Overview of project results

Final Workshop "Sustainable Land Management to Achieve Land Degradation Neutrality: Options-by-Context Approach and Tools"

24 October 2017 2017

Tunis, Tunisia

Quang Bao Le, Richard Thomas, Enrico Bonaiuti, Claudio Zucca, Chandra Biradar, Fajr Fradi (ICARDA)

Badabate Diwediga, Jim Jaspe, Bashar Ayyash (iMMAP)

Moayad Nadjadwi, Mahdi Hamdan (CodeObia)

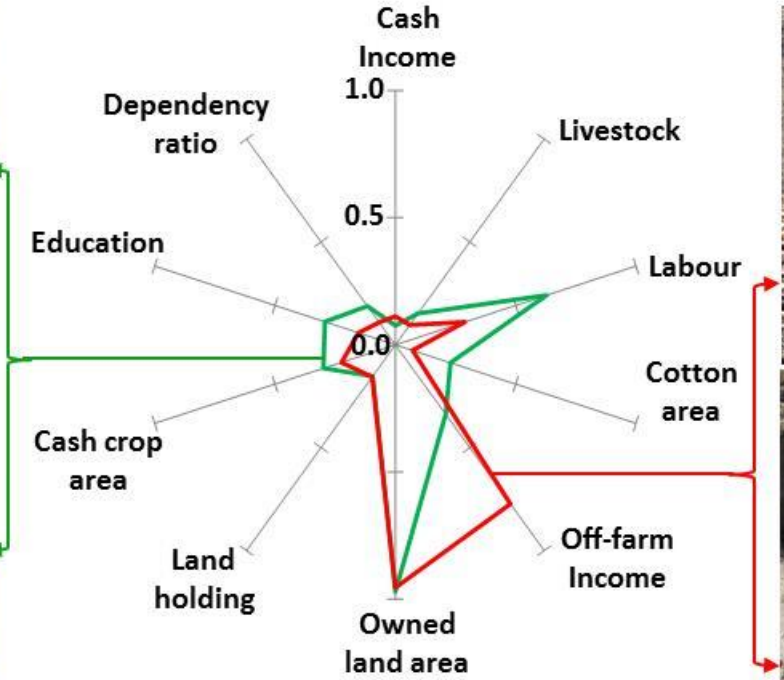
CGIAR RESEARCH PROGRAM ON Dryland Systems

ICARDA Science for Better Livelihoods in Dry Areas

Rationale

- Sustainable Land Management (SLM) options are fitted to the social, economic and ecological contexts.
  - Example: Reuse crop-livestock residues by compost in Southwestern Burkina Faso

Nutrient management practices by a farm-based, labour-endowed and educated household



Livelihood characteristics

Nutrient management practices by an off-farm oriented household

Source: Thiombiano, Le (2016)

Problems

- High contextual diversity of drylands *vs.* “uniform blanket” approach in promoting SLM over large scales

- Lack of tools supporting comparative analyses/assessments of SLM options by context, thereby informing upscaling efforts

ICARDA
Science for Better Livelihoods in Dry Areas

Aim

To provide land users, projects/programmes 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 different disciplinary projects into integrative/holistic and converging actions for promoting SLM at scale.

ICARDA
Science for Better Livelihoods in Dry Areas

GeOC's Development Stages

Geo-informatic Options-by-Context (GeOC) - A framework AND tools for defining, monitoring, assessing and co-learning SLM options fitted to the social-ecological contexts

2016: Funded by CRP Dryland Systems (CRP 1.1)

- Conceptualization of GeOC approach, framework, functions and components
- Design of GeOC tools: Off-line SLM form (Excel), WebGIS and online SLM form (initiated)

2017: Funded by GIZ/BMZ small grant (this project)

- Building the first version of WebGIS and online SLM form, all inter-linked
- Database of SLM options-by-context in two selected governorates in Tunisia (Zaghouan & Medenine) for GeOC
- GIS database for GeOC
- Case studies in Tunisia

ICARDA
Science for Better Livelihoods in Dry Areas

GeOC's option-by-context approach: A system-base view

Context (C) x **Structure & Function (SF)** x **Options ($O_{C,SF}$)** = **Performance (P)**

