Overview of Geoinformatic Options-by-Context (GeOC) Framework and Tools for Supporting SLM Outscaling

GeOC team

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ICARDA
Science for resilient livelihoods in dry areas

Problems

- High contextual diversity of drylands *vs.* “uniform blanket” approach in promoting place-based sustainable land management (place-based SLM) over large scales

- Lack of tools supporting comparative analyses/assessments of place-based SLM options by context, thereby supporting out-scaling efforts

Aim

To provide land users, projects/programs and policy decision-makers with a web-based tool as being:

- plausible, robust extrapolation domains for guiding decisions on the selection and use of SLM options,

- an open platform for docking data (system-whole completed, standardized) from different projects into integrative/holistic and converging actions for promoting SLM practices at scale.

GeOC

- **Geo-informatic Options-by-Context (GeOC) - A framework & tool** for defining, monitoring, assessing and co-learning place-based SLM options fitted to the social-ecological contexts

- Key question: WHAT WOULD WORK BEST IN WHERE / WHAT CONDITIONS?

- Key assumption: Context-matched recommendation/ implementation is more feasible and cost-effective compared to “uniform blanket” way (business-as-usual).

- A knowledge/data integration tool (rather than a specific operational simulation model)
  - ✓ Standardize and correlate available data
  - ✓ Support targeting and out-scaling in the face of contextual and data diversity

- Pre-conditions for GeOC’s usefulness: <u>Large</u> and <u>diverse</u> <u>available</u> data on innovation options and contexts

Geo-informatics Options by Context (GeOC) tool

GeOC online platform integrates (1) standardized system characterizing SLM with (2) user-friendly Web-GIS

