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

SLM – Sustainable Land Management

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

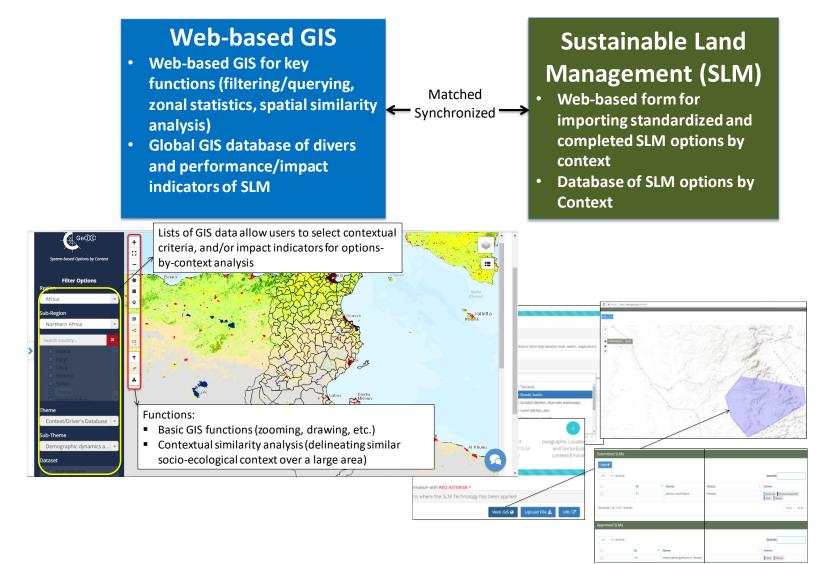To provide land users, projects/programs and policy decision-makers with a web-based tool as being:

- 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
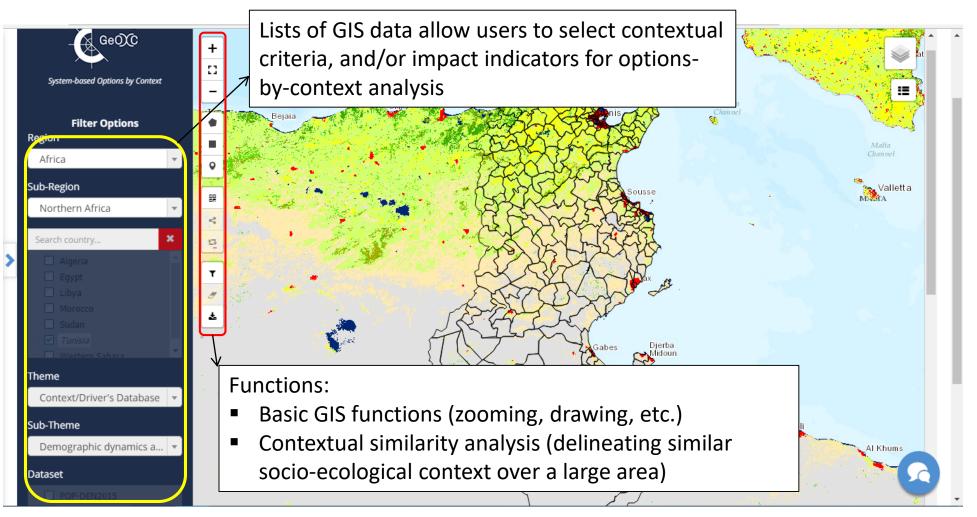
Geo-informatics Options by Context (GeOC) tool

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**

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)

The WebGIS part of GeOC tool

Graphic interface of GeOC's WebGIS and key functions

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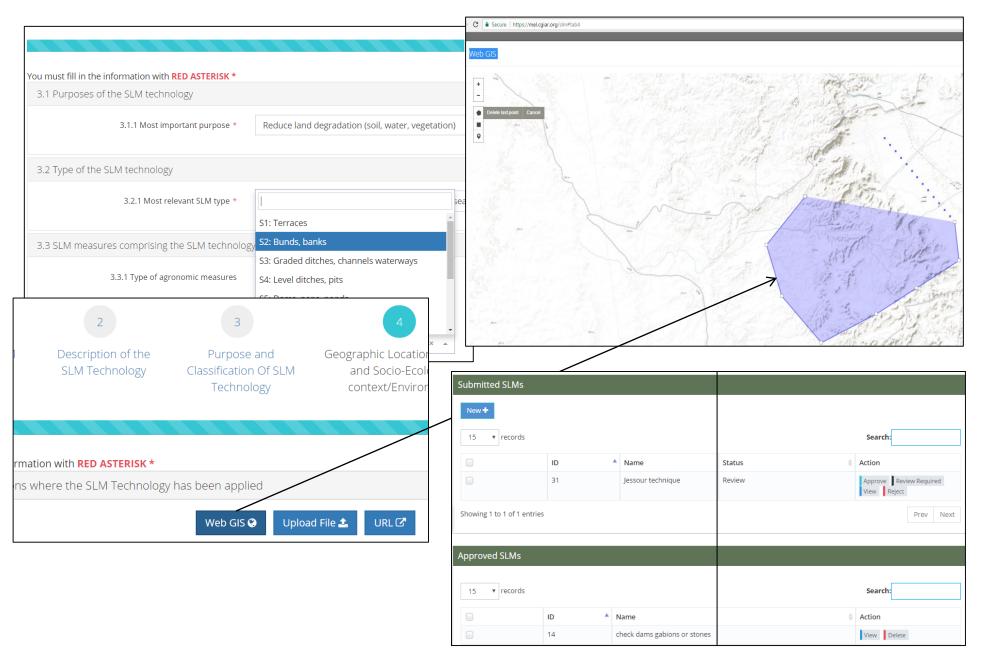
Further details in: Diwediga et al.

