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

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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: Large and diverse available 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

**Sustainable Land Management (SLM)**
- Web-based form for importing standardized and completed SLM options by context
- Database of SLM options by context

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

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)
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](https://mel.cgiar.org/slm/visualization) (users’/testers’ registration needed)
- SLM form/data:  [https://mel.cgiar.org/slm/](https://mel.cgiar.org/slm/) (users’/testers’ registration needed)
- Approval:  [http://mel.cgiar.org/slm/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](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!