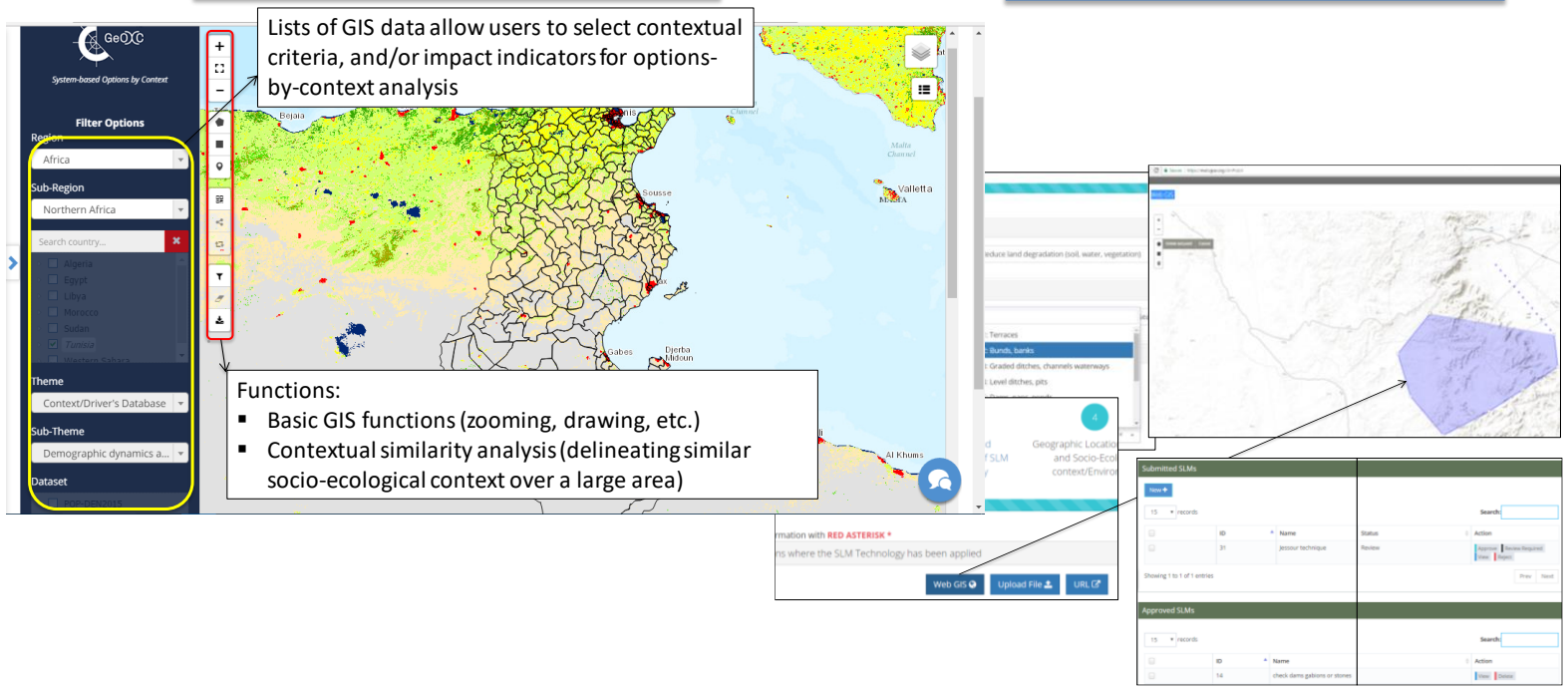
Web-based GIS

- Web-based GIS for key functions (filtering/querying, zonal statistics, spatial similarity analysis)
- Global GIS database of divers and performance/impact indicators of SLM

Matched
Synchronized

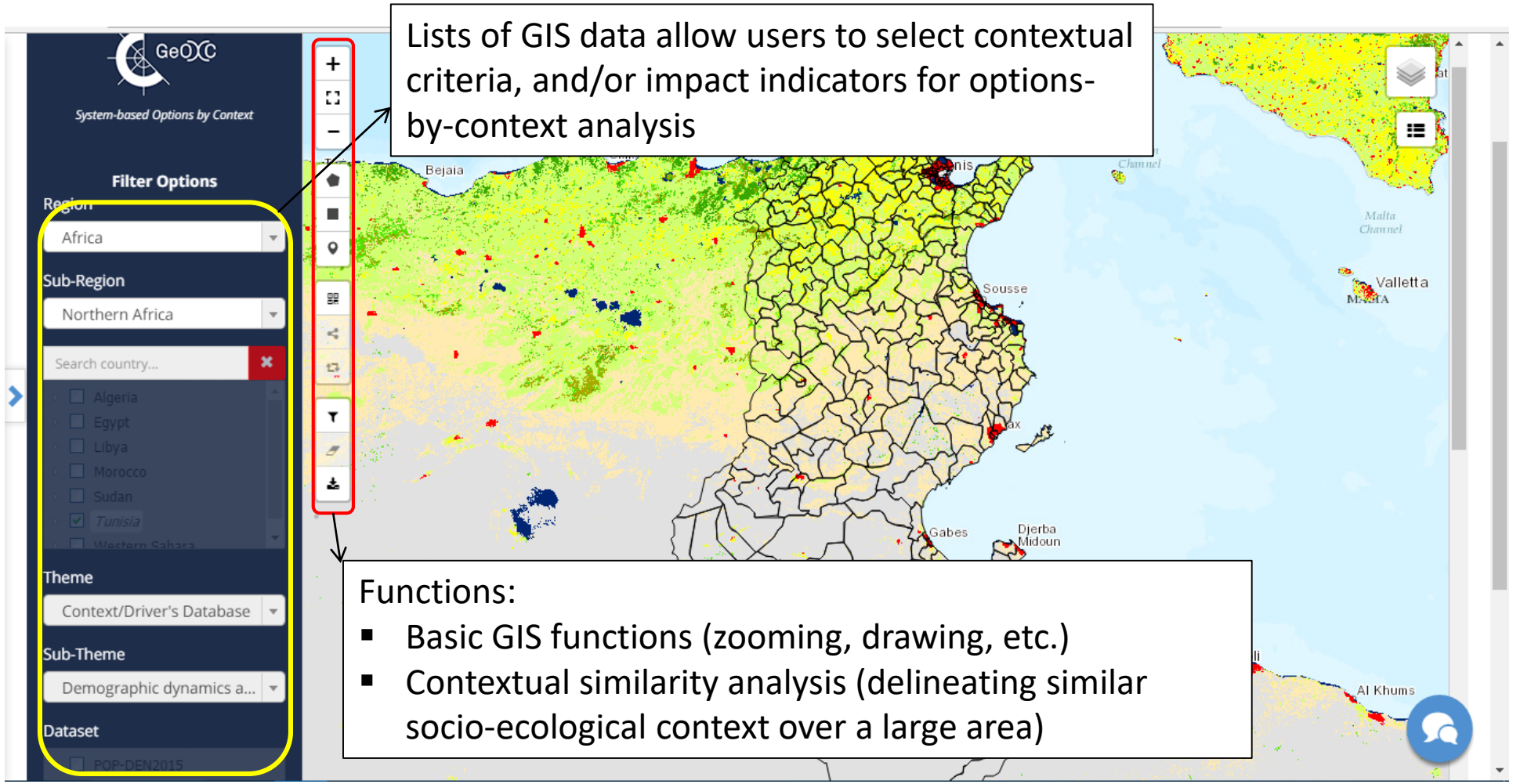
Sustainable Land Management (SLM)

