Introduction to
the new WOCAT website

Renate Fleiner / 18 WNM / 15 June 2017

The new WOCAT website

- A **gateway to WOCAT's global platform for knowledge management and decision support in SLM**
- User-friendly and to the latest state of the art
- For **improved visibility** of WOCAT network, its members and Consortium Partners
  - national and regional WOCAT partners can create their own subsite
  - individual project and country pages can be created
- Integrates: **new global SLM database, Decision Support SLM Knowledge Management Platform** and **WOCATpedia**
- Link of WOCAT website and WOCATpedia offer **one platform for discussion and active knowledge exchange**
- Available in English, in future also in French and Spanish

WOCAT and SLM **information and knowledge**

- Learn more about WOCAT (About)
- Understand importance of SLM (WOCAT & SLM)
- Find practices in specific context and share own practices (Global SLM database)
- Get guidance for decision making in SLM (Decision Support for SLM)
- Get to know or share about projects in specific country or region (Projects & Countries)
- Access WOCAT books, documents and videos (Media library)
- Get updated on latest WOCAT developments (News & Events)

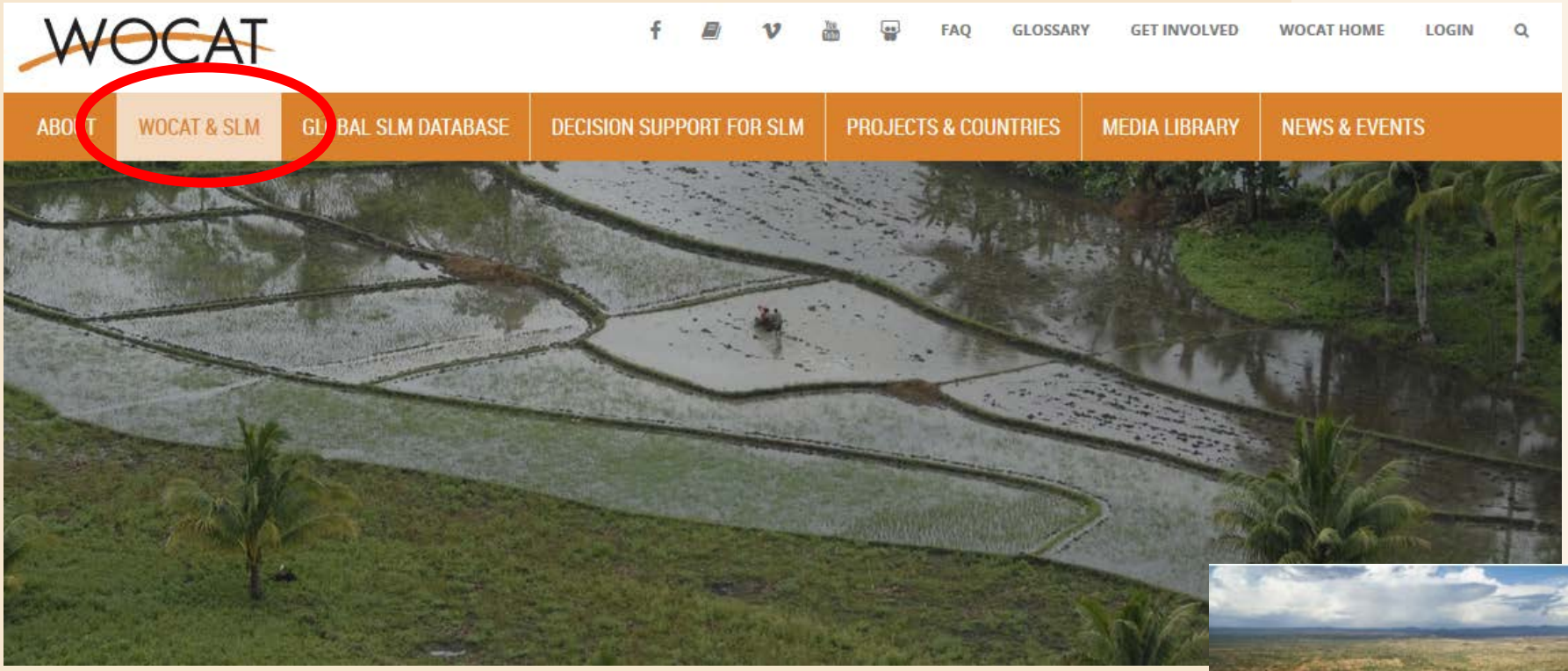
Homepage

- Discover WOCAT: Are you new and want to find out what WOCAT is…?
- Global Issues and SLM
- News
- Introduction and link to Global SLM database
- WOCAT knowledge products and tools
- WOCATpedia -> to share and exchange
- Projects and Countries -> to share and explore

About

- What WOCAT is about and what we do
- The WOCAT strategy
- The WOCAT network and how it is organized

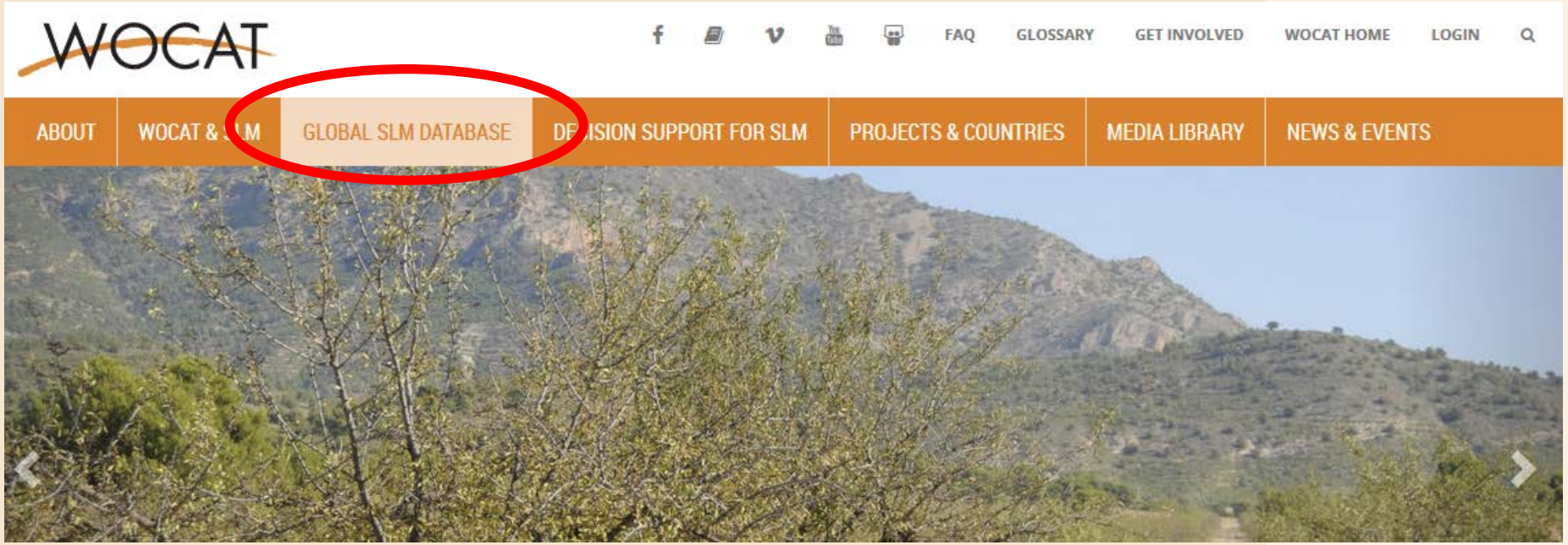
WOCAT & SLM



Understand the importance of SLM

- How SLM is defined by WOCAT
- How WOCAT deals with local and global concerns and links it to SDGs

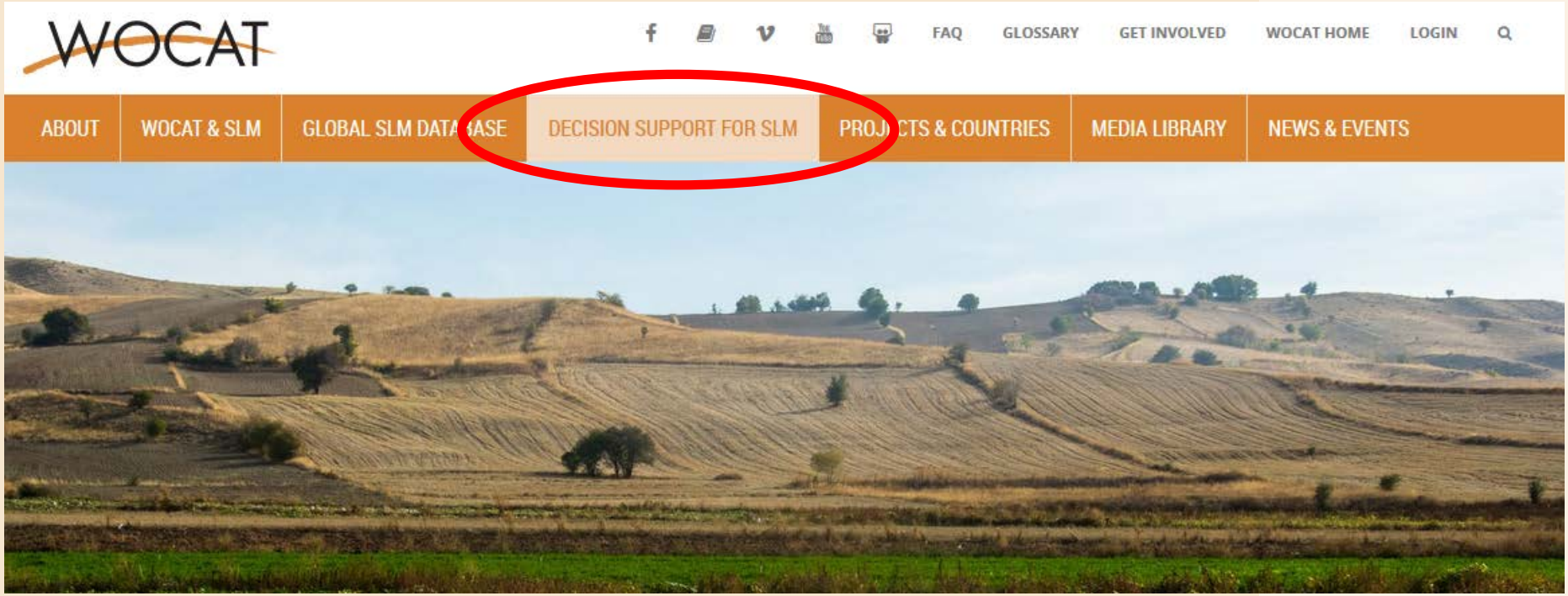
Global SLM database



Find practices in a specific context and share own practices

- Global SLM database
- SLM practices: technologies and approaches
- WOCAT questionnaires
- WOCAT modules
- Land management mapping tools