1. Manageable driving factors (**EXTERNAL CAUSES**) as interventional options

2. Underlying social, development, biophysical aspects acting as **BOUNDARY CONDITIONS,** not necessarily as CAUSES)

Manageable structural, functional factors (not all) as options → **SYSTEM ENGINEERING**

SLM strategies:

1. Changeable factors from external context (O_C), e.g.
- Smart subsidy policy
- Improved market access
- Developed, inclusive value chains
- Effective partnerships

2. Alternative farm design/planning/practices (O_{SF}), e.g.
- Improved varieties
- Efficient use of inputs
- Farm design for subsidiary links

3. All in coping with the Context (C)

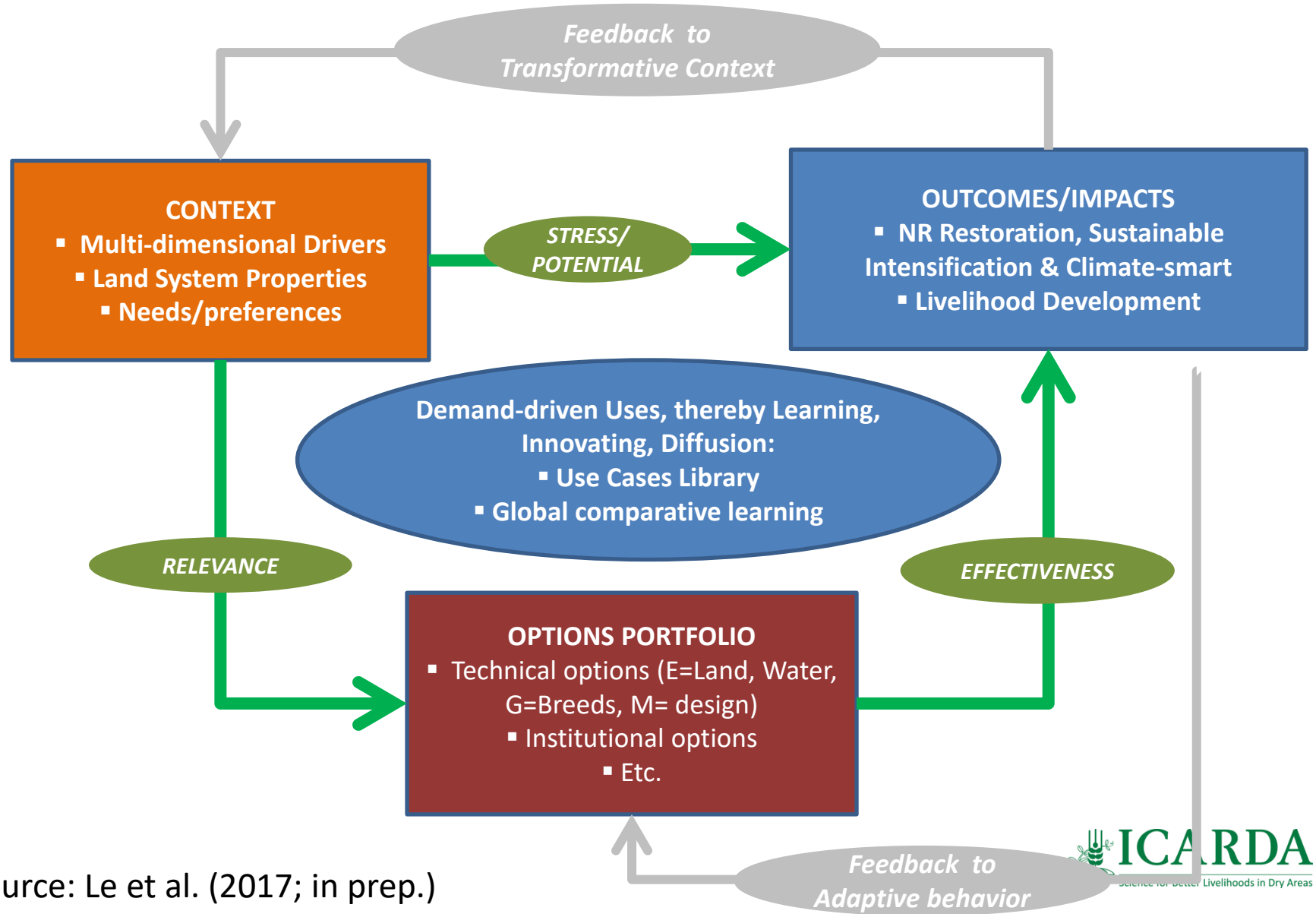
SLM outcomes:
1. Total productivity persistently improved
2. Resource use efficiency
3. System capital build
4. Social equity

Secondary feedback (rebound effect)

Source: Le et al. (2017; in prep.)