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)

Field of information	Your input Note: please field the lined boxes, with the use of the provided formats or information lists if you are asked in the Note column.	Note
PART 1: GENERAL INFORMATION		
1.1. Name of the SLM Technology		
1.1 Name:	Jessours rainwater harvesting in southern Tunisia	Max 70 letters includin
1.2 Locally used name:	"Jessours"	Max 70 letters includin
1.3 Country:	Tunisia	lect from the provide
	Tunisia / Turkey / Turkmenistan / Turks and Caicos Islands / Tuvalu / Uganda / Ukraine / United Arab Emirates	
1.2 Documentors and Resouces Persons/Information		
Main Documentor		
Name (first name + last name):		
Sex (M/F):		

2.3.1 Illustrative photo 1:		Insert a photo
Caption of photo 1	Technical sheme for jessour (ref: Taamalah et al., 2010, "Gestion durable de terres en Tunisie, Bonnes pratiques agricoles", p:7)	
2.3.2 Illustrative photo 2:		Insert a photo
Caption of photo 2	An overall view of an area arranged in Jessour in	

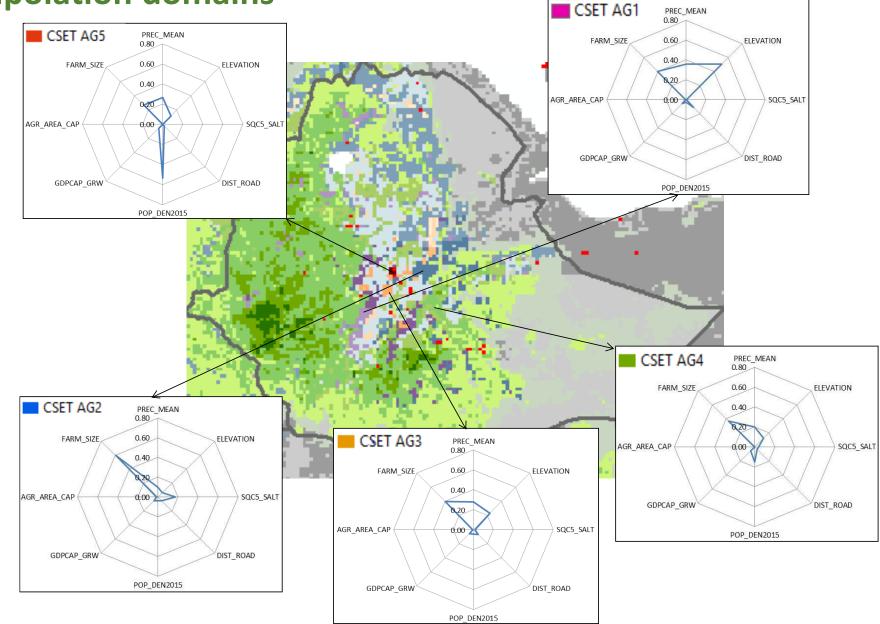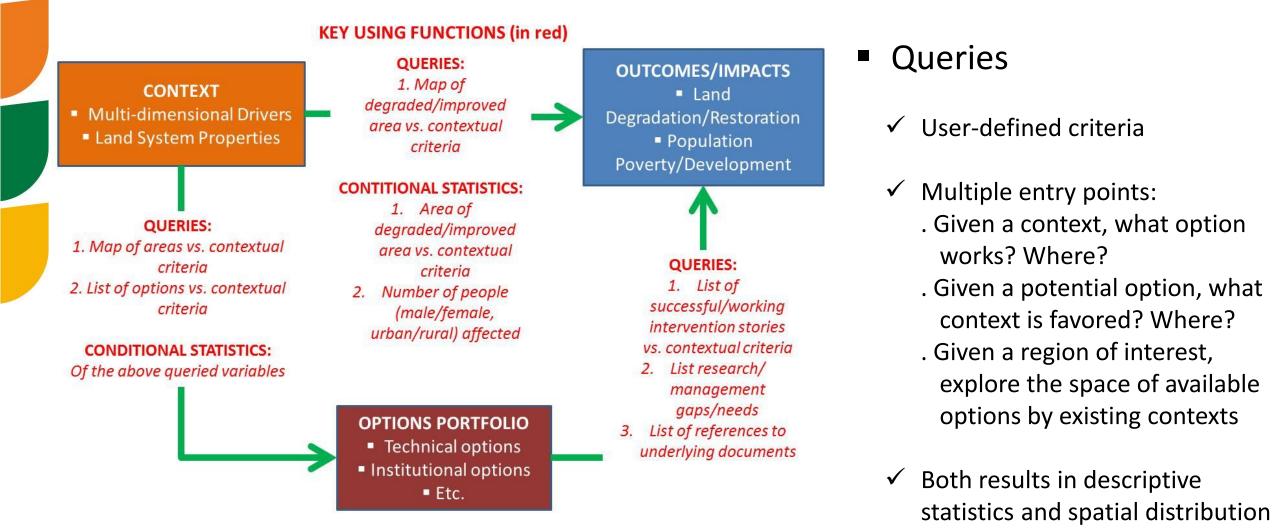| 3.1 Purposes of the SLM Technology (max. 3 most important purposes):		
3.1.1 The 1st most important purpose	Reduce land degradation (soil, water, vegetation)	ect from the provided li
If the mainpurose was selected as "Other ...", please spec	Reduce land degradation (soil, water, vegetation) / Restore/rehabilitate land degradation (soil, water, vegetation)	x 70 letters including s