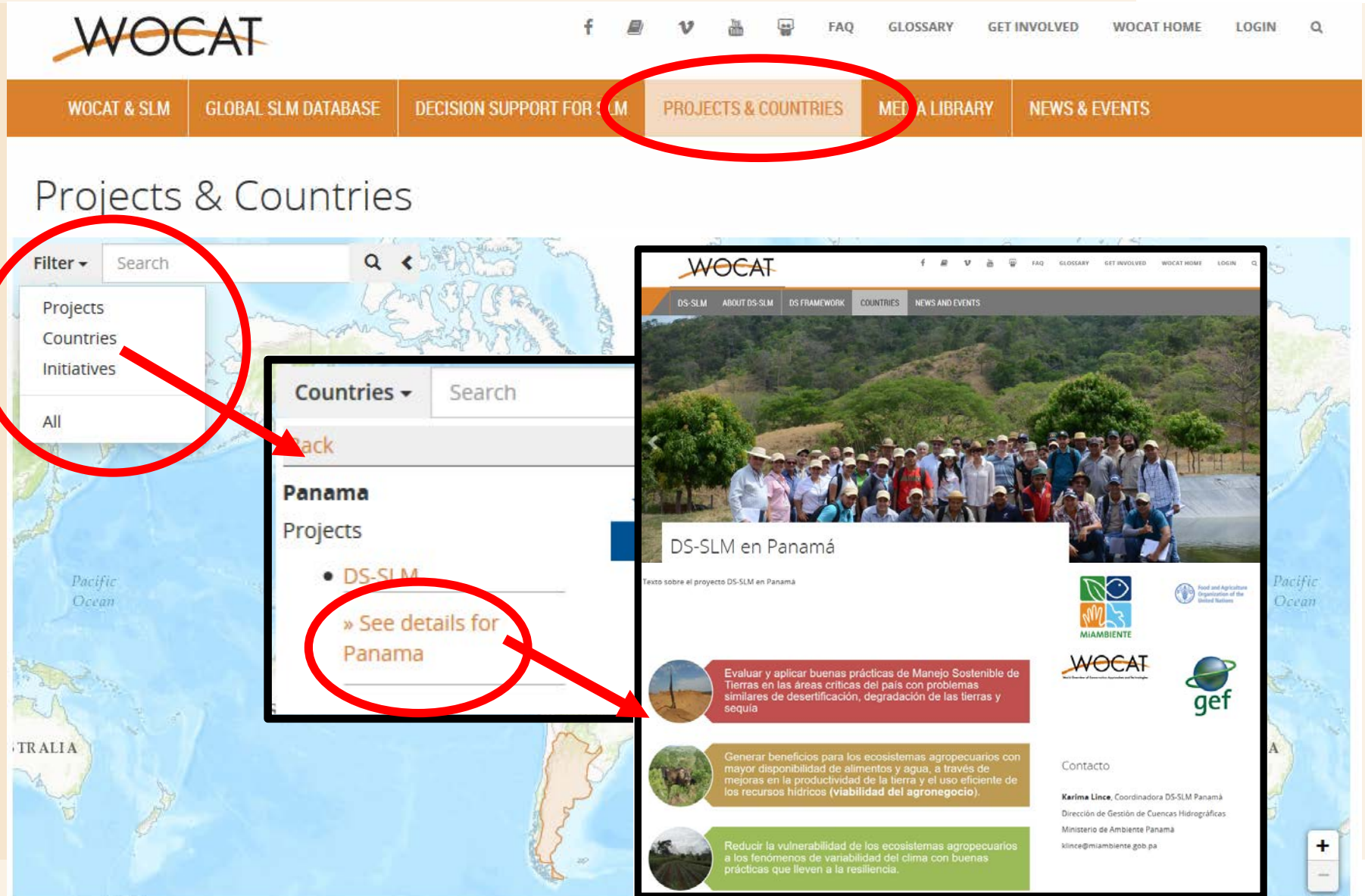
Decision Support for SLM



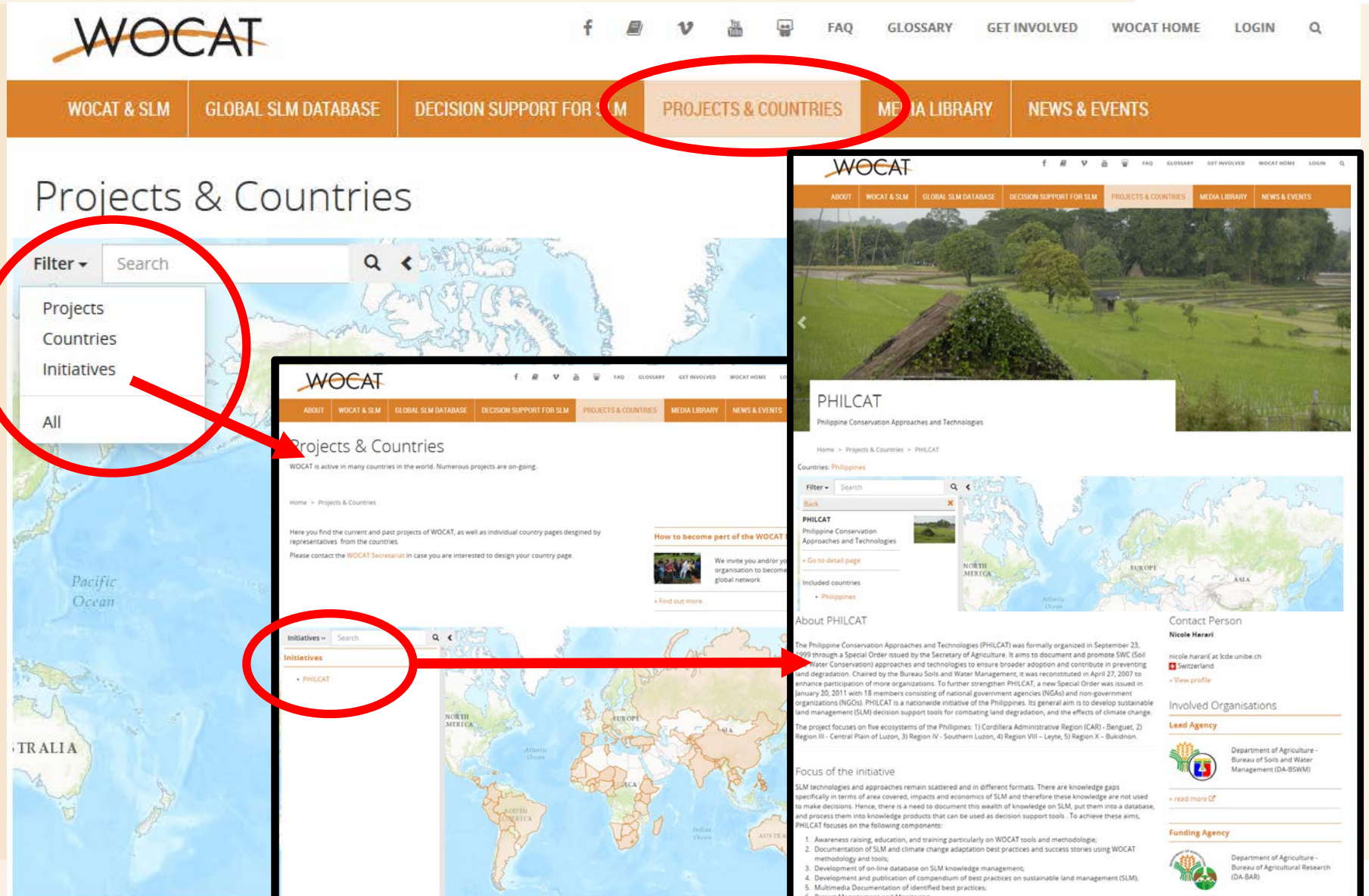
Get guidance for decision making in SLM

- WOCAT DS-Framework: DSF in the DS-SLM Project
- Extended DS-Modules

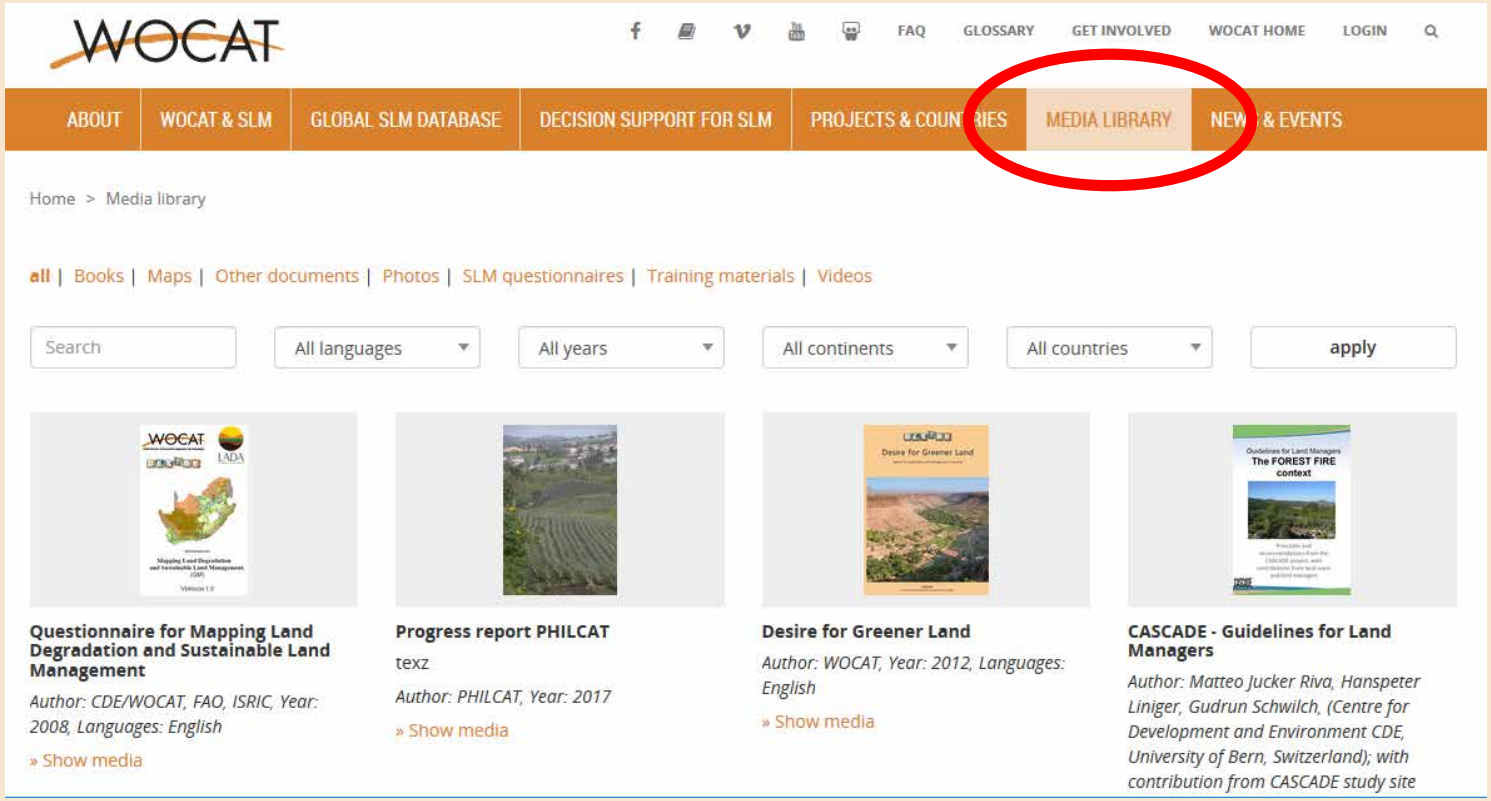
Projects & Countries



Projects & Countries



Media library



Access WOCAT books, documents and videos

News & Events

Get updated on the latest developments in WOCAT

Outlook

- Finalize content and fix technical bugs
- Launch WOCAT website in 2017
- Explore possible synergies and linkages with other knowledge platforms
- Make content available also in French and Spanish
- Further develop some technical aspects (additional funding?)

→ We welcome your inputs and comments

WOCAT

World Overview of Conservation Approaches and Technologies

The Global WOCAT SLM Database

Renate Fleiner / 18 WNM / 15 June 2017, Cali

New Global SLM Database
a key platform on SLM knowledge

- provides free access to documentation of field-tested SLM data worldwide: SLM practices and maps
- offers practitioners opportunity to share their own SLM practice or map

-> facilitates sharing and dissemination of valuable knowledge on land management, to support evidence-based decision-making and scaling up identified good practices

-> thereby contributes to preventing and reducing land degradation and to restoring degraded land

New Global SLM Database

What it offers

- SLM documentation in **one global database**
- **Officially recognized by UNCCD** as the primary recommended database
- **Search and add SLM data** in standardized format
- Database available in **English, Spanish, French, Russian, Khmer and Lao**
- Database with **interface for external applications to access and link to data**
- Up-to-date **key numbers**

New Global SLM Database

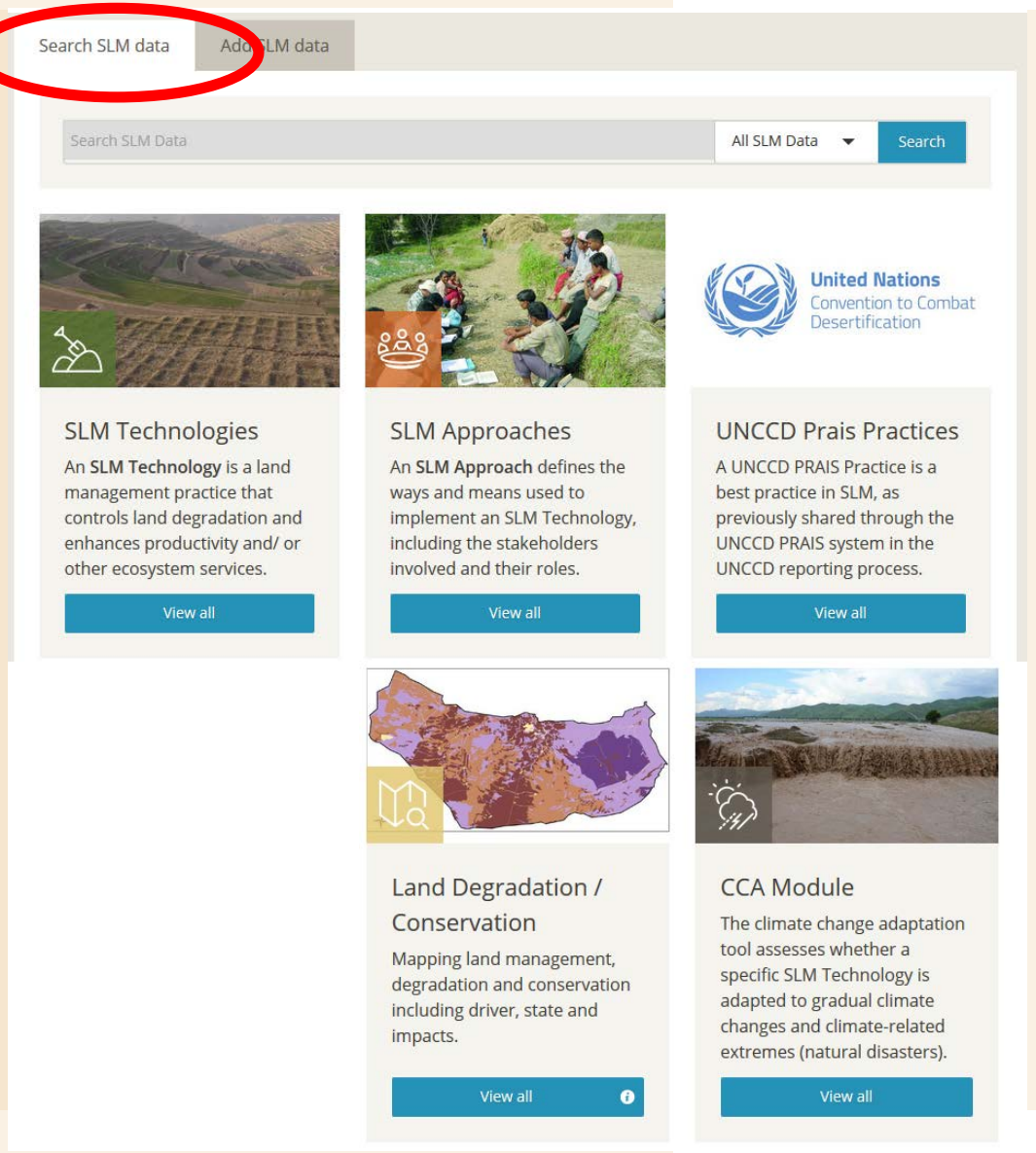
Achievements since launch in 08/2016

- SLM documentation in one global database recognized as asset to partners and projects
- Global SLM Database is used in a number of projects: DRR project, FAO GEF DS-SLM project, IFAD project

New Global SLM Database

Search SLM Data

- SLM Technologies
- SLM Approaches
- UNCCD PRAIS Practices
- Land Degradation/Conservation (in old database)
- Climate Change Adaptation



New Global SLM Database

Search filter - *current*

Filter by: Country, Project, Text

Filter for: SLM Technologies, SLM Approaches, UNCCD PRAIS Practices

New Global SLM Database

Improved search filter – *in development*

WOCAT international

WOCAT SLM DATABASE

Home | Search SLM Data | Add SLM data | My SLM Data | Login | English

SLM Data Type: SLM Technologies

Country: Tajikistan

Project: Select or type a project name

Search Terms: Search SLM Data

+ Add Filter — Add an additional filter criterion

Search

e.g. agroclimatic zone, landuse
land degradation type, etc.

Country: Tajikistan | Reset all

Note: The migration of the data from the old WOCAT database is in process!

Only data declared as public are visible.