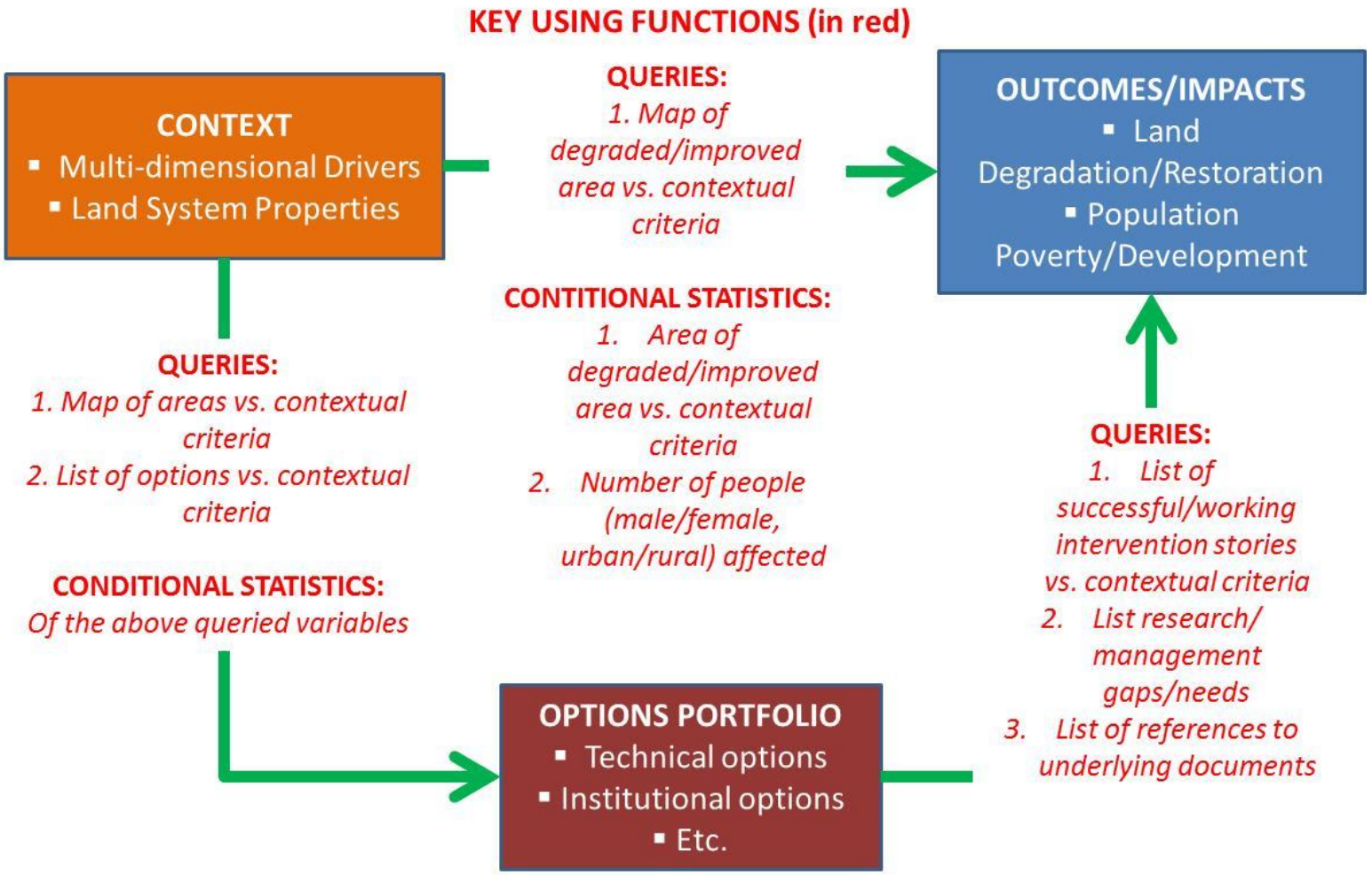
ICARDA
Science for Better Livelihoods in Dry Areas

GeOC's Conceptual Framework



Source: Le et al. (2017; in prep.)

