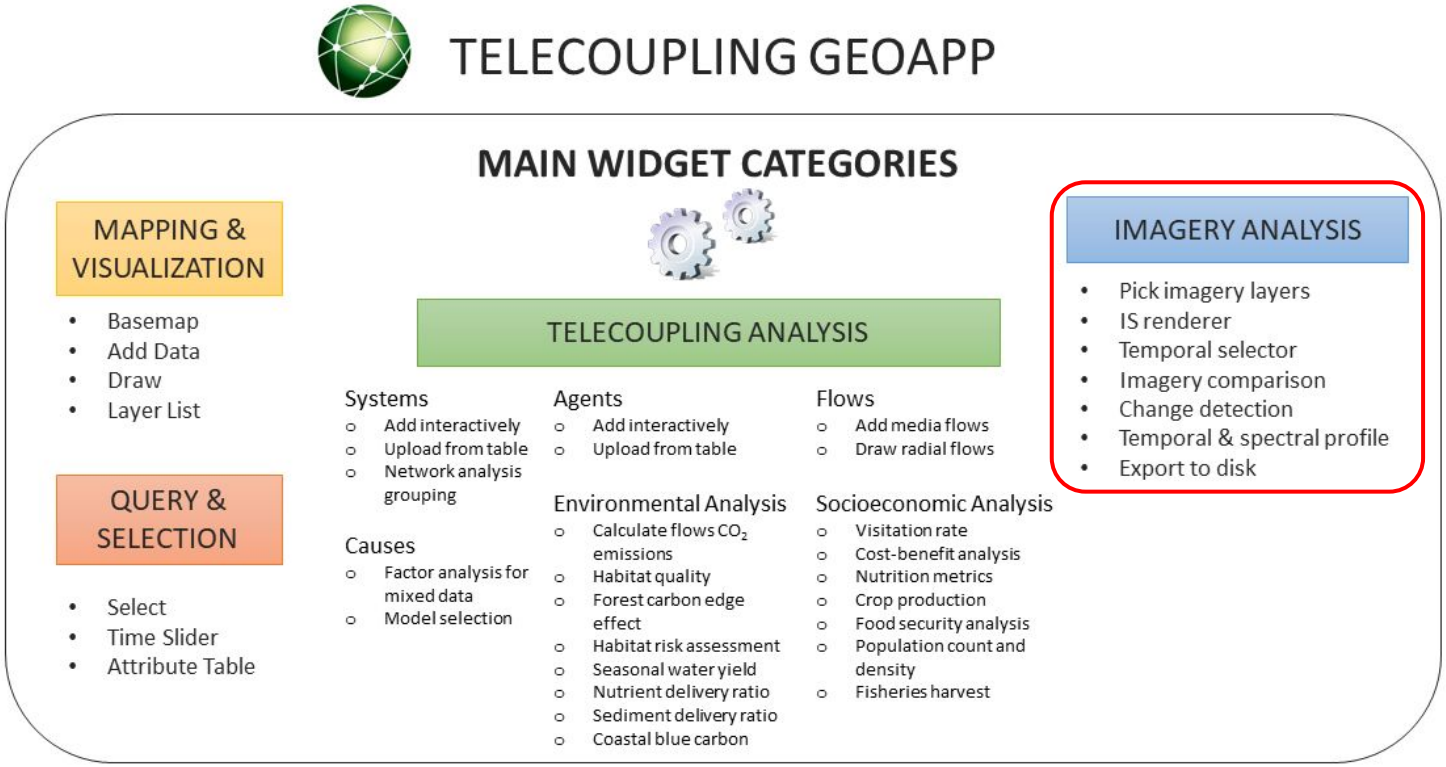

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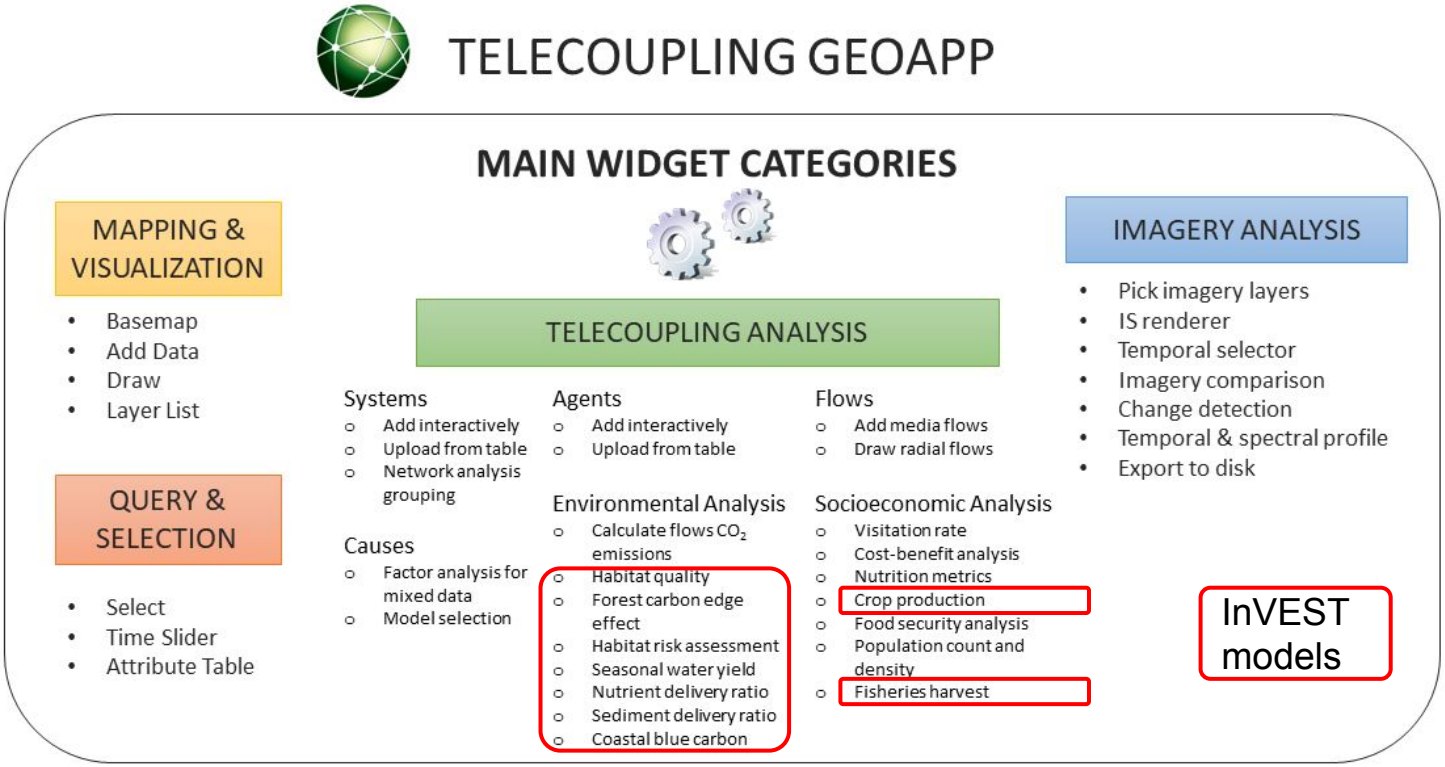

Telecoupling Toolbox - GeoApp

TELECOUPLING GEOAPP

MAIN WIDGET CATEGORIES

MAPPING & VISUALIZATION

- Basemap
- Add Data
- Draw
- Layer List

QUERY & SELECTION

- Select
- Time Slider
- Attribute Table

TELECOUPLING ANALYSIS

Systems
- Add interactively
- Upload from table
- Network analysis grouping

Causes
- Factor analysis for mixed data
- Model selection

Agents
- Add interactively
- Upload from table

Environmental Analysis
- Calculate flows CO_2 emissions
- Habitat quality
- Forest carbon edge effect
- Habitat risk assessment
- Seasonal water yield
- Nutrient delivery ratio
- Sediment delivery ratio
- Coastal blue carbon

Flows
- Add media flows
- Draw radial flows

Socioeconomic Analysis
- Visitation rate
- Cost-benefit analysis
- Nutrition metrics
- Crop production
- Food security analysis
- Population count and density
- Fisheries harvest