Your search results (74)

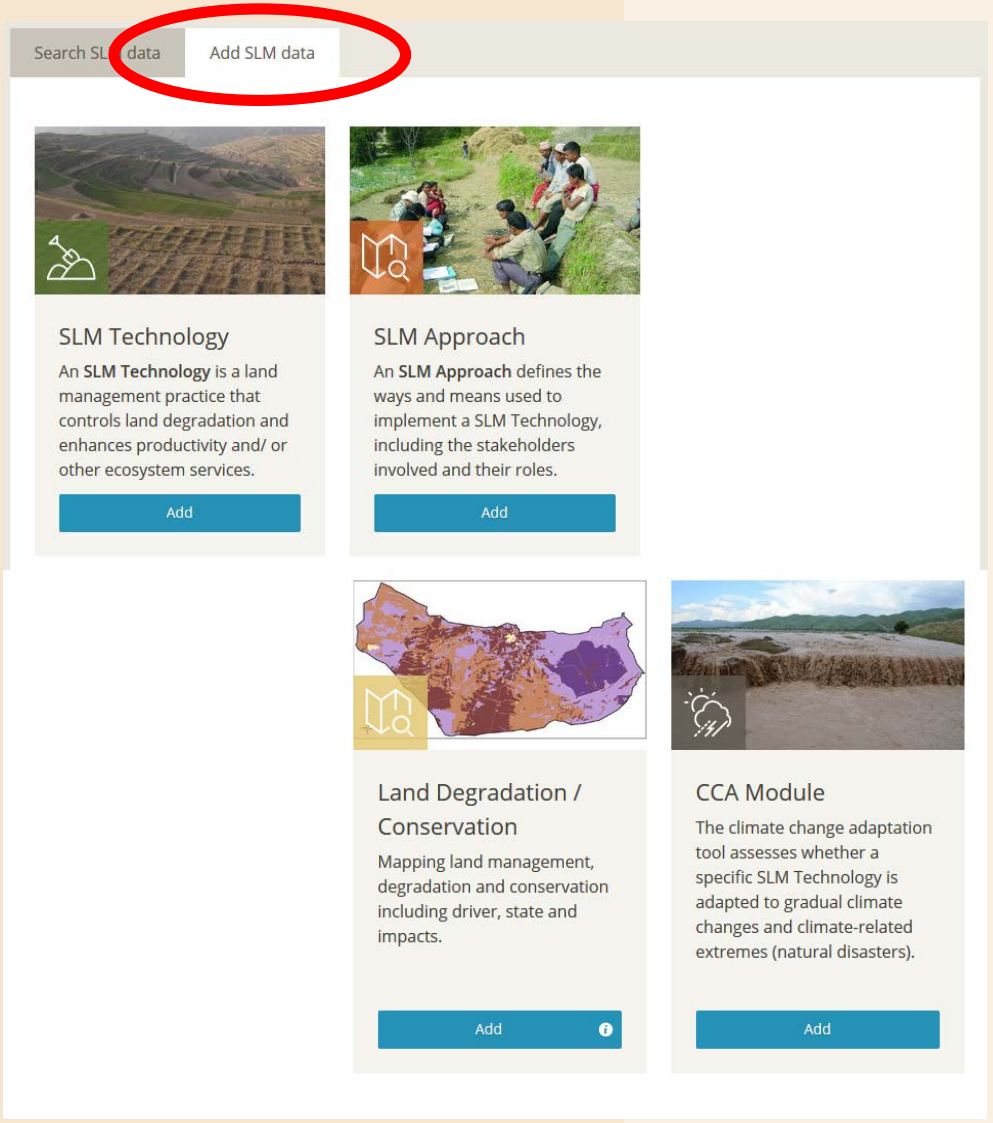
Gradual development of bench terraces from contour ditches [Tajikistan]

Use of the SLM technology facilitates the development of bench terraces from contour channels by gradually removing soil material up the slope for an estimated 5 years until the terraces on the slope reach a desired width of 1.2 m.

New Global SLM Database

Add SLM Data

- through web-based standardized questionnaire for:
  - SLM Technology
  - SLM Approach
  - Climate Change Adaptation Module (based on existing SLM Technology)
- on Land Degradation/Conservation (in old database)



Add SLM Data

Data entry and review process

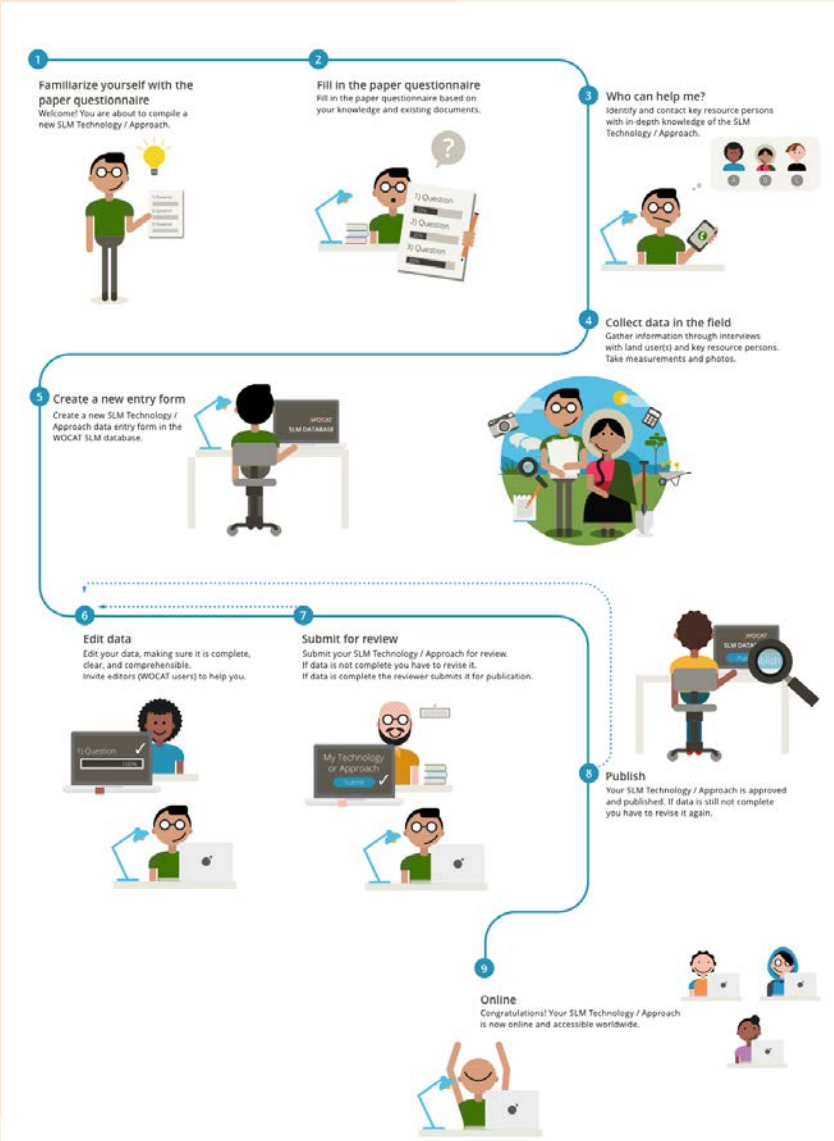
1. Get to know the questions
2. Collect the data
3. Enter the data online into the database
4. Submit data for review

   …

5. Further revise if requested

   …

6. Until approved by WOCAT Secretariat for publishing

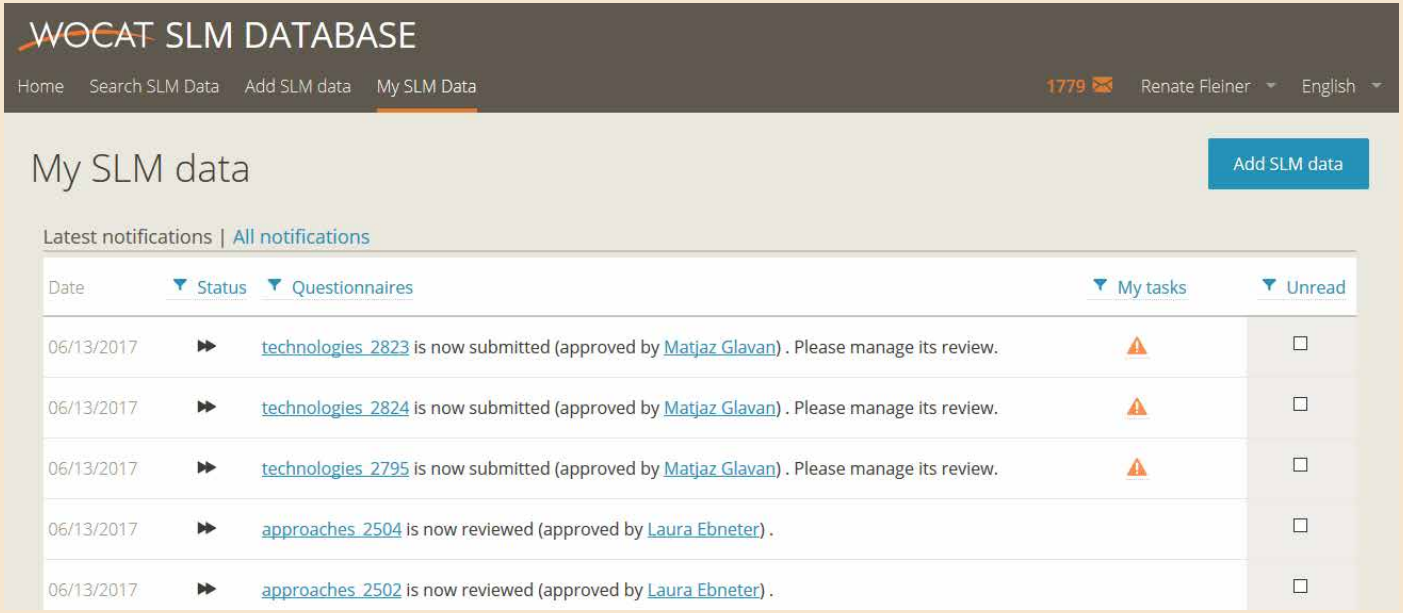


My SLM Data

Manage own SLM data

My SLM Data

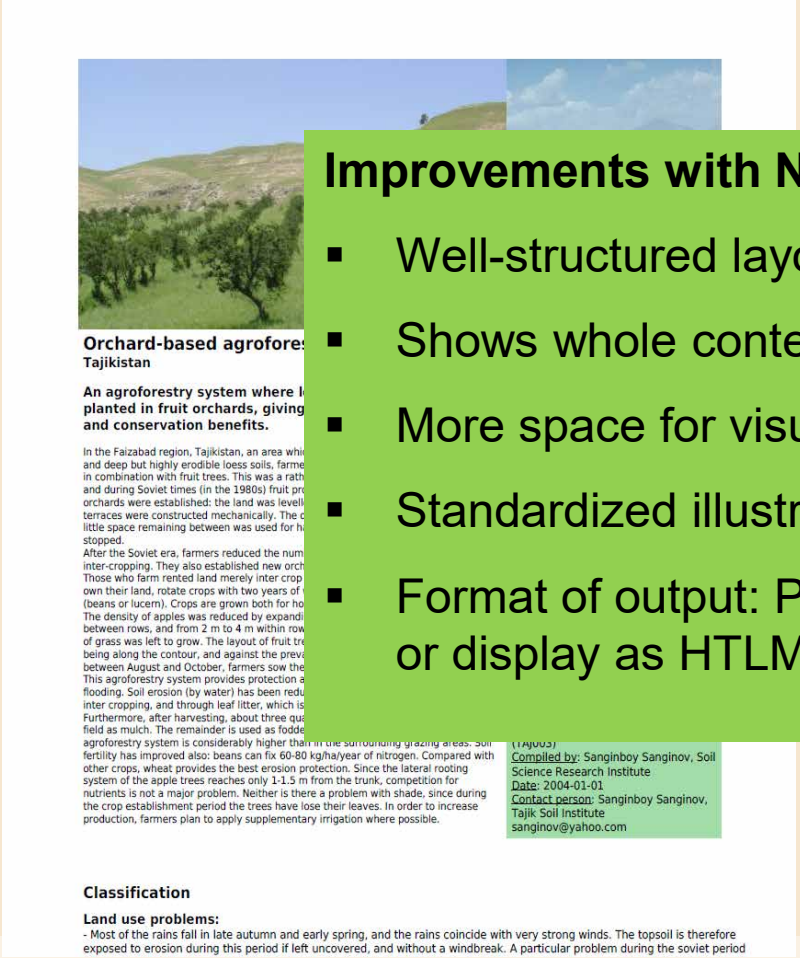
- check the status of own SLM data -> draft, submitted, reviewed, published (notifications)
- access/edit/revise own SLM data



SLM Data output

New Summary for Technologies and Approaches

Automatic summary from Old WOCAT database:



Orchard-based agrofores
Tajikistan

An agroforestry system where l
planted in fruit orchards, giving
and conservation benefits.

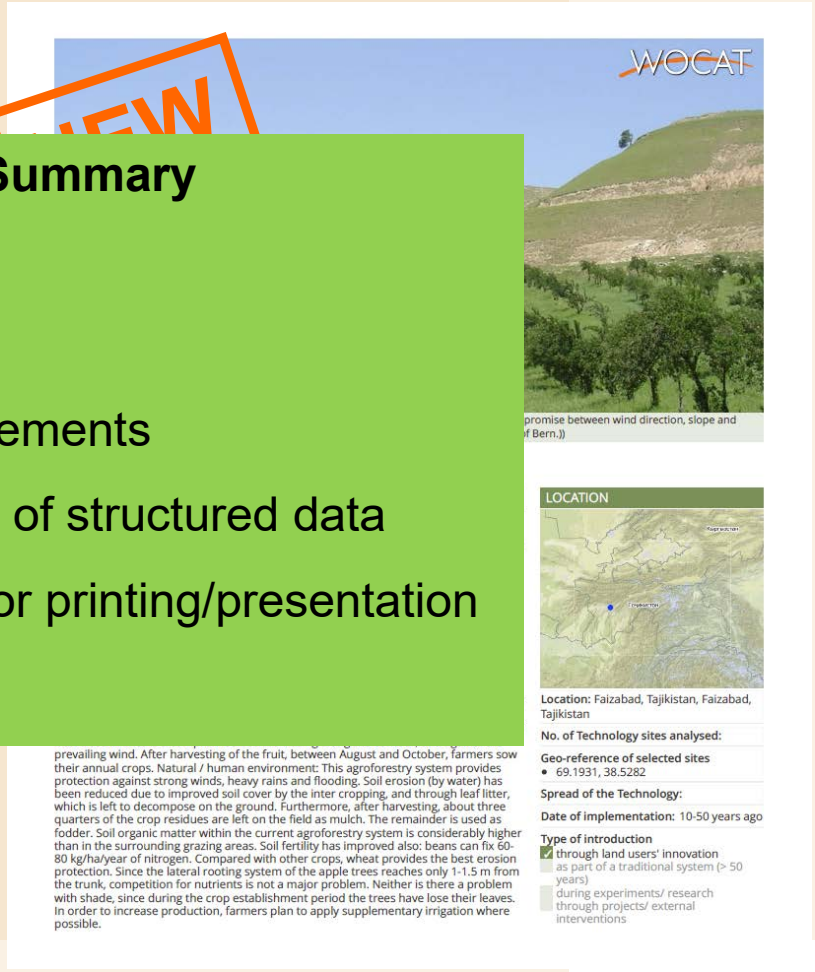
In the Faizabad region, Tajikistan, an area whi
and deep but highly erodible loess soils, farme
in combination with fruit trees. This was a rath
and during Soviet times (in the 1980s) fruit pr
orchards were established: the land was levell
terraces were constructed mechanically. The c
little space remaining between was used for h
stopped.
After the Soviet era, farmers reduced the num
inter-cropping. They also established new orch
Those who farm rented land merely inter crop
own their land, rotate crops with two years of
(beans or lucern). Crops are grown both for ho
The density of apples was reduced by expandi
between rows, and from 2 m to 4 m within row
of grass was left to grow. The layout of fruit tr
being along the contour, and against the preva
between August and October, farmers sow the
This agroforestry system provides protection a
flooding. Soil erosion (by water) has been redu
inter cropping, and through leaf litter, which is
Furthermore, after harvesting, about three qua
field as mulch. The remainder is used as fodde
agroforestry system is considerably higher than in the surrounding grazing areas. Soil
fertility has improved also: beans can fix 60-80 kg/ha/year of nitrogen. Compared with
other crops, wheat provides the best erosion protection. Since the lateral rooting
system of the apple trees reaches only 1-1.5 m from the trunk, competition for
nutrients is not a major problem. Neither is there a problem with shade, since during
the crop establishment period the trees have lose their leaves. In order to increase
production, farmers plan to apply supplementary irrigation where possible.