- Web-based form for importing standardized and completed SLM options by context
- Database of SLM options by Context



The WebGIS part of GeOC tool

Graphic interface of GeOC's WebGIS and key functions



Lists of GIS data allow users to select contextual criteria, and/or impact indicators for options-by-context analysis

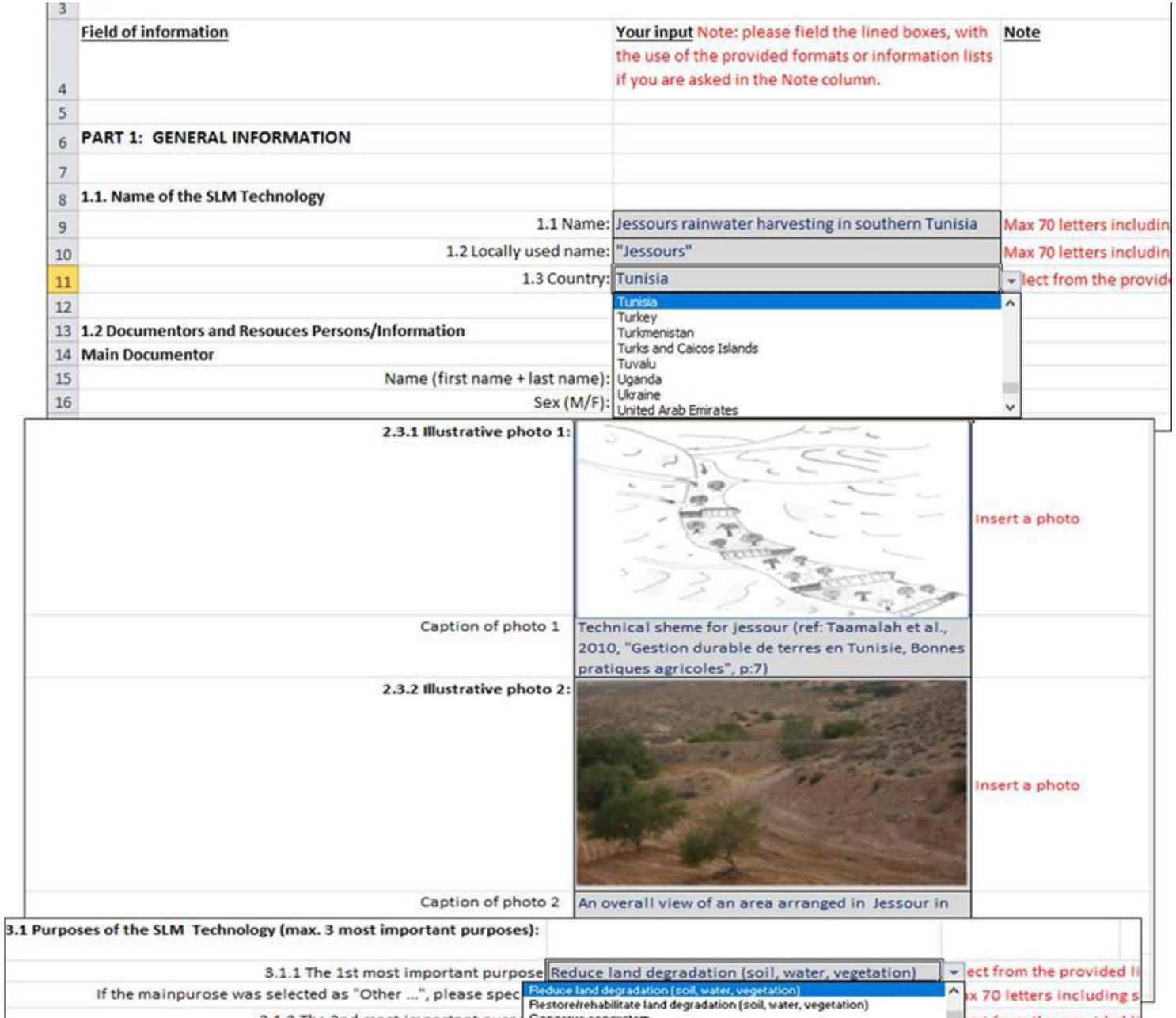
Functions:

- Basic GIS functions (zooming, drawing, etc.)
- Contextual similarity analysis (delineating similar socio-ecological context over a large area)