IMAGERY ANALYSIS

- Pick imagery layers
- IS renderer
- Temporal selector
- Imagery comparison
- Change detection
- Temporal & spectral profile
- Export to disk

EPA EnviroAtlas

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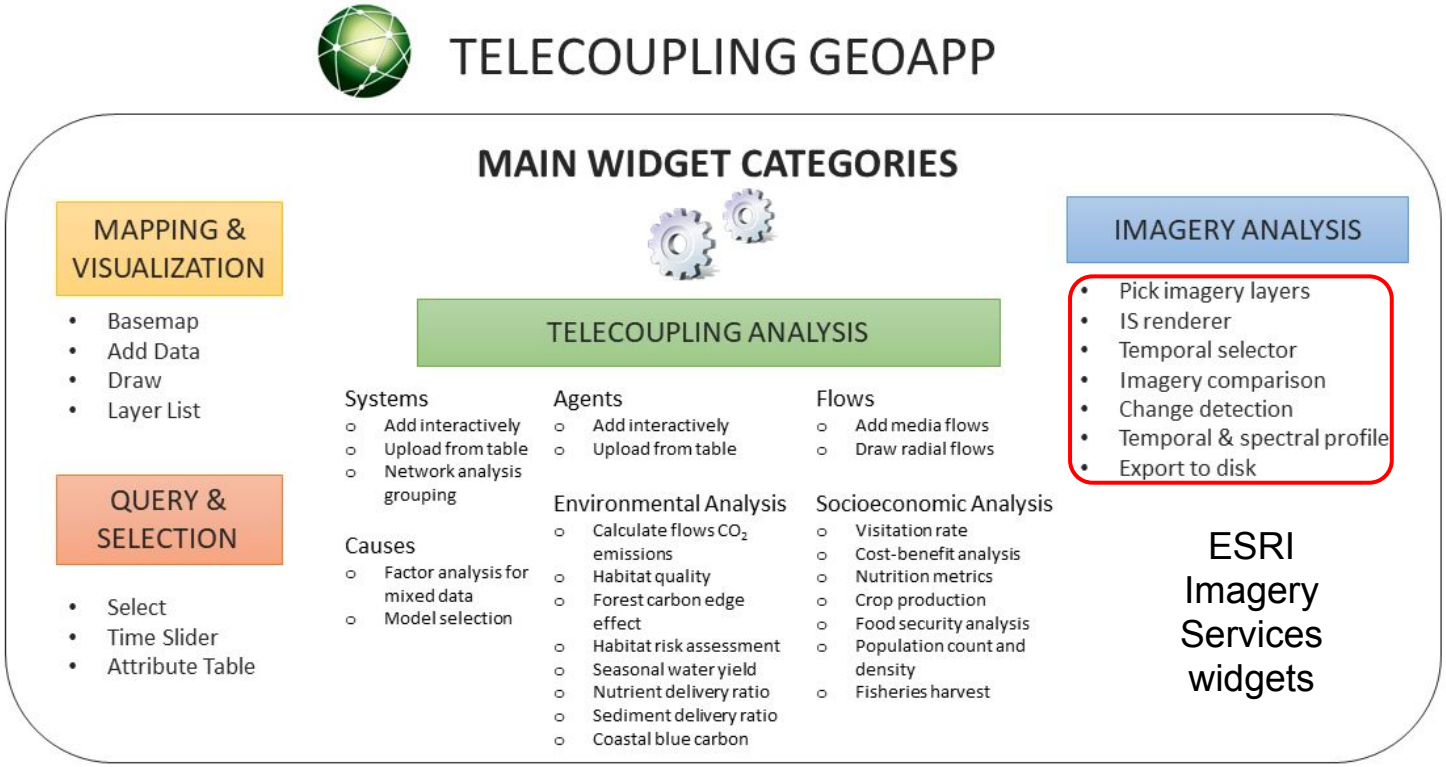
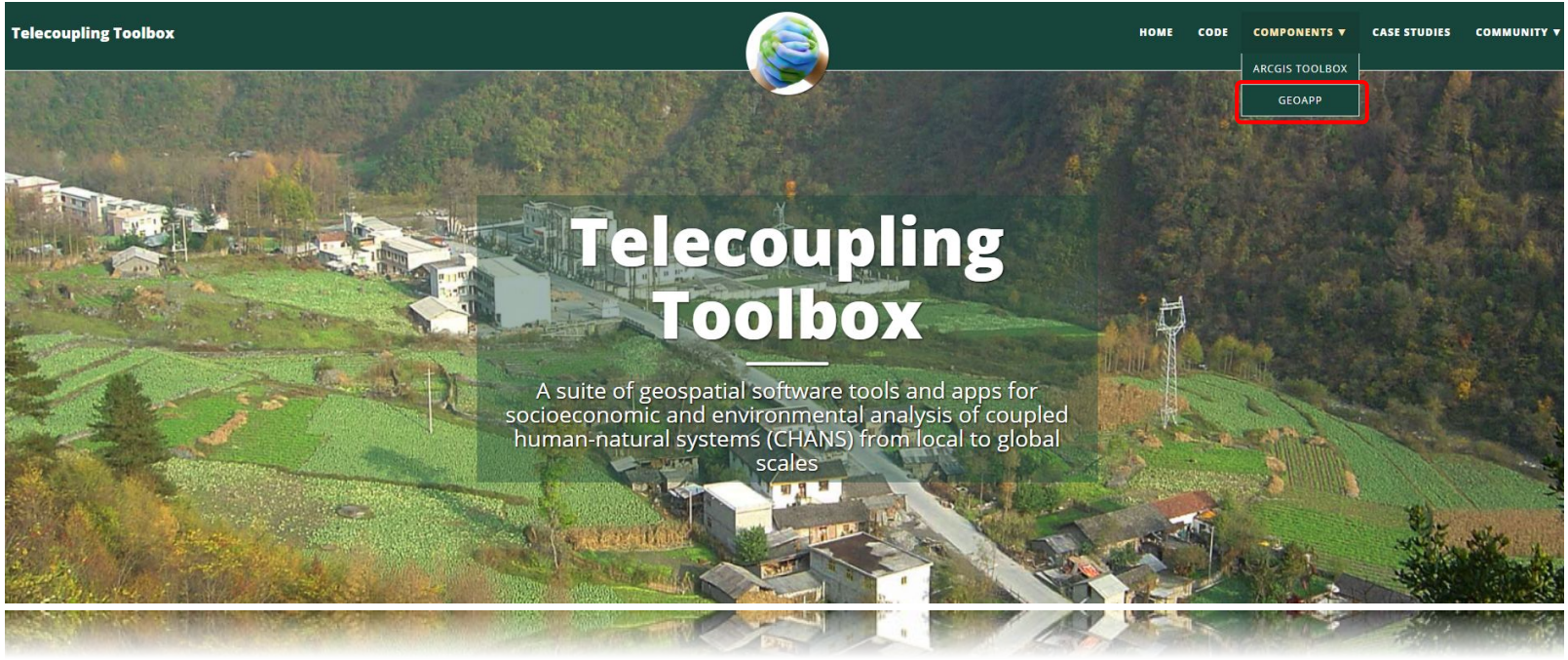


Telecoupling Toolbox - Open Access

Code is publicly shared and freely available on Github
(https://github.com/MSU-CSIS/telecoupling-toolbox)

Telecoupling Toolbox - Main reference

https://telecouplingtoolbox.org/



LIVE DEMO

Thank you!
Q&A

https://www.surveymonkey.com/r/YWBYHF5

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Reference Publications

- McCord, P., Tonini, F., and Liu, J. (2018). Making strides in sustainable development with the Telecoupling GeoApp. Science Trends, September 6, 2018.https://sciencetrends.com/making-strides-in-sustainable-development-with-the-telecoupling-geoapp/

- McCord, P., Tonini, F., and Liu, J. (2018). The Telecoupling GeoApp: A Web-GIS Application to Systematically Analyze Telecouplings and Sustainable Development. *Applied Geography*, 96, pp. 16-28. https://doi.org/10.1016/j.apgeog.2018.05.001

- Tonini, F., and Liu, J. (2017). Telecoupling Toolbox: Spatially explicit tools for studying telecoupled human and natural systems. *Ecology and Society*, 22 (4), pp. Art11.https://doi.org/10.5751/ES-09696-220411