(TJQ003)
Compiled by: Sanginboy Sanginov, Soil Science Research Institute
Date: 2004-01-01
Contact person: Sanginboy Sanginov, Tajik Soil Institute
sanginov@yahoo.com

Classification

Land use problems:
- Most of the rains fall in late autumn and early spring, and the rains coincide with very strong winds. The topsoil is therefore exposed to erosion during this period if left uncovered, and without a windbreak. A particular problem during the soviet period

Automatic summary from NEW WOCAT database:



Improvements with New Summary

- Well-structured layout
- Shows whole content
- More space for visual elements
- Standardized illustration of structured data
- Format of output: PDF for printing/presentation or display as HTLM

Outlook

Further enhance Global SLM Database

- Will be integrated into new WOCAT website as a main component
- Manual migration of SLM data will be completed until UNCCD COP13
- Search filter is currently being revised to make it more user-friendly
- Online database analysis tool to be developed
- Further improvements are foreseen (funding?)

→ Check out the global SLM database and give us feedback

https://qcat.wocat.net/en/wocat/

or via WOCAT website at https://www.wocat.net/


WOCAT SLM DATABASE
Home
Search SLM Data
Add SLM data
My SLM Data
Login
English
the Global Database on Sustainable Land Management
welcomes you to join!

Thank you

WOCAT Decision Support

National/subnational level (N)

Step N0 and Step N1:
Stakeholder workshop: Setting the stage and focus

Version 1.0 (May 2017)

Authors:

Hanspeter Liniger, Nicole Harari, Felicitas Bachmann, Isabelle Providoli, Gudrun Schwilch (WOCAT Secretariat, CDE)

Thomas Caspari, Godert van Lynden, Maria Ruiperez Gonzalez (ISRIC-World Soil Information)

Foreword

Purpose of this document

This guideline is part of the WOCAT decision support framework for evaluating and scaling-up sustainable land management (SLM). A schematic overview of this framework is presented in Figure 1.

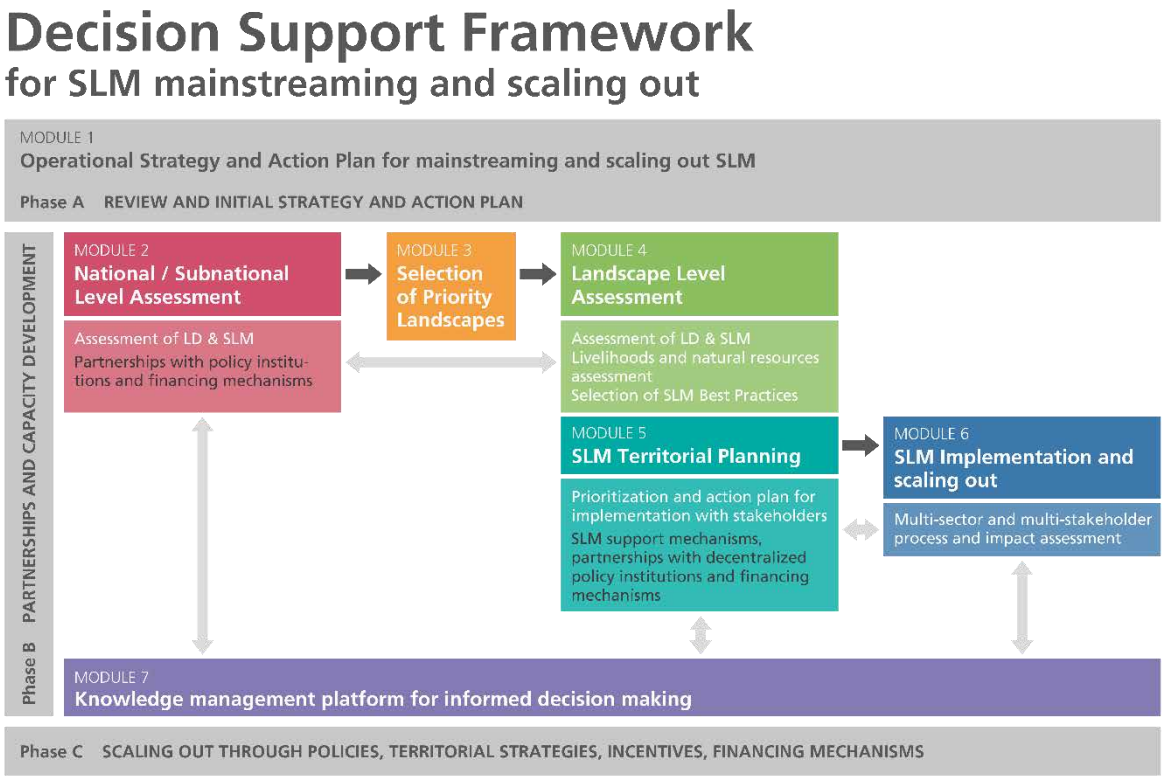


Figure 1: Schematic representation of the process for WOCAT-based decision-making on sustainable land management

The main purpose of this document is to support national moderators in organising a first stakeholder workshop at the national/sub-national level aimed at identifying SLM priority areas for action (Module 2 in Figure 1 and Step N0 and Step N1 in Figure 2).

The suggested stakeholder workshop (Step N0 and Step N1 in Figure 2) consists of a series of exercises, which you can conduct in 1 day. There is also a 2-day option, including additional exercises. By following the suggested sequence of exercises you will guide the group of national stakeholders in compiling and discussing relevant information regarding current land use systems, prevailing land degradation problems, degrading practices, and potential SLM solutions for the most relevant spatial units ("zones") within your country. **The workshop will identify SLM priority zones for action, and help to perform a review of existing programmes and policies in terms of their positive and negative impacts on land management.**

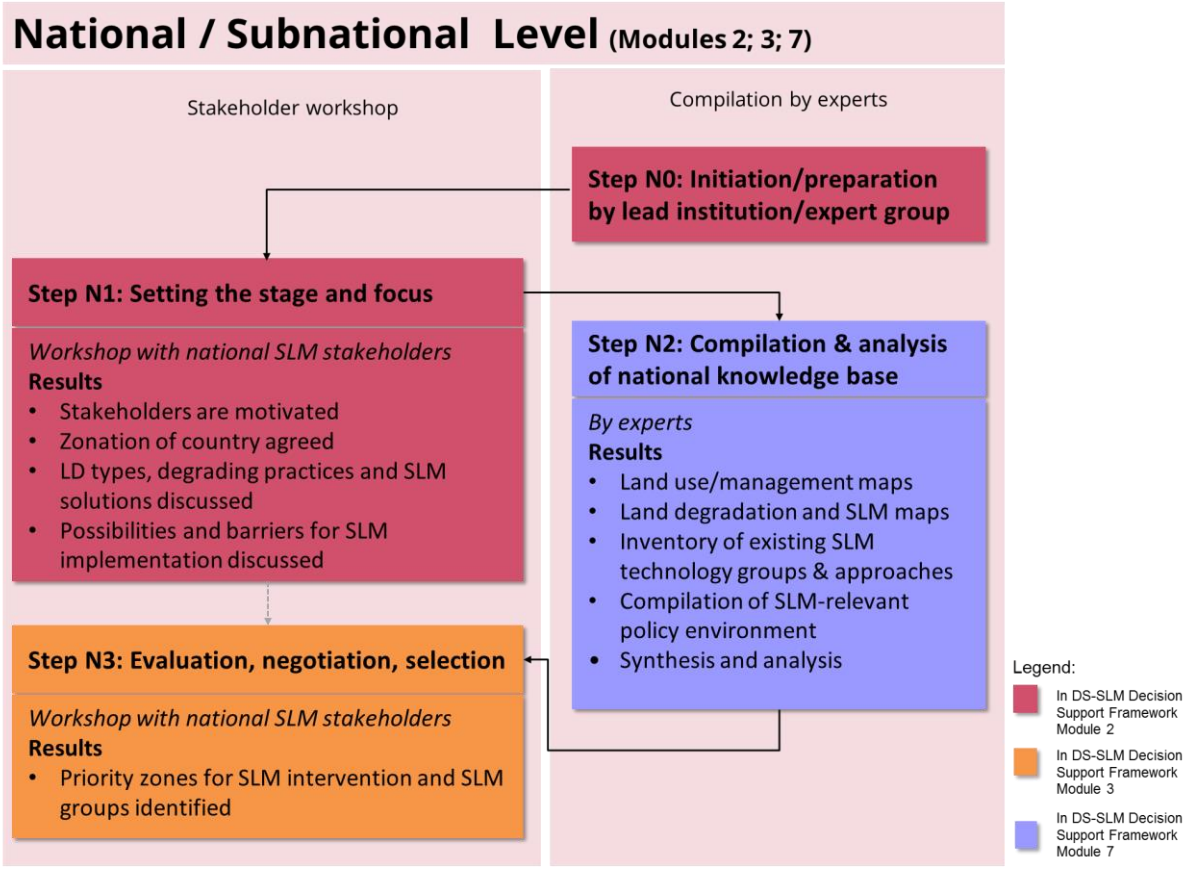


Figure 2: SLM decisions support process at national / subnational level (reflecting modules 2, 3 and 7).

Once the workshop at national / subnational level is done (Figure 2: Step N0 and Step N1) it can be followed by Step N2: “Compilation and analysis of a national knowledge base” (Figure 2) and later on by an assessment at the landscape / local level Figure 3.

For more information on WOCAT’s methodological framework for decision-making on SLM, please visit our website: https://www.wocat.net/en/methods/decision-support.html

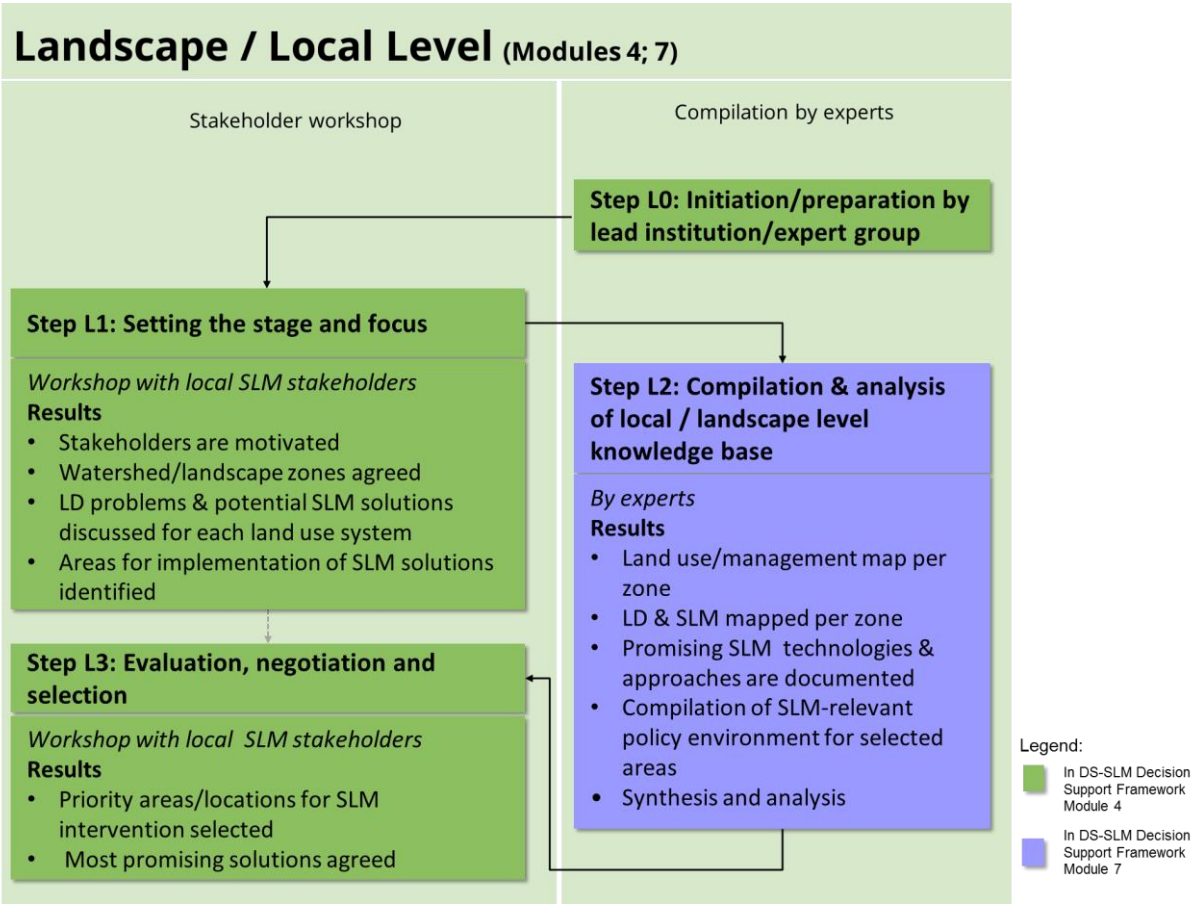


Figure 3: SLM decisions support process at landscape / local level (reflecting modules 4 and 7).