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

KEY USING FUNCTIONS (in red)

CONTEXT
- Multi-dimensional Drivers
- Land System Properties

QUERIES:
1. Map of areas vs. contextual criteria
2. List of options vs. contextual criteria

CONDITIONAL STATISTICS:
Of the above queried variables

OPTIONS PORTFOLIO
- Technical options
- Institutional options
- Etc.

QUERIES:
1. Map of degraded/improved area vs. contextual criteria

CONTITIONAL STATISTICS:
1. Area of degraded/improved area vs. contextual criteria
2. Number of people (male/female, urban/rural) affected

OUTCOMES/IMPACTS
- Land Degradation/Restoration
- Population Poverty/Development

QUERIES:
1. List of successful/working intervention stories vs. contextual criteria
2. List research/ management gaps/needs
3. List of references to underlying documents

- **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
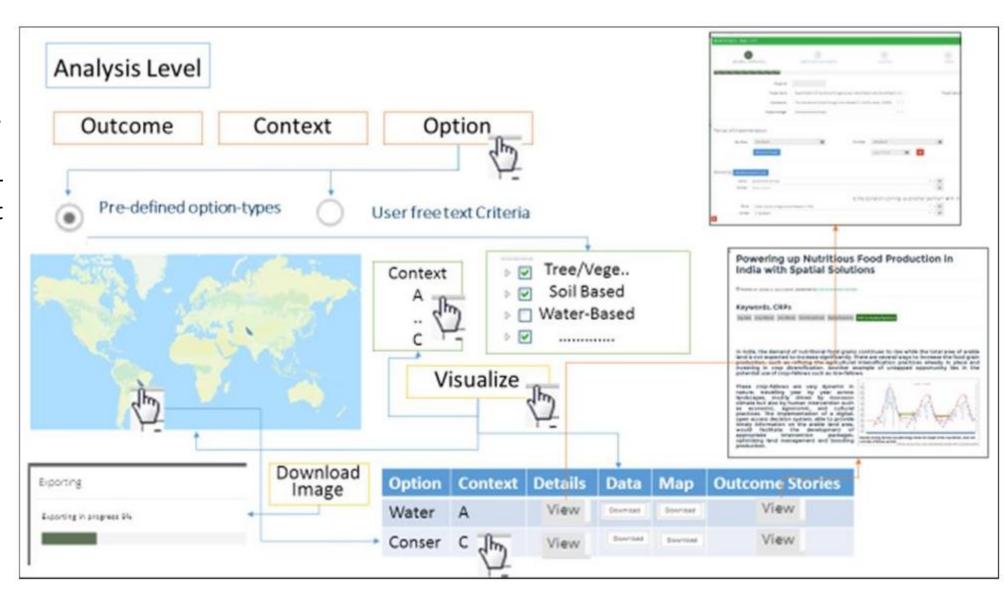 - ✓ Comparative views

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!