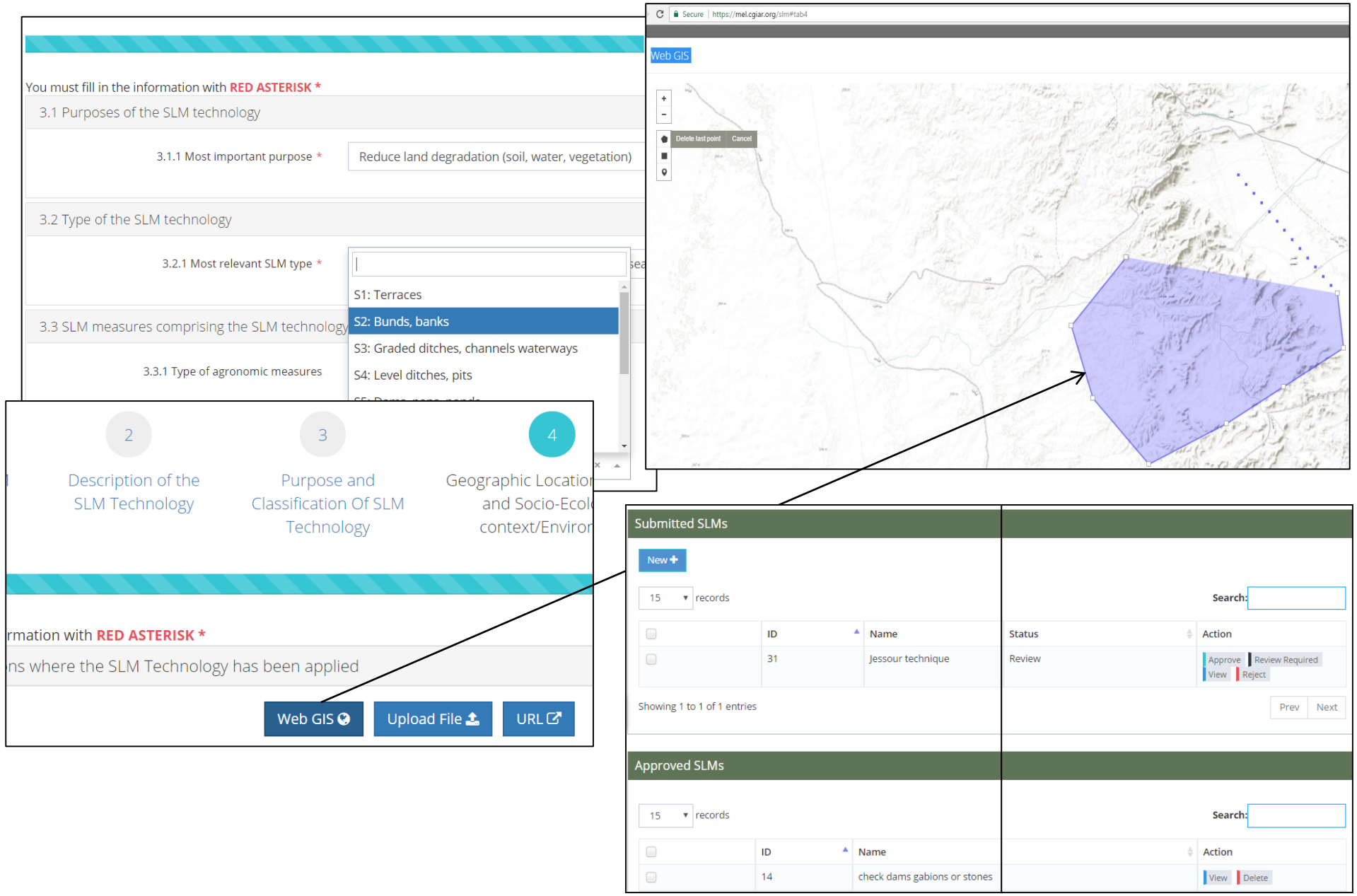
Further details in: Diwediga et al.

Template for completed, standardized SLM characterization

- Location:
  - ✓ Uploaded, or, directly mapped (supported by mapping tool)
- Context/potential drivers
  - ✓ Automatically retrieved from multi-attribute spatial database
  - ✓ Generated by projects
- Technological description of the SLM option
- Interactions with other components of agricultural systems
- Adoption (risks considered)
- Impacts (multi-criteria)