About WOCAT

WOCAT was founded in 1992 as an informal global network of soil and water conservation specialists. It was one of the first programmes to promote resource conservation and SLM in response to land degradation (www.wocat.net). WOCAT developed standardized tools for documenting, monitoring, and evaluating SLM know-how as well as disseminating it around the globe, enabling land users to exchange their experience. Joint and participatory development of the programme by national and international partner institutions and organizations has made it possible to continuously improve and adapt its contents to users' needs while maintaining the benefits of standardization.

Over the years, WOCAT expanded its focus in several ways. It went beyond data collection to conduct evaluation, monitoring, training, and research on SLM. An initial emphasis on soil erosion and declines in soil fertility was broadened to include examination of good practices (technologies and approaches) for SLM that account for soils, water, vegetation, and animals.

WOCAT's initial use of questionnaires gradually developed into a flexible, modular methodology. Overall, it went from being a programme mainly focused on knowledge generation to one concerned with the use of that knowledge for evidence-based decision-making, addressing both on-site and off-site benefits of SLM including watershed and

landscape approaches. In early 2014, WOCAT's growth and ongoing improvement culminated in its being officially recognized by the UNCCD as the primary recommended database for SLM best practices, including measures of adaptation.

More info: https://www.wocat.net/

Send us your feedback

Although WOCAT has been around for a while, our approach for mainstreaming and upscaling is a rather novel one and under rapid development. Please make sure you always have the latest version of this document from our decision-support webpage on https://www.wocat.net/en/methods/decision-support.html

If you should encounter any difficulties while making use of this guideline, please do get in touch with us. We are keen on learning about your experience, and potential ideas for improving this document.

https://www.wocat.net/en/about-wocat/contact.html

N0: Initiation and preparation by lead institution / expert group

Identifying the lead agency

The aim of the first decision support (DS) workshop at national or subnational level is to promote and facilitate the spreading and implementation of sustainable land management (SLM) practices. Therefore the process of a decision support for upscaling SLM should only be initiated if an agency, an institution or a project is committed to identify and spread SLM, improve the use of the natural resources and the impact it has on people and the environment. This agency, institution or project takes the initiative for the DS process (from now on called the DS lead agency) and identifies a lead person. If there is no commited lead agency, the DS process does not make sense and will frustrate the stakeholders and participants as there will be no concrete implementation and improvement of the land and the livelihoods of people.

In this first workshop at national level, it is of utmost importance that participants are being motivated for the process of mutual learning and participatory decision-making on SLM. Sharing one's knowledge and experience, joint reflection and dialogue, and co-creation of knowledge are at the heart of the learning process.

Role of the lead agency / person

The role of the lead agency / person will be to lead the decision-making process, among others by

- Taking responsibility for the identification and mobilization of resources to carry out the process;
- Identifying other relevant key partners and establishing a working group;
- Agreeing with the working group on the DS process and identifying key stakeholders participating in the stakeholder workshop;
- Inviting and motivating stakeholders to participate in the workshop;
- Identifying moderator(s);
- Organizing the workshop;
- Taking initiative for the implementation of practices that will be identified during the DS workshops at the local level for spreading and upscaling SLM.

The lead agency and the member of the working group should have the following skills and experiences:

- Good knowledge of land degradation issues at national level, and of existing or potential technologies and approaches to overcome these issues.
- Involvement in / overview of essential programmes and activities in land degradation and restoration at the national level.
- Detailed knowledge of existing national policies affecting natural resources.

Preparing and conducting a stakeholder workshop is demanding. It is essential to have a group of motivated individuals in the working group. This would ideally include one or more senior member(s) of a nationally respected lead agency (organization, institute or nation-wide project / programme) which is committed to take the overall responsibility for the SLM decision-making process.

Defining the role of moderator(s)

Moderator(s) are the key for success! The moderator is facilitating and guiding the whole DS process, which is a challenging task that needs a strong personal commitment.

The moderator should have the following skills and experiences:

- Didactic skills in activating and guiding the participants of a workshop;
- Knowledge of land degradation and sustainable land management;
- Knowledge of national policies and institutional set-up.

The role of the moderator(s), will be to guide the group in its learning and decision-making process, among others by:

- The moderator has to have a neutral position regarding stakeholder interests;
- Creating a trustful and appreciative working atmosphere;
- Motivating stakeholders for the process;
- Structuring the work (themes, exercises, working groups, time);
- Facilitating group work and moderating plenary discussions; and
- Documenting the results and writing a workshop report.

This means the moderator(s) are responsible for providing the opportunity that everybody can express him-/herself', avoiding that discussions are dominated by individual persons, and facilitating discussions in a way that leads the group to draw conclusions.

Moderator(s) need to be prepared for facilitating the stakeholder workshop(s). **It is important that you take enough time to get familiar with the contents of this guideline**, and the methods and tools that are part of it.

- Familiarise yourself with this guideline, and the tools recommended for use during the workshop.
- Decide about the overall length of the workshop. Do you go for the 'extended' version including optional components, or will the 'basic' version do in your context?
- Decide if translation of workshop documents into local language(s) is required?

Declaring the workshop objectives

The lead agency and the moderator(s) will have to communicate the objectives of the entire DS process and the objectives of the first stakeholder workshop as well as the requirements for the participating stakeholders.

The **overall goal** of the first stakeholder workshop is to engage all relevant SLM stakeholders in identifying national / subnational priority zones / regions and SLM practices for scaling up improved land management with the help of a participatory decision making process. It includes the engagement of all participants in the process ahead, strengthening trust and collaboration among them, and enabling and fostering a mutual learning process among all stakeholders.

The **specific objectives** of the first DS workshop at national or subnational level (N1) are:

- Participants are aware of the evidence-based DS process (Steps N1, N2, N3) and their role in it;
- Existing strategies, policies, programmes relevant for SLM mainstreaming and scaling up are discussed;
- Division of national / subnational area into an agreed set of "zones" is accomplished;
- Dominant land degradation problems are identified;
- A preliminary list of degrading land management practices, as well as SLM solutions is compiled;
- Criteria for the selection of priority zones / regions and SLM practices are identified;
- Responsibilities for building the required knowledge base at national level (Step N2) are agreed upon;
- Further process at national level (Steps N2 and N3) is clear to all stakeholders.

Selecting workshop participants

For the process to be successful, you will need the right people on board. There will be obvious partners at the national level, but it may be worthwhile to reflect in more depth which organisations and individuals are most strategic, having high motivation and/or influence to participate. For example, you could place potential participants on a stakeholder matrix (Figure 4), or even do a more detailed stakeholder analysis.

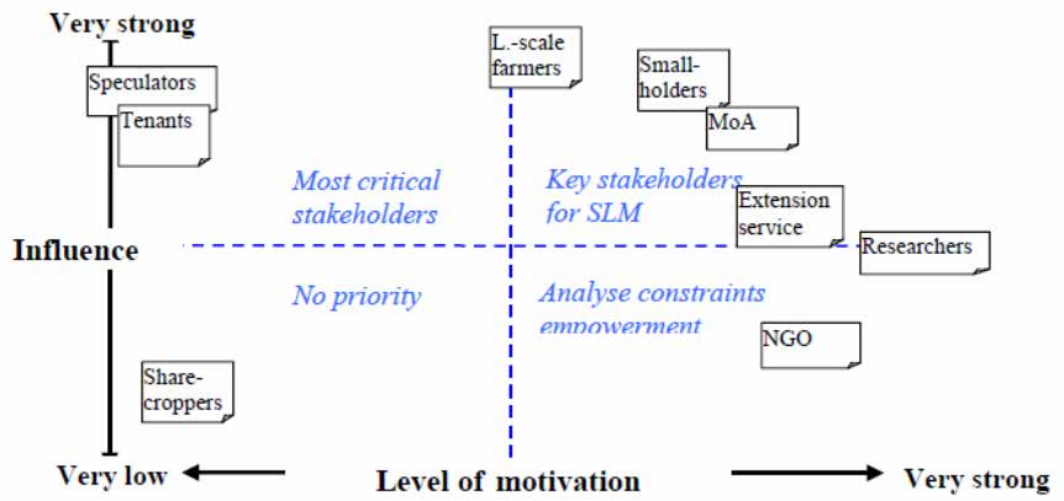


Figure 4: Example of a stakeholder matrix, showing the level of motivation and the influence of the stakeholders. First, place all stakeholders in the matrix according to their motivation and influence. Secondly, group the stakeholders into the four types (in blue) to identify key stakeholders, most critical stakeholders, those that need empowerment and those who have no priority.

The stakeholder matrix can be used to reflect with the lead agency on all relevant SLM stakeholders with different levels of motivation and influence in terms of promoting and implementing SLM, and to identify workshop participants.

In order to have a broad range of expertise and experience represented, the group should be interdisciplinary in composition, and it should include women and men of different ages. Another important aspect is continuity: Make sure that at least some of the people participating in the first workshop are also willing to participate further down the line of information gathering and decision-making.

Based on the existing WOCAT experience with decision-making on SLM at nation level, these are stakeholder groups or individuals to consider for this workshop:

1. Senior staff from relevant ministries who are able and willing to influence decision-making on mainstreaming and scaling up SLM (e.g. agriculture, environment, water, forest, economy, planning, finance)
2. Stakeholders who have a good knowledge (national / subnational) on land management, land degradation and SLM (e.g. research centres, extension services, NGO's)
3. National interest groups (e.g. farmers association, conservation group)
4. National UN representatives and focal points (e.g. FAO, UNEP, UNCCD, CBD, UNFCCC, IPBES)
5. Major SLM donors and programme/ project implementers

Concerning the overall number of participants, you will have to make a compromise between having numerous experts with various backgrounds present on the one hand, and keeping the exercises manageable on the other hand. Experience has shown that there is an optimal group size of some 15-20 participants. Whatever you decide for, **make sure that all relevant stakeholders are represented**.

Note: that at the national level all representatives of the stakeholders must have national or subnational knowledge. It is thus difficult to include land users at the national level (they will play a key role in the DS process at the local or landscape level).

Inviting workshop participants

The moderator invites all participants timely to the workshop and includes the workshop objectives in the invitation. The participants should confirm their attendance.

Organizational preparatory work by the moderator(s) and lead agency

1. Make arrangements of the workshop:
    - **Venue**: organize a suitable venue with enough space or additional rooms for group work. A room with easily movable furniture is preferable as it allows for flexible working arrangements for group work.
    - **Pinboards**: big enough walls or several pinboards are a must to be able to display the results of group work.
    - Organize **meals and snacks**.
    - Depending on the length of the workshop organize **accommodation** for the participants.
2. Arrange for overhead projection and availability of at least one laptop computer and a beamer.
3. Make sure that abundant general working material is available such as paper sheets (formats A1 and A4, different coloured paper A5), post-it stickers, coloured sticky dots, tape, markers, scissors, glue, thumbtacks, whiteboard, pinboard, etc.

Collection of data and thematic inputs by moderator(s), lead agency and expert group

The moderator together with the lead agency identifies an expert group to compile relevant information and materials as an input to the workshop. For this purpose a group of experts having the required specific information may be invited to support the moderator and the lead agency in compiling and preparing useful inputs for the workshop.

Preferably, the following information should be compiled as input materials for the workshop:

- Existing land use map (alternatively satellite, aerial or google earth images)
- Suggestion for a zoning of the national / subnational area; see Step N1, Part II;
- Data and reports on state of land degradation at national to regional scale;
- Information on SLM practices currently being implemented across the country or in a specific region;
- Overview of major projects and organisations currently working on SLM in the country.
- *Optional: all material needed for the extended workshop version (see step N1).*

We recommend that 1-2 weeks are spent for the preparation of the workshop.

N1: Stakeholder workshop for setting the stage and the focus

Suggested schedules for a 1- or 2-day workshop

The DS process starts with a 1 or 2 day workshop depending whether the basic or extended version (including optional components) is used, bringing together a critical mass of relevant stakeholders in the field of SLM (see step N.0). The basic or extended version is chosen depending on stakeholder motivation and/or availability, available human and financial resources, and other factors. Consider that this first workshop is the most relevant one in terms of activating the stakeholders, engaging them in the process and making them share their knowledge as a basis for success.

The stakeholder workshop has the following parts:

- **Part I: Introduction.**
  Participants get to know each other, and their expectations are matched with the workshop programme and objectives.
- **Part II: Land degradation, potential SLM solutions and priority areas for action.**
  In this main workshop part, existing information on land degradation problems as well as potential SLM solutions are discussed. A close look is given to already existing activities, and hindering / supporting drivers for SLM implementation. The part concludes with an agreement on a preliminary set of priority zones/ region and SLM practices for action.
- **Part III: Outlook and planning of process to compile knowledge base.**
  This sets the stage for the following steps at national level (see Figure 2), most importantly the compilation or further development of a national knowledge base on SLM. The next steps at the national level (N2 and N3) are clear to all stakeholders.

Table 1: Suggested schedule for a basic (1-day) and extended (2-day) workshop for DS process at national / subnational level divided into three parts.

Preparations for workshop (to be made by the moderator(s) and the expert group): ● Collect information ● Methodological preparation ● Preparation of working materials	1-2 weeks
PART I Introduction to the workshop	Basic: 30' Extended: 150'

1. Purpose and objectives of the workshop
2. Presentation of participants
3. Workshop programme
4. Intended working
   Optional: Picture gallery
   Optional: The multiple benefits of SLM (Motivational component)
5. Rules of conduct

PART II Land degradation, SLM solutions and priority areas for action	Basic: 195' Extended: 465'

1. Zones and their land use types
2. Land degradation problems and potential solutions per zone and land use types
3. *Optional: Impacts of land management practices*
4. Hindering and supporting drivers for SLM implementation
5. Finding consensus on priority areas

PART III Outlook and planning of process to compile knowledge base	Basic/Extended: 70'

1. Overview and planning of next steps (compilation of the knowledge base)
2. Workshop evaluation
3. Closure

Total duration:	**Basic: 4 h 45 min** **Extended: 11 h 25 min**
Documentation of workshop results	1-2 days

PART I: Introduction to the workshop

Objectives

- To inform the participants on the context, the purpose and objectives of the workshop.
- To know participants' expectations, and to prepare the ground for a good working atmosphere.