GeOC's Key Functions



ICARDA
Science for Better Livelihoods in Dry Areas

Main components of GeOC tool

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)

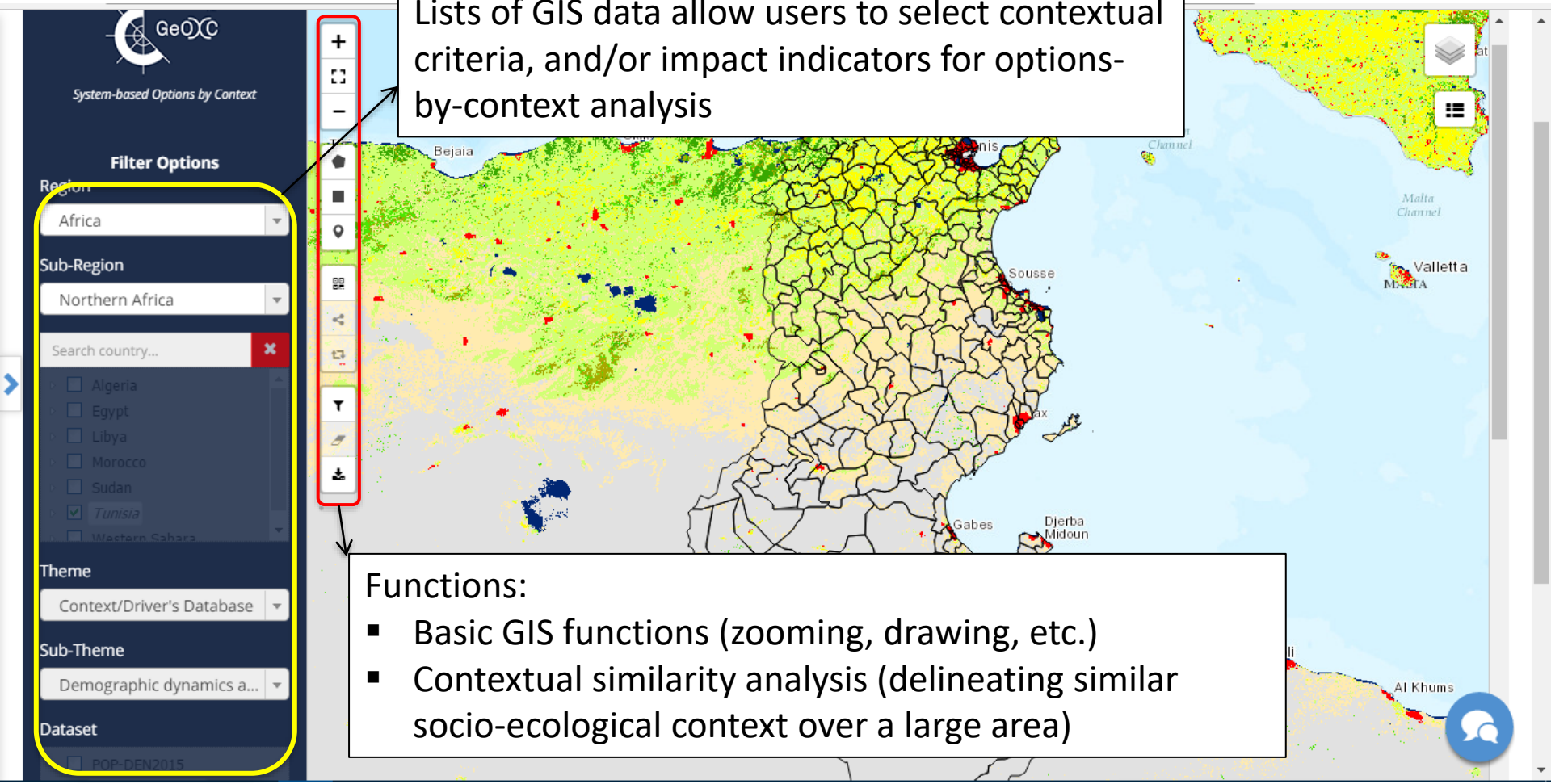
- Web-based form* for importing standardized and completed SLM options by context
- Database of SLM options by Context

Note: red asteric * refers to complementaty aspects compared to WOCAT

ICARDA
Science for Better Livelihoods in Dry Areas

The WebGIS part of GeOC tool

Graphic interface of GeOC's WebGIS and key functions



[Details in a later presentation – Diwediga et al.]