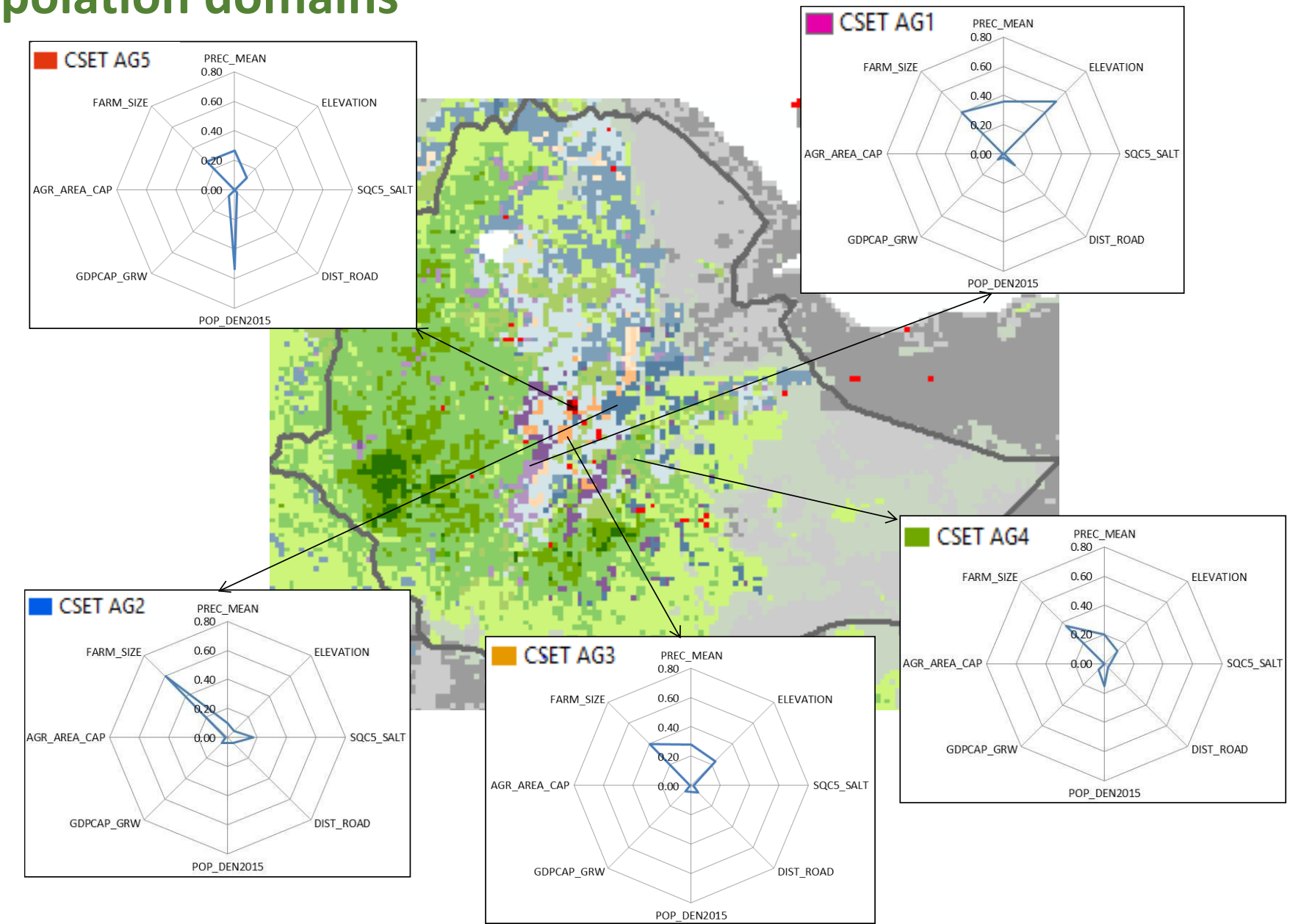
Web-based SLM interfaces



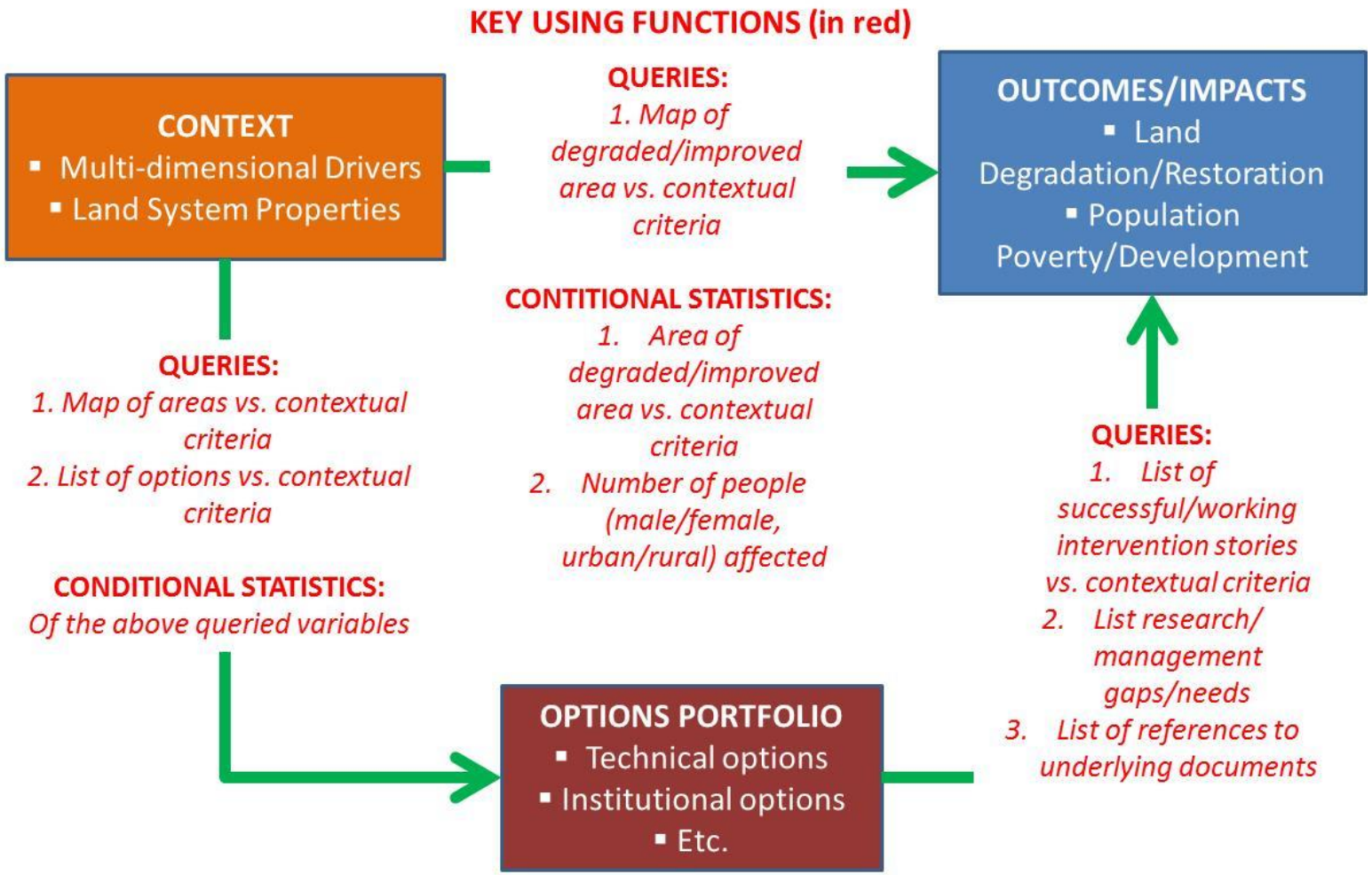
GeOC's Key Function 1 – Systemized data integration and storage

- Systemized data integration and storage
  - ✓ Couple descriptive data with spatial data
  - ✓ Systemize and standardize land/FS/LS management options
  - ✓ Multi-variate dataset for multi-usages rather than factsheet
  - ✓ Both off-line and online media for maximal accesses (by all) & links to Big Data
  - ✓ Peer-review for data QC

GeOC's Key Function 2 - Functional Context Socio-Ecological Types (fCSET) as extrapolation domains