Duration

Steps	Basic	Extended
1. Context, purpose and objectives	10	20
2. Presentation of participants *Optional: Picture Gallery*	10	50
3. Optional: The benefits of SLM		60
4. Workshop programme	5	10
5. Rules of the game and intended working spirit	5	10
Total	**30 min**	**150 min**

Preparations and material required

- Brief presentation on the goal and specific objectives of this workshop (e.g. PowerPoint).
- Workshop programme (e.g. written on sheets A1)
- Paper sheets, markers, tape

Methodology Plenary session

Procedure

1. Welcome participants and briefly introduce yourself. Explain the context of this workshop, its purpose and objectives. Inform on the role of this particular stakeholder workshop within your wider ambitions of national decision-making on SLM.
2. Let the participants briefly introduce themselves and their expectations. *Optional*: 'Picture gallery' exercise (see page 4).
3. *Optional*: Benefits of SLM (see page 5).
4. Give a brief overview on the workshop programme and schedule.
5. Agree on basic rules of conduct (e.g. to respect other people's opinion; switch off mobile phones; be on time etc.).

Expected results

- The participants are clear about objectives, the procedure and programme of the workshop.
- Agreement upon 'rules of the game'

Workshop objectives

The participants have already received the objectives in the invitation to the workshop (see step N0). However, these objectives need to be repeated and explained by the moderator at the beginning of the workshop. Participants are then given the opportunity to ask for clarification on the process, the methodology and the expected results of the workshop.

The **overall goal** of the first stakeholder workshop is to engage all relevant SLM stakeholders in identifying national / subnational priority zones / regions and SLM practices for scaling up improved land management with the help of a participatory decision making process. It includes the engagement of all participants in the process ahead, strengthening trust and collaboration among them, and enabling and fostering a mutual learning process among all stakeholders.

The **specific objectives** of the first DS workshop at national or subnational level (N1) are:

- Participants are aware of the evidence-based DS process (Steps N1, N2, N3) and their role in it;
- Existing strategies, policies, programmes relevant for SLM mainstreaming and scaling up are discussed;
- Division of national / subnational area into an agreed set of “zones” is accomplished;
- Dominant land degradation problems are identified;
- A preliminary list of degrading land management practices, as well as SLM solutions is compiled;
- Criteria for the selection of priority zones / regions and SLM practices are identified;
- Responsibilities for building the required knowledge base at national level (Step N2) are agreed upon;
- Further process at national level (Steps N2 and N3) is clear to all stakeholders.

Optional: Picture gallery

Objectives	- To “activate” participants, establish a personal relation with the workshop topic, and establish a relaxed working atmosphere - To give everybody an opportunity to present her/ himself and her/ his interest in the topic (“stake”)
Duration	Approx. 50 min.
Preparations and material required	- 20 to 30 photos showing aspects of land degradation or SLM from within your country. - Print the photos (format A5 or A4). The photos have to be self-explanatory and ‘easy to read’ for the participants! - Display the photos in the room, e.g. on a wall, on a table or on the floor
Methodology	Individual photo selection + plenary session

Procedure

1. **Introduction**: The moderator explains the exercise. Invite the participants to visit the photo gallery, to watch the photos and to spontaneously select a photo that attracts his/her attention.
2. **Plenary session**: When everybody has made his choice, ask people to come together. One after the other shows the photo selected to the whole group, briefly introduces himself / herself and explains the reason for the choice made. What attracts their attention and why have they selected the respective photo? How can they relate the photo to their own reality and experience? What is their motivation to join the workshop? What are their expectations?

Summary by the moderator: Summarise the main backgrounds and functions of participants present, their motivation, and expectations. You can link to the overall contents of the workshop and elucidate in how far those expectations will/won't be met. You can also discuss which important stakeholders may be missing for tackling the tasks ahead.

Expected results

- Information on background and function of national stakeholders present
- Expectations of participants are matched with workshop contents
- Insight into motivation and influence of stakeholders present (also: identification of lack of stakeholders of a certain kind)

Optional: The benefits of SLM

Objectives

- To introduce the concept, benefits and impacts of SLM (highlighting its importance for achieving the Sustainable Development Goals (SDGs)).

Duration

Approx. 60 min.

Preparations and material required

- Presentation on the benefits of SLM; this can e.g. be based on the publication http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/CSD_Benefits_of_Sustainable_Land_Management%20.pdf
- Complimentary: SLM videos available from the WOCAT website or youtube:
  https://www.wocat.net/en/knowledge-base/slm-videos/general-slm-videos/category/thematic-video.html;
  UNCCD video on land degradation neutrality (LDN): https://www.youtube.com/watch?v=DPgtdEw5lgI)
  Introduction to SLM (IFAD, IIED, World Bank Institute, VU Amsterdam): https://www.youtube.com/watch?v=pJcwTvutZxk
- Complementary: Data & presentation from national SLM case study and its impacts (if available)

Methodology Presentation

Procedure

1. **Presentation by the moderator/team**:
2. **Plenary session**: Invite participants to share their thoughts. Is it clear to everyone what the benefits and impacts of SLM are and why SLM should be or mainstreamed and scaled up? Etc.

Expected results

- Motivational background for SLM decision-making process at national / subnational level is set
- Participants are aware of the multiple benefits that SLM has in view of achieving the SDGs

PART II: Land degradation, SLM solutions and priority areas for action

Step 1: Zones and their land use types

Objectives

- To agree on the major zones at national / subnational level
- To identify the relevant land use types per zone

Duration

Steps		Basic	Extended
1.1.	Zones at national / subnational level	15	60
1.2.	Land use types per zone	30	60
	Total	**45 min**	**120 min**

Preparations and material required

- Zonation maps
  Basic (proposed by moderator, experts):
  Proposal for zonation (Power Point slide or large printout of country map with suggested zonation). *Prior to the workshop, the moderator prepares a proposal for clearly distinguishable and relevant zones that characterise the country. These zones can be based on existing administrative zones at the subnational level (districts, municipalities, counties, states, etc.), or on biophysical or agro-ecological criteria (topography, climate, watershed zones, land cover etc.).*
  Extended (participatory): Large printouts of country map, ideally with elevation or land cover information as a backdrop. Number of copies should match maximum number of zones expected.
- Land cover/use maps
- Paper sheets, markers (different colours), tape

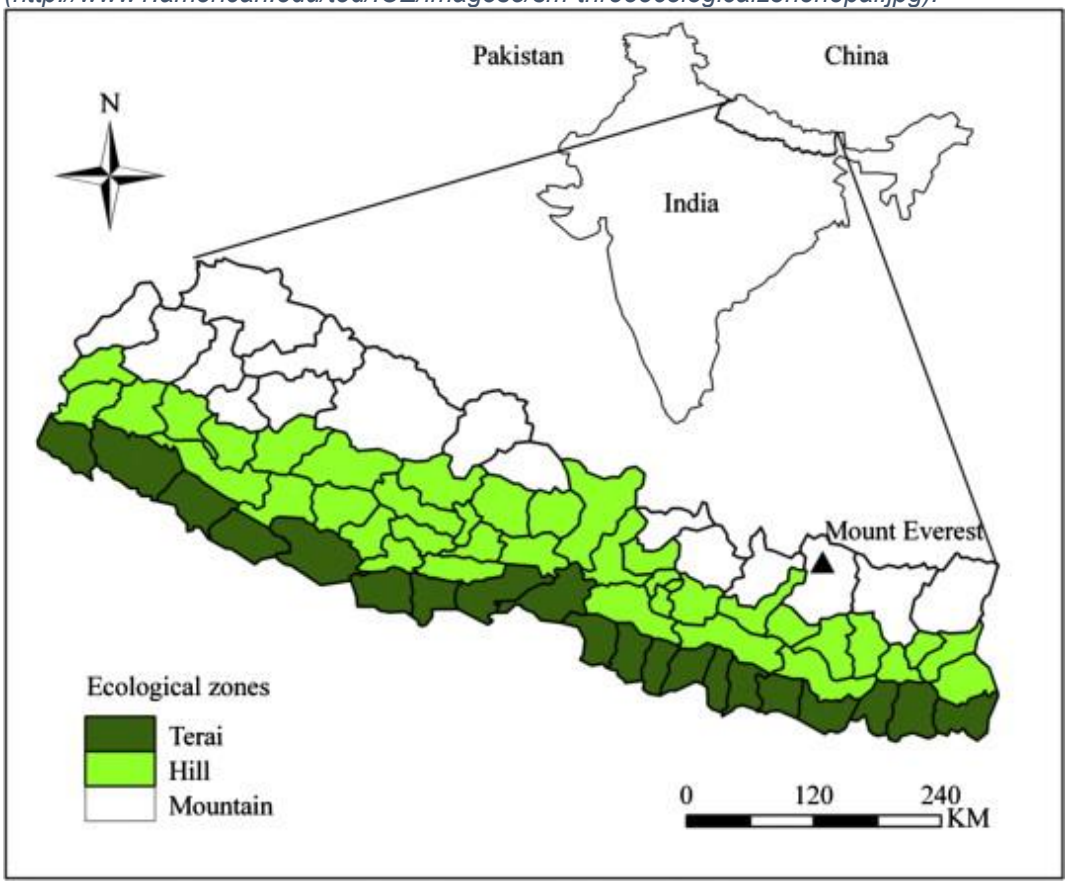
Methodology

Basic: Presentation and plenary session
Extended: Group work and plenary session

Procedure 1.1. Zones at national / subnational level

Basic	Extended
1. The moderator explains the purpose of identifying different zones. 2. The moderator presents a zoning proposal for the national / subnational level prepared by the moderator / experts prior to the workshop to the participants, and the criteria used. 3. Participants discuss whether the proposal is suitable. If not whether an easy adjustment can be made straight away. Then the zonation is adjusted and agreed upon.	1. The moderator explains the purpose of identifying different zones. 2. The moderator presents a zoning proposal for the national / subnational level prepared by the moderator / experts prior to the workshop to the participants, and the criteria used. 3. Initiate a discussion on the appropriateness of the suggested zoning, and discuss potential alternative suggestions. 4. Find a consensus on the zonation. Draw a map of agreed zone borders (on the screen, or on a paper map). 5. In a break, produce sufficient copies of the agreed zonation map (1 per zone)

Figure 5: Example of a zonation map for Nepal based on ecological zones and administrative units (http://www1.american.edu/ted/ICE/images5/sm-threeecologicalzonenepal.jpg).



Procedure 1.2. Land use types per zone

Basic	Extended
1. In the plenary, show available maps and data on the major existing land use types per zone at national / subnational level (see WOCAT List of Land Use Types in Table 3). 2. On a flipchart or board, start a table with agreed zones and land use types in the first two columns (see example below Table 2).	1. Divide the participants into groups, each representing one zone at national / subnational level. **Each group works on one zone throughout the workshop.** Make sure that participants are in the zone to which their main interest and experience relates. 2. Each group assesses the major land use types within their assigned zone (see WOCAT List of Land Use Types in Table 3). 3. Fill in the major land use types for the assigned zone on a flipchart, board or directly in an Excel table with two columns (see example in Table 2). 4. The groups present the result in the plenary.

Table 2: Example with three national zones, and three major land use types per zone:

Zone	Major land use types
Zone A e.g. 'Highlands'	Natural forest
	Extensive grazing
	Improved pastures
Zone B e.g. 'Midlands'	Agroforestry
	Vineyards
	Wastelands
Zone C e.g. 'Lowlands'	Annual cropping (wheat, fodder crops, vegetables)
	Swamp

Please note: In the course of the workshop, this table will be extended to contain degrading practices and potential SLM solutions per zone and land use type.

Expected results
- Agreed zones for national / subnational level.
- Major land use types per national / subnational zone are identified.

Table 3: WOCAT List of Land Use Types

Main categories	*Subcategories*
Cropland: *land used for cultivation of crops (field crops, orchards)*	● ***Ca: Annual cropping:*** *land under temporary/ annual crops usually harvested within one, maximally two years (e.g. maize, paddy rice, wheat, vegetables, fodder crops)* ● ***Cp: Perennial (non-woody) cropping:*** *land under permanent (not woody) crops that may be harvested after 2 or more years, or where only part of the plants are harvested (e.g. sugar cane, banana, sisal, pineapple)* ● ***Ct: Tree and shrub cropping:*** *permanent woody plants with crops harvested more than once after planting and usually lasting for more than 5 years (e.g. orchard/ fruit trees, coffee, tea, grapevines, oil palm, cacao, coconut, fodder trees)*

Grazing land: *land used for animal production*	● ***Ge: Extensive grazing land:*** *grazing on natural or semi-natural grasslands, grasslands with trees/ shrubs (savannah vegetation) or open woodlands for livestock and wildlife. Includes the following subcategories:*
	  ● ***Nomadism****: people move with animals*
	  ● ***Semi-nomadism/ pastoralism****: animal owners have a permanent place of residence where supplementary cultivation is practiced. Herds are moved to distant grazing grounds.*
	  ● ***Ranching****: grazing within well-defined boundaries, movements cover smaller distances and management inputs are higher compared to semi-nomadism.*
	● ***Gi: Intensive grazing/ fodder production:*** *improved or planted pastures for grazing/ production of fodder (for cutting and carrying: hay, leguminous species, silage etc.) not including fodder crops such as maize, cereals. These are classified as annual crops (see above). Intensive grazing can be subclassified into:*
	  ● ***Cut-and-carry/ zero grazing****: carrying fodder to animals confined to a stall/ shed or another restricted area; in zero-grazing systems the livestock are not permitted to graze at any time*
	  ● ***Improved pastures****: pasture that is sown with a mixture of introduced grasses and legumes (can be fertilized and/ or inoculated with rhizobia to fix nitrogen).*

Forests/ woodlands: *land used mainly for wood production, other forest products, recreation, protection.*	● ***Fn: Natural or semi-natural:*** *forests mainly composed of indigenous trees, not planted by man*
	  ● *Selective felling*
	  ● *Clear felling: felling the whole forest at one time*
	  ● *Shifting cultivation: felling (harvesting) only certain valuable trees within a forest*
	  ● *Dead wood/ prunings removal (no cutting of trees)*
	  ● *Non-wood forest use (e.g. fruit, nuts, mushrooms, honey, medicinal plants, etc.)*
	● ***Fp: Plantations, afforestations:*** *forest stands established by planting or/ and seeding in the process of afforestation or reforestation*
	  ● *Monoculture local variety*
	  ● *Monoculture exotic variety*
	  ● *Mixed varieties*
	● ***Fo: Other:*** *e.g. selective cutting of natural forests and incorporating planted species*

Mixed: *mixture of land use types within the same land unit (includes agroforestry)*	● ***Mf: Agroforestry:*** *cropland and trees* ● ***Mp: Agro-pastoralism****: cropland and grazing land (including seasonal change between crops and livestock)* ● ***Ma: Agro-silvopastoralism:*** *cropland, grazing land and trees (including seasonal change between crops and livestock)* ● ***Ms: Silvo-pastoralism:*** *forest and grazing land* ● ***Mo: Other:*** *other mixed land*
Settlements, infrastructure	● ***Ss:*** *Settlements, buildings* ● ***St:*** *Traffic lines: roads, railways* ● ***Se****: Energy lines: pipe lines, power lines* ● ***So****: Other infrastructure*
Waterways, waterbodies, wetlands	● ***Wd****: Drainage lines waterways* ● ***Wp****: Ponds, dams* ● ***Ws****: Swamps, wetlands* ● ***Wo****: Other waterways*
Mines, extractive industries	● ***I****: Mines, extractive industries*
Unproductive land	● ***U****: Wastelands, deserts, glaciers, etc.*

Step 2: Land degradation problems and potential solutions per zone and land use types

Objectives

- To identify degradation problems, as well as existing and potential solutions per zone and land use type
- To set preliminary priorities for action.