ICARDA
Science for Better Livelihoods in Dry Areas

Off-line SLM form

Template for Standardized Description of Sustainable Land Management (SLM) Technologies with a Focus on Field-Landscape Level

Created by Quang Bao Le, Program Management Unit (PMU), CGIAR Research Program on Dryland System; Claudio Zucca, ICARDA

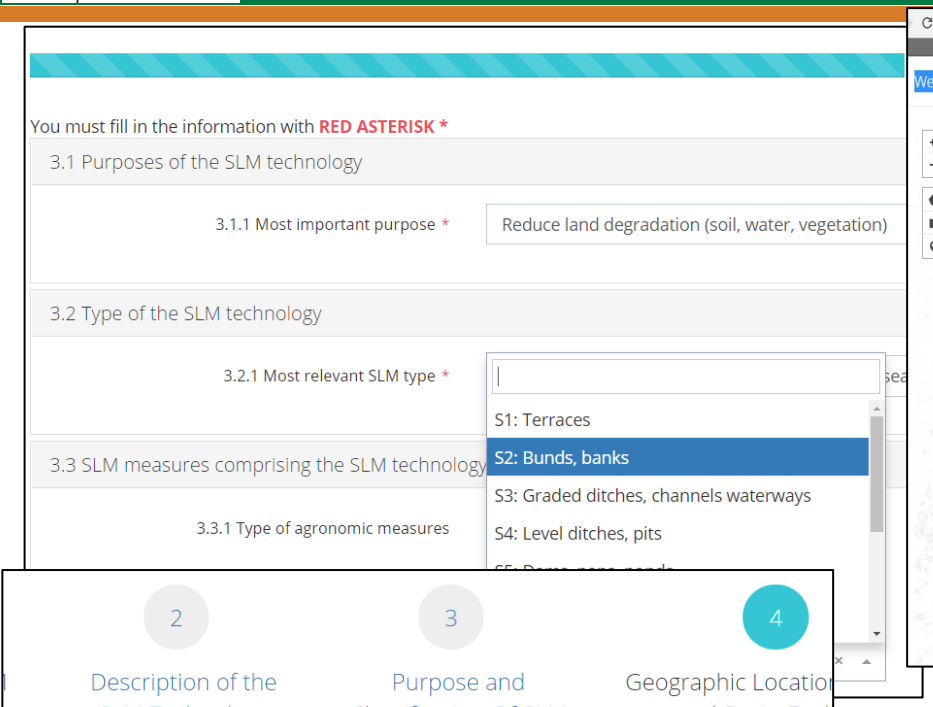
Note: This CRP-DS template of SLM technology description is partly adapted from those of WOCAT, however with major modifications and additions. Though CRP-DS is still development this template until August 2016, it can be used for catalouging SLM technologies considered by current CRP-DS projects.

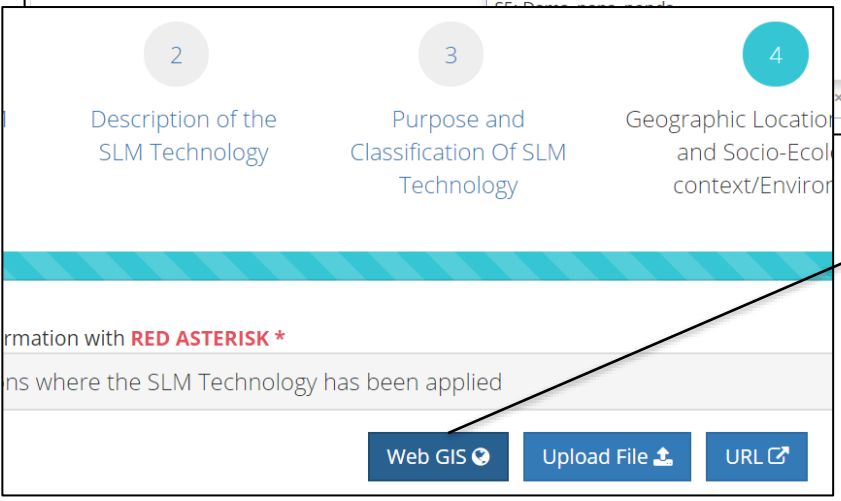
Field of information	Your input Note: please field the lined boxes, with the use of the provided formats or information lists if you are asked in the Note column.	Note
PART 1: GENERAL INFORMATION		
1.1. Name of the SLM Technology		
1.1 Name:	Jessours rainwater harvesting in southern Tunisia	Max 70 letters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