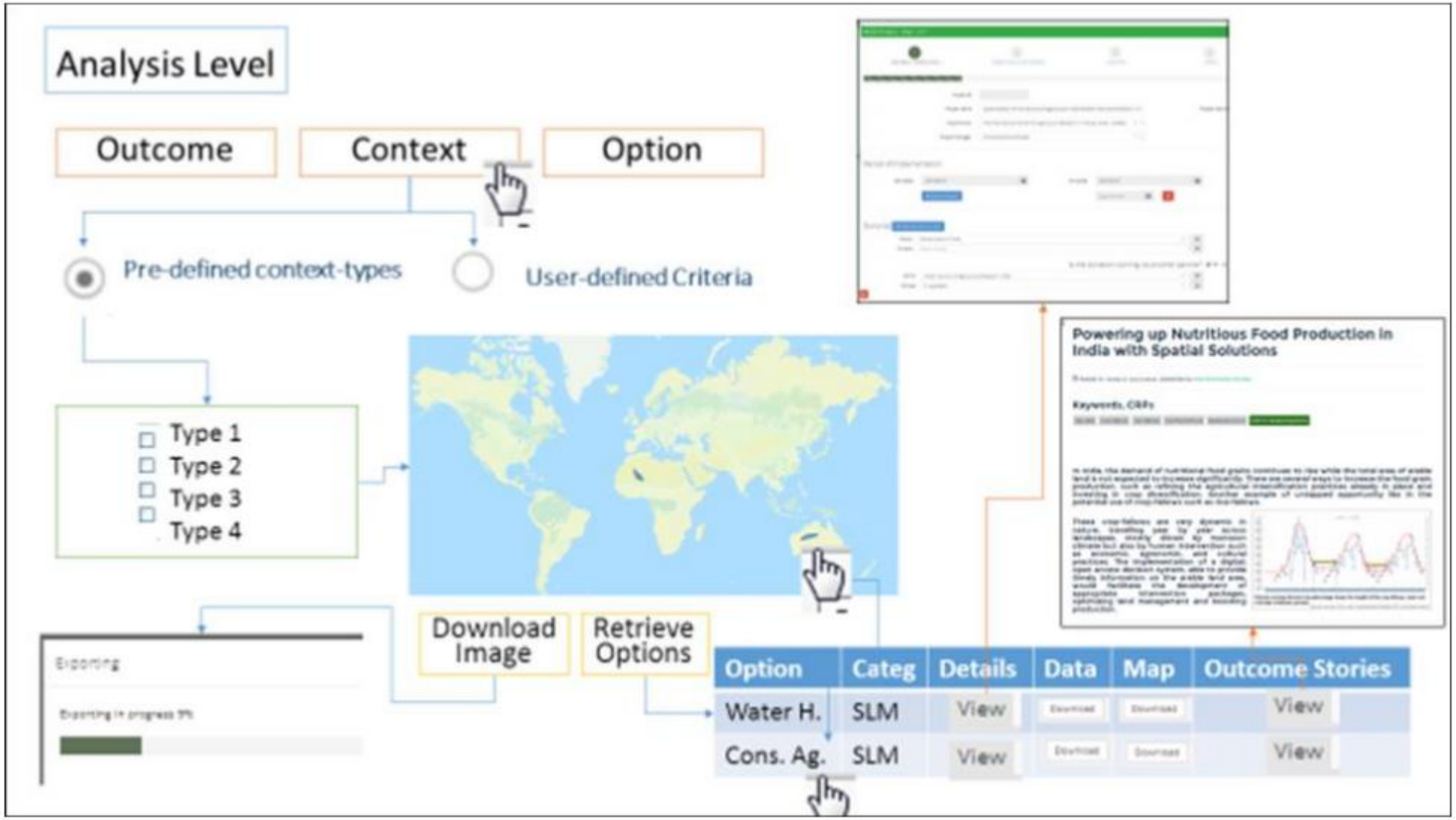
GeOC's Key Function 3 – Flexible queries



- Queries
  - ✓ User-defined criteria
  - ✓ Multiple entry points:
    . Given a context, what option works? Where?
    . Given a potential option, what context is favored? Where?
    . Given a region of interest, explore the space of available options by existing contexts
  - ✓ Both results in descriptive statistics and spatial distribution
  - ✓ Comparative views