Duration

Steps		Basic	Extended
2.1.	Land degradation per zone	30	60
2.2.	Degrading practices and SLM solutions	30	60
	Total	**60 min**	**120 min**

Preparations and material required

- National map with agreed zonation (1 copy)
- Land degradation maps (or related information available at national level, if existing)
- Table started in Part II, Step 1
- Coloured "voting" stickers (dots)
- Paper sheets, markers (different colours), tape

Methodology Basic: Presentation and plenary session
Extended: Group work and plenary session

Procedure **2.1 Land degradation per zone**

Basic	Extended
1. If available, the moderator provides and explains a map of land degradation types and severity at the national level. 2. In a plenary, participants discuss the most pressing land degradation issues per zone and land use type. 3. The moderator enters the main land degradation types (see Table 7: WOCAT list of land degradation types) identified for the main land use types into the workshop table (flipchart) started in Part II, step 1. 4. The next step is a prioritisation by the participants across all zones: each participant gets 3 to 5 voting stickers and places them into the workshop table (flipchart). She/ he has to select the zone, land use and degradation type that have the highest priority to be addressed. 5. The moderator counts the dots, enters the number into the table and opens the discussion about the	1. If available, the moderator provides and explains a map of land degradation types and severity at the national level. 2. The groups continue to work on their allocated zones: Each group reflects the land degradation information available for their specific zone. They discuss which land use type has the most threatening land degradation (see Table 7: WOCAT list of land degradation types). They enter the main land degradation types identified for the main land use types into the workshop table (flipchart). 3. The groups present their results in a plenary session. 4. The next step is a prioritisation by the participants across all zones: each participant gets 3 to 5 voting stickers and places them into the workshop table (flipchart). She/ he has to select the zone, land use and degradation

results.

type that have the highest priority to be addressed.

5. The moderator counts the dots, enters the number into the table and opens the discussion about the results.

Table 4: Example table after Part II, step 1 (1.1. and 1.2) and step 2 (2.1)

Step 1.1	**Major land use types** *Step 1.2*	**Main land degradation types** *Step 2.1*	**Number of votes** *Step 2.1*			
Zone A: Highlands	Natural forest	B: Biological *Bf: detrimental effects of fire*	4			
	Extensive grazing	W: Soil erosion by water *Wt: Water erosion*	18			
	Improved pastures	P: Physical soil detoriation *Pc: compaction* *Pw: water logging*	8			
Zone B: Midlands	Agroforestry					
	Vineyards	C: Chemical soil detoriation *Cp: soil pollution (copper)*	1			
	Wasteland	W: Soil erosion by water *Wt: Water erosion* E: Soil erosion by wind *Et: wind erosion*	10 3			
Zone C: Lowlands	Annual cropping (wheat, fodder crops, vegetables)	P: Physical soil detoriation *Pc: compaction*	14			
	Swamp	H: Water degradation *Hw: reduction of the buffering capacity*	2			

Procedure 2.2 Degrading practices and SLM solutions

Basic	Extended
1. Plenary discussion: For each row containing a land degradation type, the moderator encourages participants to mention any existing (already practiced in the zone) and potential SLM solutions (practiced outside the zone or country). Make sure that there is at least 1 SLM solution present for the most pressing problems. 2. The moderator writes the SLM solutions into the workshop table. Afterwards, she/he categorises the SLM solutions into the WOCAT SLM groups (refer to 3. Table ***6***) and presents it to the plenary. Plenary: A first prioritisation is done by letting participants vote with 3 to 5 "voting" stickers for what they believe are the most promising SLM solutions / groups to solve pressing land degradation across all zones and land use types e.g. most benefits for minimum inputs, or the most urgent to avoid disasters.	1. The groups continue to work on their allocated zones. Each group discusses the most relevant land degrading practices for their specific zone and land use types. The group leader enters the degrading practices into the workshop table (flipchart). 2. The group identifies existing (already practiced in the zone) and potential SLM solutions (practiced outside the zone or country) to address the land degradation types and practices. Make sure that there is at least 1 SLM solution present for the most pressing problems. The group leader enters the identified solutions into the workshop table. 3. Plenary: One member of each group presents the findings to the plenary. 4. The moderator categorises the SLM solutions into the WOCAT SLM groups (refer to 5. Table ***6***) and presents it to the plenary. Plenary: A first prioritisation is done by letting participants vote with 3 to 5 "voting" stickers for what they believe are the most promising SLM solutions / groups to solve pressing land degradation across all zones and land use types e.g. most benefits for minimum inputs, or the most urgent to avoid disasters.

Table 5: Example table after Part II, step 1 (1.1 and 1.2) and step 2 (2.1 and 2.2)

Step 1.1	**Major land use types** *Step 1.2*	**Main land degradation types / subcategories** *Step 2.1*	**Number of votes** *Step 2.1*	**Land degrading practices** (Extended) Step 2.2	**SLM solutions / groups (e=existing, p=potential)** Step 2.2	**Number of votes** Step 2.2
A: Highlands Zone	Natural forest	B: Biological *Bf: detrimental effects of fire*	4	No management of the forest	- Firebreaks (e)	8
	Extensive grazing	W: Soil erosion by water *Wt: Water erosion*	18	Grazing with goats & sheep	- Terracing (e) - Fencing of steeper slopes (e)	13 4
	Improved pastures	P: Physical soil detoriation *Pc: compaction* *Pw: water logging*	8	Trampling by livestock	- Improved grazing rotation and water points (e))	7
B: Midlands Zone	Agroforestry	*No major degradation*	0	-	-	-
	Vineyards	C: Chemical soil detoriation *Cp: soil pollution (copper)*	1	Fungicide application	- Biological control agents (p)	0
	Wasteland	W: Soil erosion by water *Wt: Water erosion* E: Soil erosion by wind *Et: wind erosion*	10 3	-	- Water harvesting with eye brow pits combined with Agroforestry(p) - Shelterbelts (p)	11 5
C: Lowlands Zone	Annual cropping (wheat, fodder crops, vegetables)	P: Physical soil detoriation *Pc: compaction*	14	Heavy wheel traffic	- Decreased axle loads (e) - Use of cover crops (p) - Minimal crop rotation (p)	4 5 3
	Swamp	H: Water degradation *Hw: reduction of the buffering capacity*	2			

Please note: If no land degradation issue has been identified for a land use type in a particular zone, the cell is left blank.

Expected results

- Overview of main land degradation types / subcategories per land use type per zone and their prioritisation for action at national level.
- Preliminary compilation of existing and potential SLM solutions / groups per land use type per zone at national level
- Extended: list and reflection about the most degrading practices.

Table 6: SLM group to which the Technology belongs

Assign the described Technology to one of the following SLM groups. If this is not possible, select several (max. 3) groups to represent the Technology:

- ☐ natural and semi-natural forest management
- ☐ forest plantation management
- ☐ agroforestry
- ☐ windbreak/ shelterbelt
- ☐ area closure (stop use, support restoration)
- ☐ rotational system (crop rotation, fallows, shifting cultivation)
- ☐ pastoralism and grazing land management
- ☐ integrated crop–livestock management
- ☐ improved ground/ vegetation cover
- ☐ minimal soil disturbance
- ☐ integrated soil fertility management
- ☐ cross-slope measure
- ☐ integrated pest and disease management (incl. organic agriculture)
- ☐ improved plant varieties/ animal breeds
- ☐ water harvesting
- ☐ irrigation management (incl. water supply, drainage)
- ☐ water diversion and drainage
- ☐ surface water management (spring, river, lakes, sea)
- ☐ groundwater management
- ☐ wetland protection/ management
- ☐ waste management/ waste water management
- ☐ energy efficiency
- ☐ beekeeping, aquaculture, poultry, rabbit farming, silkworm farming, etc.
- ☐ home gardens
- ☐ ecosystem-based disaster risk reduction
- ☐ post-harvest measures
- ☐ other (specify): .....

***Natural and semi-natural forest management**: encompasses administrative, legal, technical, economic, social, and environmental aspects of the conservation and use of forests.*

***Forest plantation management**: plantation forests comprise even-aged monocultures and are established primarily for wood and fibre production. They are usually intensively managed and have relatively high growth rates and productivity.*

***Agroforestry**: integrates the use of woody perennials with agricultural crops and/ or animals for a variety of benefits and services including better use of soil and water resources; multiple fuel, fodder, and food products; and habitat for associated species.*

***Windbreak**: or shelterbelt is a plantation usually made up of one or more rows of trees or shrubs planted in such a manner as to provide shelter from the wind and to protect soil from erosion. They are commonly planted around the*

***Improved plant varieties/ animal breeds**: refers to the development of new plant varieties or animal breeds that offer benefits such as improved production, resistance to pests and diseases, or drought tolerance, in response to changing environmental conditions and land users' needs.*

***Water harvesting**: is the collection and management of floodwater or rainwater runoff to increase water availability for domestic and agricultural use as well as ecosystem sustenance.*

***Irrigation management (incl. water supply, drainage)** aims to achieve higher water use efficiency through more efficient water collection and abstraction, water storage, distribution, and water application.*

***Water diversion and drainage**: is the natural or artificial diversion or removal of surface and sub-surface water from an area*

***Surface water management (spring, river, lakes, sea)**:*

edges of fields on farms.

***Area closure (stop use, support restoration)**: enclosing and protecting an area of degraded land from human use and animal interference, to permit natural rehabilitation, enhanced by additional vegetative and structural conservation measures.*

***Rotational systems (crop rotation, fallows, shifting cultivation)**: is the practice of growing a series of dissimilar/ different types of crops/ plants in the same area in sequenced season, letting it fallow for a period of time, shifting cultivation is an agricultural system in which plots of land are cultivated temporarily, then abandoned and allowed to revert to their natural vegetation while the cultivator moves on to another plot.*

***Pastoralism and grazing land management**: is the grazing of animals on natural or semi-natural grassland, grassland with trees, and/ or open woodlands. Animal owners may have a permanent residence while livestock is moved to distant grazing areas, according to the availability of resources*

***Integrated crop–livestock management**: optimizes the uses of crop and livestock resources through interaction and the creation of synergies.*

***Improved ground/ vegetation cover**: any measures that aim to improve the ground cover be it by dead material/ mulch or vegetation*

***Minimal soil disturbance** refers to no-tillage or low soil disturbance only in small strips and/ or shallow depth and direct seeding.*

***Integrated soil fertility management** (IFSM) aims at managing soil by combining different methods of soil fertility amendment together with soil and water conservation. ISFM is based on three principles: maximizing the use of organic sources of fertilizer (e.g. manure and compost application, nitrogen-fixing green manure and cover crops); minimizing the loss of nutrients; and judiciously using inorganic fertilizer according to needs and economic availability.*

***Cross-slope measures**: are constructed on sloping lands in the form of earth or soil bunds, stone lines, or vegetative strips, etc. for reducing runoff velocity and soil erosion.*

***Integrated pest and disease management (incl. organic agriculture)**: Integrated pest and disease management is a process to solve pest and disease problems while minimizing risks to people and the environment.*

involves the protection of springs, rivers, and lakes from pollution, high water flows(floods), or over-abstraction of water, as well as protection measures against damage from waterbodies (e.g. river bank erosion, floods, tidal erosion)

***Groundwater management**: involves securing the recharge of groundwater reserves and their protection from pollution, overexploitation/ overuse, and rising groundwater levels leading to salinization.*

***Wetland protection/ management**: managing wetland typically involves manipulating water levels and vegetation in the wetland, and providing an upland buffer.*

***Waste management/ waste water management**: is a set of activities that include collection, transport, treatment and disposal of waste, prevention of waste production, and modification and reuse/ recycling of waste.*

***Energy efficiency technologies**: reduce the amount of energy required to provide products and services, e.g. for cooking and heating, reducing the demand for fuel (fossil, wood).*

***Beekeeping, aquaculture, poultry, rabbit farming, silkworm farming, etc.**: allow food production and agricultural products requiring small surfaces of the land.*

***Home gardens** (also called backyard or kitchen gardens): are a traditional multifunctional farming system applied on a small area of land around the family home. They have the potential to supply most of the non-staple foods (including vegetables, fruits, herbs, animals and fish). They also provide a space for recreation, leisure, and relaxation.*

***Ecosystem-based Disaster Risk Reduction**: is the sustainable management, conservation, and restoration of ecosystems with the aim of enabling these ecosystems to provide services that mitigate hazards, reduce vulnerability, and increase livelihood resilience.*

***Post-harvest measures**: encompasses activities to deliver a crop from harvest to consumption with minimum loss, maximum efficiency, and maximum return for all involved – such as drying, storage, cooling, cleaning, sorting, and packing.*