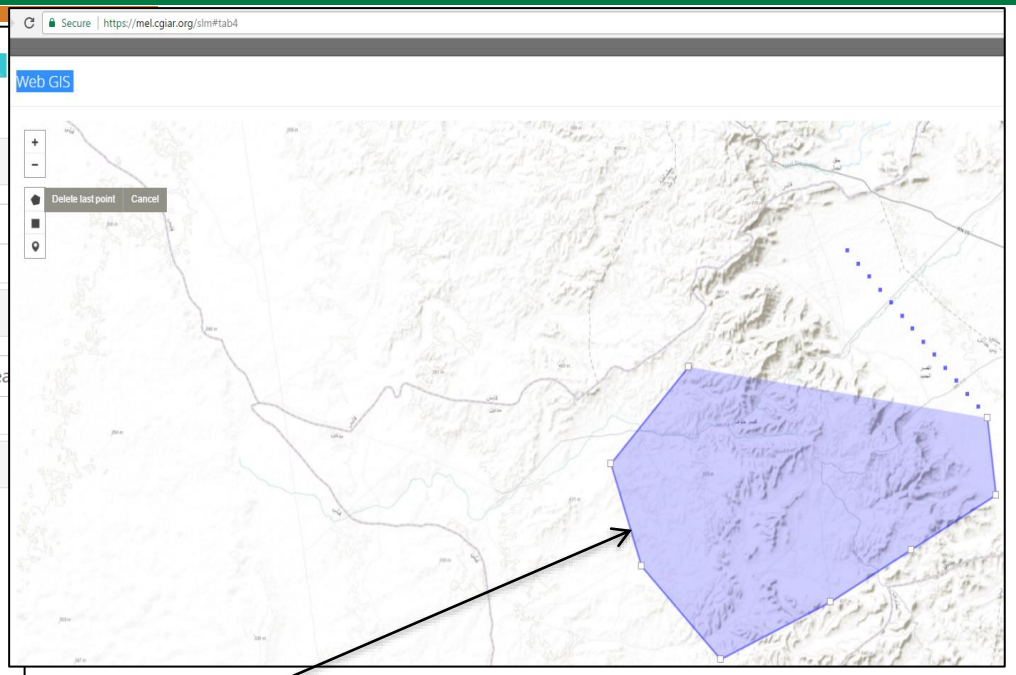
Tunisia
Turkey
Turkmenistan
Turks and Caicos Islands
Tuvalu
Uganda
Ukraine
United Arab Emirates

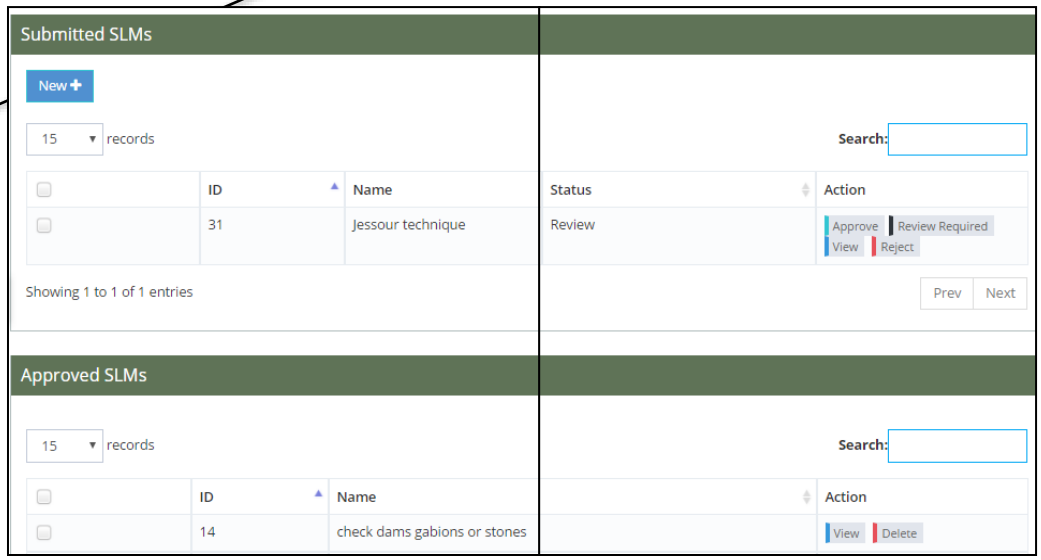
2.3.1 Illustrative photo 1:		Insert a photo
Caption of photo 1	Technical sheme for jessour (ref: Taamalah et al., 2010, "Gestion durable de terres en Tunisie, Bonnes pratiques agricoles", p:7)	
2.3.2 Illustrative photo 2:		Insert a photo