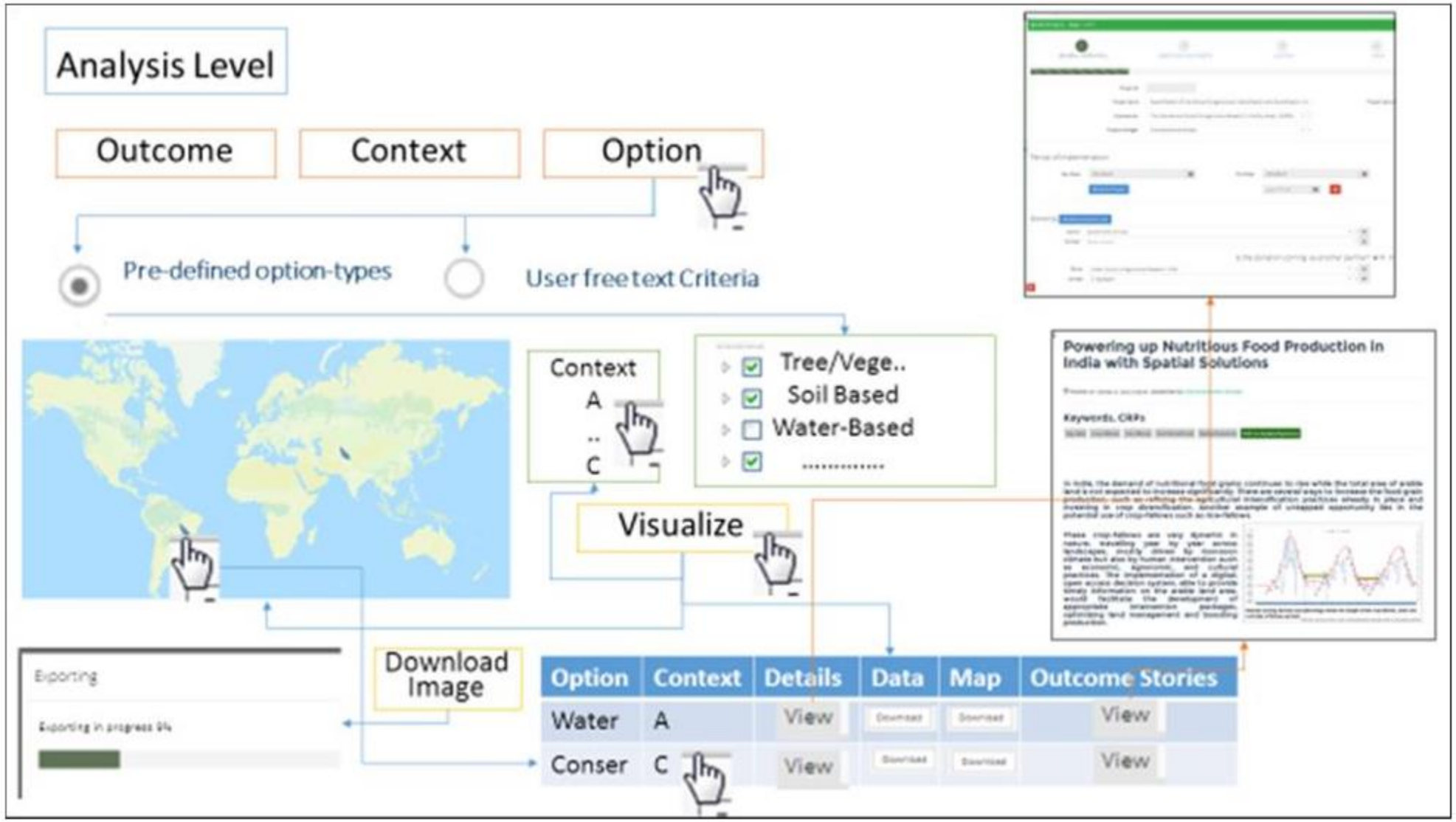
Common Use Case 1: Context-based analysis of SLM options

Given a socio-ecological context (either pre-provided by fCSET data, or defined by users' criteria), users are able to list and compare available SLM options



Common Use Case 2: Potential extrapolation domain for an option

Given a SLM option (searched by users' criteria), users are able to find map of socio-ecological context similarity that would serve as a potential extrapolation domain



Current availability and next

Current availability

- ✓ Alpha version of online GeOC and sub-tools, integrated with MEL
- ✓ Global GIS dataset
- ✓ National OxC SLM datasets: Tunisia (40+); Ethiopia, Kenya, Niger (on working)

Next

Tools:

- ➢ Improve sub-tool WebGIS to host more national GIS data
- ➢ Improve sub-tool SLM template to capture better farming system innovation options (including innovations in cropping and livestock production); session for cost-benefit assessment
- ➢ New GUI module/tab for comparative analysis across options and contexts

Data:

- ➢ Data of DryArc test cases
- ➢ National/regional GIS data in the countries/regions of DryArc test cases

Online tools and tutorial video clips

GeOC links for GeOC tools:

- WebGIS: https://mel.cgiar.org/slm/visualization (users'/testers' registration needed)
- SLM form/data: https://mel.cgiar.org/slm/ (users'/testers' registration needed)
- Approval: http://mel.cgiar.org/slm/approval (only for the tool admin)

Five tutorial video clips (Available on You Tube:

https://www.youtube.com/watch?v=NLpd9vY21CA&list=PLRIsJ0x4IVjn1NUkaWPcIVswWv5jKtEVH)

- Introduction of GeOC tool - motivation, goals, potential users (**video clip 1**)
- Introduction of the WebGIS tool- key functions (**tutorial video clip 2**)
- Use case 1: Context-based analysis: searching implemented SLM options with a defined context (**tutorial video clip 3**)
- Use case 2: Option-based analysis: searching similar context(s) given a considered SLM option (**tutorial video clip 4**)
- General introduction of the web-based SLM input form (**tutorial video clip 5**)

Thank you!