Web-based SLM interfaces









[Details in a later presentation – Fadi et al.]

The SLM part of the GeOC

Main features

- Data entry forms both off-line Excel and web-based form* for standardized description of SLM (adapted from with from WOCAT)
- Multi-variate* database rather than static factsheet
- Synchronized with the GIS database and tool (WebGIS) to retrieve - hence relate with - contextual and impact variables at larger scale*
- Peer-reviewed process for submitted SLM (handled as paper submission to journals)

Added values

- Relatively match with WOCAT questionnaire; allow either on- or off-line inputs
- Allow user-defined queries in response to SLM's attributes selected (e.g. type, environmental and socio-economic characteristics)
- Allow spatially explicit analysis/assessment
- Better quality management

Note: red asterisk * refers to complementary aspects compared to WOCAT

ICARDA
Science for Better Livelihoods in Dry Areas

Online tools and tutorial video clips

GeOC links for GeOC tools:

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

Five tutorial video clips:

- 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**)

Available on You Tube:

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

ICARDA
Science for Better Livelihoods in Dry Areas

GIS Database

- Compiles common intermediate and underlying drivers/causes of land use/management practices:
  Biophysical, demographic, economic, resource governance/institutional factors (26 GIS layers: 10 newly calculated; 16 extracted/downscaled from global datasets)

- Includes key indicators for performances and impacts of land management practices:
  Trend of biomass productivity, rain use efficiency, land productivity gap, affected/benefited population (7 GIS layers: 5 newly calculated, 2 extracted/downscaled from global datasets)

- These data are:
  - Embedded in the WebGIS tool for performing its functions
  - Available as individual GIS data for SLM-related studies (e.g. soil erosion assessment, SLM adoption analysis, SLM's impact assessment)

Details in a later presentation – Le et al.

ICARDA
Science for Better Livelihoods in Dry Areas

SLM Data

SLM Options-by-Context (SLM OxC) database:

Zaghouan		Medenine		Total database	
SLM types	SLM OxC	SLM types	SLM OxC	SLM types	SLM OxC
11	22	18	29	29	**51**

Each SLM OxC includes:

- Characteristics of SLM technology, socio-economic and biophysical context/environment (Excel sheet and on-line form)
- Connected GIS vector/shape file of the SLM implementing sites (detailed polygons rather than a point as in WOCAT)

Details in later presentations – Diwediga et al.; Hermassi et al.; Ouessar et al.

ICARDA
Science for Better Livelihoods in Dry Areas

Case study

- GIS-based assessment of SLM options on net primary productivity (NPP) and rain use efficiency across geographic contexts
- Visualizing areas of contextual similarities to support SLM out-scaling

Details in a later presentation – Le et al.

- Multi-temporal and multi-scale assessment of landscape pattern dynamics in Tunisia

Details in a later presentation – Le et al.

Some remarks and/or lessons learned

- Objectives expected seems higher than the funding and timing availabilities of project (compared to other projects of similar type)
  - It would have been easier for the team if there were more fund and time.
  - What has been produced means a over-expected efforts made by the project team, with a lots of in-kind contributions from ICARDA team and partners

- The effective teaming of SLM scientists and software developers demands consideration time and fund

ICARDA
Science for Better Livelihoods in Dry Areas