Table 7**:** WOCAT List of Land Degradation Types

Main categories	***Subcategories***
W: Soil erosion by water	● ***Wt*** *loss of topsoil / surface erosion: even removal of top soil, sheet and interrill erosion* ● ***Wg*** *gully erosion / gullying* ● ***Wm*** *mass movements / landslides* ● ***Wr*** *riverbank erosion* ● ***Wc*** *coastal erosion* ● ***Wo*** *offsite degradation effects: deposition of sediments, downstream flooding, siltation of reservoirs and waterways, and pollution of water bodies with eroded sediments*
E: Soil erosion by wind	● ***Et*** *loss of topsoil: uniform displacement* ● ***Ed*** *deflation and deposition: uneven removal of soil material* ● ***Eo*** *offsite degradation*
C: Chemical soil deterioration	● ***Cn*** *fertility decline and reduced organic matter content (not caused by erosion): eg leaching, soil fertility mining, nutrient oxidation and volatisation (N)* ● ***Ca*** *acidification: lowering of the soil pH* ● ***Cp*** *soil pollution: contamination of the soil with toxic materials* ● ***Cs*** *salinisation / alkalinisation: a net increase of the salt content of the (top) soil leading to a productivity decline*
P: Physical soil deterioration	● ***Pc*** *compaction: deterioration of soil structure by trampling or the weight and/or frequent use of machinery* ● ***Pk*** *sealing and crusting: clogging of pores with fine soil material and development of a thin impervious layer at the soil surface obstructing the infiltration of rainwater* ● ***Pw*** *waterlogging: effects of human induced water saturation of soils (excluding paddy fields)* ● ***Ps*** *subsidence of organic soils, settling of soil* ● ***Pu*** *loss of bio-productive function due to other activities (eg construction, mining, roads, etc)*
B: Biological degradation	● ***Bc*** *reduction of vegetation cover: increase of bare / unprotected soil* ● ***Bh*** *loss of habitats: decreasing vegetation diversity (fallow land, mixed systems, field borders), increased fragmentation of habitats* ● ***Bq*** *quantity / biomass decline: reduced vegetative production for different land use* ● ***Bf*** *detrimental effects of fires (includes low / high severity of fires): on forest (eg slash and burn), bush, grazing and cropland (burning of residues)* ● ***Bs*** *quality and species composition /diversity decline: loss of natural species, land races, palatable perennial grasses; spreading of invasive, salt-tolerant, unpalatable, species / weeds* ● ***Bl*** *loss of soil life: decline of soil macro-organisms and micro-organisms in quantity and quality* ● ***Bp*** *increase of pests / diseases, loss of predators: reduction of biological control*
H: Water degradation	● ***Ha*** *aridification: decrease of average soil moisture content* ● ***Hs*** *change in quantity of surface water: change of the flow regime (flood, /peak flow, low flow, drying up of rivers and lakes)* ● ***Hg*** *change in groundwater / aquifer level: lowering of groundwater table due to over-exploitation or reduced recharge of groundwater; or increase of groundwater table resulting in waterlogging and/or salinisation* ● ***Hp*** *decline of surface water quality: increased sediments and pollutants in fresh water bodies due to point pollution and land-based pollution* ● ***Hq*** *decline of groundwater quality: due to pollutants infiltrating into the aquifers* ● ***Hw*** *reduction of the buffering capacity of wetland areas: to cope with flooding and pollution*

Step 3 (optional): Impacts of land management practices

Objective

- To create a common understanding of the impacts of good and bad land management at national / subnational level

Duration

Steps	Minutes
3.1 Introduction to impacts	30
3.2 Plenary: "Negative" impacts of degrading practices	30
3.3 Group work: "Positive and negative" impacts of SLM solutions	45
Total	**105**

Preparations and material required

- Case study example of land degradation / SLM impacts
- WOCAT list of SLM solution impacts (Annex 1)
- Paper sheets, markers (different colours), tape

Methodology Plenary session and group work

Procedure

3.1 Introduction to impacts

- The moderator shortly introduces the topic, highlighting the socio-economic, socio-cultural and ecological dimension of impacts. Explain off-site and on-site impacts. Stress how one phenomenon (e.g. soil erosion) can have multiple negative impacts, and how SLM can generate multiple benefits. If available, use example of a case study from your country. (Powerpoint presentations forthcoming).

3.2 Plenary: "Negative" impacts of degrading practices

- The moderator selects the 3 most pressing land degradation problems (step 2.1) and associated degrading practices (step 2.2) (extended only) identified in Step 2.
- The plenary discusses how those practices have negatively impacted on the natural and human environment in the affected region.
- All aspects are captured in the workshop table.

3.3 Group work: "Positive and negative" impacts of SLM solutions

- The moderator divides the participants into groups to work on impacts of SLM solutions corresponding to the most pressing problems. Each groups discusses one (or several) SLM solution(s).
- Each group discusses "positive (benefits / advantages)" and "negative (disadvantages)" impacts of the SLM solution assigned. Annex 1 can be used as a template to capture the most important aspects.
- All aspects are captured in the workshop table.

Table 8: Example table after Part II, steps 1-3 (only Zone A is shown):

Step 1.1	**Major land use types** *Step 1.2*	**Main land degradation types** *Step 2.1*	**Number of votes** *Step 2.1*	**Land degrading practices** (Extended) *Step 2.2*	**SLM solutions / groups (e=existing, p=potential)** *Step 2.2*	**Number of votes** *Step 2.2*	**«Negative» impacts of degrading practices** (Extended) *Step 3*	**«Positive and negative» impacts of SLM solutions** (Extended) *Step 3*
Highlands	Natural forest	B: Biological *Bf: detrimental effects of fire*	4	No management of the forest	- Firebreaks (e)	8	- Increasing risk of wild fires	Positive: - Reduced fire risk Negative: - Additional work load / costs
	Extensive grazing	W: Soil erosion by water *Wt: Water erosion*	18	Grazing with goats and sheep	- Terracing (e) - Fencing of steeper slopes (e)	14 4	- Reduced vegetation cover - Decreased firewood - River siltation (off-sited) - Reduced productivity	Positive: - Increased cover - Increased productivity - Reduced erosion Negative: - Additional investment costs
A:	Improved pastures	P: Physical soil detoriation *Pc: compaction* *Pw: water logging*	8	Trampling by livestock	- Improved grazing rotation and water points (e)	6	- Soil compaction - Reduced vegetation cover - Reduced productivity	Positive: - Increased cover - Increased productivity - Reduced erosion - Improved social-organisation through pasture user associations Negative: - Additional investments in water points
Zone								

Expected results

- Participants are aware of the manifold impacts of land degradation in the worst affected areas.
- Account of “positive (benefits / advantage) and negative (disadvantages)” impacts for the top 3 SLM solutions established.

Step 4: Hindering and supporting drivers for SLM implementation

Objectives

- To identify external drivers (factors) hindering or supporting the implementation of SLM at national / subnational level.
- To create a list of existing SLM-relevant national policies / programmes / projects / collaborations / networks / initiatives in support of SLM at (sub-) national level.

Duration

Steps		Basic	Extended
4.1.	Introduction to the topic	10	10
4.2.	Plenary session (extended: group work): Drivers hindering or supporting the implementation of SLM	30	60
4.3.	Plenary session: Existing national policies / programmes / projects / collaborations / networks / initiatives in support of SLM	20	20
	Total	**60 min**	**90 min**

Preparations and material required

- List of drivers related to land degradation (see Table 12)
- Paper sheets (format A1), markers and facilitation cards (two colours: one for hindering drivers, one for supporting drivers)

Methodology

Basic: Plenary session
Extended: Group work and plenary session

Procedure

1. Introduction to the topic

Besides actual land management practices which have a direct influence on land and its provision of ecosystem services, external factors may indirectly influence the quality and management of land. Hindering and supporting drivers are e.g. labor availability, inputs and infrastructure, education, governance (see Table 12 for a comprehensive list).

Basic

1. The moderator selects from the working Table 5 from each zone the SLM solution / group with the highest score (step 2.2) and enters the solution, the respective land use type and zone in Table 9.
2. Ask the participants to write on the facilitation cards the hindering (red card) and the supporting drivers (blue card) from Table 12 for the selected land use types (for 5-10 minutes). As soon as the participants are ready, they can place their cards on the paper sheet under the respective category (Table 9).
3. Plenary: discuss the results and highlight

Extended

1. The moderator selects from the working Table 5 from each zone two SLM solution with the highest score (step 2.2) and writes the solution, the respective land use type and zone in a new flipchart (Table 9). Discuss with the participants weather you would like to add additional SLM solutions.
2. Each group discusses the drivers for their specific zone and land use types. Ask the participants to write on facilitation cards the hindering (red card) and the supporting drivers (blue card) from Table 12 for the selected land use types (for 5-10 minutes). As soon as the participants are ready, they

the most critical hindering factors. You may let participants rate the importance of these drivers according to their perception (and indicate the importance on the paper sheet, e.g. via L-low, M-medium or H-high).

4. Plenary: discuss what actions could help to overcome the most hindering drivers. The moderator writes the key actions on a card (green) and places it on Table 10.
5. Plenary: the moderator encourages the participants to name any policies / programmes / projects / collaborations / networks / initiatives etc. in support of SLM they are aware of. The moderator compiles the information into a list with the following minimum aspects per item (Table 11): Type, name, target area, institution/contact.

can place their cards on the paper sheet under the respective category.

3. Each group discusses the results and highlights the most critical hindering factors. You may let participants rate the importance of these drivers according to their perception (and indicate the importance on the paper sheet, e.g. via L-low, M-medium or H-high).
4. Each group discusses what actions could help to overcome the most hindering drivers and writes them on a card and places it on the table.
5. Plenary: One member of each group presents the findings to the plenary. Participants reflect on the results of the respective zones and their importance at national / subnational level.
6. Plenary: the moderator encourages the participants to name any policies / programmes / projects / collaborations / networks / initiatives etc. in support of SLM they are aware of. The moderator compiles the information into a list with the following minimum aspects per item (Table 11): Type, name, target area, institution/contact.

Table 9: Example table: Drivers for SLM implementation within major land use types

Drivers (refer to table 4)	**SLM per land use type (step 1.2.)**					
	Zone A: Extensive grazing **SLM solutions :** Terracing		**Zone B:** Wasteland **SLM solutions:** Water harvesting with eye brow pits combined with agroforestry		**Zone C.** Annual cropping **SLM solutions:** Use of cover crops	
	Hindering	Supporting	Hindering	Supporting	Hindering	Supporting
Population pressure						
Consumption pattern and individual demand						
Poverty						
Labour Availability	Shortage of rural labour		Shortage of rural labour			
Inputs and infrastructure	Access to roads					
Education, awareness raising			Lacking information about technology			

Governance, institutions and politics						
Land tenure	Poorly defined tenure security		Poorly defined tenure security			
War and conflict						
Others						

Table 10: Example table actions to overcome hindering drivers

Drivers (refer to table 4)	**SLM per land use type (step 1.2.)**					
	Zone A: Extensive grazing **SLM solutions :** Terracing		**Zone B:** Wasteland **SLM solutions:** Water harvesting with eye brow pits combined with agroforestry		**Zone C.** Annual cropping **SLM solutions:** Use of cover crops	
	Hindering	Action	Hindering	Action	Hindering	Action
Population pressure						
Consumption pattern and individual demand						
Poverty						
Labour Availability						
Inputs and infrastructure						
Education, awareness raising						
Governance, institutions and politics						
Land tenure						
War and conflict						
Others						

Table 11: Policies / programmes / projects / collaborations / networks / initatives in support of SLM

Type	**Name**	**Target area**	**Institution**	**Contact**
Policy	Natural Resources Management	Mountain areas	Ministry of Environment	

Table 12: List of drivers related to land degradation – indirect causes of land degradation (from: WOCAT mapping questionnaire (QM))

Drivers of land degradation

Code	Indirect causes of land degradation
p	**Population pressure:** density of population can be a driving force for degradation. High population pressure may trigger or enhance degradation, e.g. by competing for scarce resources or ecosystem services, but a low population density may also lead to degradation, for instance where it leads to a lack of labour force.
c	**Consumption pattern and individual demand:** a change in the consumption pattern of the population and in the individual demand for natural resources (e.g. for agricultural goods, water, land resources, etc.) leading to degradation.
h	**Poverty:** poor people cannot afford to invest in resource conserving practices, so instead they continue to use inappropriate farming practices (such as ploughing hillsides and overgrazing), which again will lead to increased land degradation and worsen poverty. Whether poverty plays a role in land degradation needs to be assessed. It also includes situations where the need for bigger profits leads to over-exploitation and degradation of natural resources.
l	**Labour Availability / off-farm employment:** Shortage of rural labour (eg through migration, prevalence of diseases) can lead to abandonment of traditional resource conservation practices such as terrace maintenance. Off-farm employment opportunities may, on the other hand, help to alleviate pressure on production resources, in the sense that land users can invest more in conservation infrastructure as income increases.
r	**Inputs and infrastructure** (roads, markets, distribution of water points, etc.)**:** inaccessibility to, or high prices for key agricultural inputs such as fertilizers, may render it difficult or unprofitable to preserve soil fertility or water resources. Access to markets and prices and good infrastructure may improve this. On the other hand, a road through a forest can lead to overexploitation and degradation.
e	**Education, awareness raising and access to knowledge and support services and loss of knowledge:** investing in human capital is one of the keys in reducing poverty (and thus land conservation practices). Educated land users are more likely to adopt new technologies. Land users with education often have higher returns from their land. Education also provides off-farm labour opportunities.
g	**Governance, institutions and politics:** laws and enforcements, organization, collaboration and support: government induced interventions may set the scene and be indirect drivers for implementation of conservation interventions.
t	**Land Tenure:** Poorly defined tenure security / access rights may lead to land degradation, as individual investments in maintenance and enhancement can be captured by others and land users do not feel “owner” of the maintenance investments. Tenure systems are particular important factors when conservation practices have a long lag between investment and return, such as terracing and tree planting.
w	**War and conflict:** they lead to reduced options to use the land or to increased pressure.
o	**Others**

Remark: Excluding natural unfavourable preconditions.

Step 5: Finding consensus on priority areas

Objectives

- Based on the information and discussion in Part II, steps 1-4, build a consensus on a defined set of national / subnational priority areas for SLM implementation

Duration

Steps		Minutes
5.1.	Plenary discussion on priority areas	20
5.2.	Prioritization	10
	Total	**30**

Preparations and material required

- Paper sheets, markers (different colours), tape

Methodology

Plenary session

Procedure

Agreement on priority areas

1. The moderator with the support of the lead agency(ies) summarizes the results of Part II, step 1 – 4 in view of priority zones and land use / land management types.
2. The moderator asks the participants if additional factors need to be taken into account for the prioritization, which have not been addressed so far (e.g. specific development regions already identified at national / subnational level)?
3. As a general conclusion the participants vote with 3 “voting” stickers over all zones and land use types, which areas have the highest priority at national / subnational level for SLM implementation.

Discuss the result, final remarks and conclusion.

Expected results

- A finite set of national / subnational priority areas is agreed

PART III: Outlook and planning of process to compile knowledge base

Objectives

- To inform participants on the next steps of the process at national / subnational (and maybe also local / landscape) level
- To reach a tentative agreement of responsibilities for compilation of national knowledge base
- To evaluate the workshop

Duration

Steps	Minutes
1. Overview of next steps	15
2. Responsibilities for national knowledge base	30
3. Workshop evaluation	15
4. Closure	10
Total	**70**

Preparations and material required

- Sufficient copies of Workshop evaluation template (Annex 2)
- Paper sheets, markers (different colours), tape

Methodology

Plenary session

Procedure

1. Overview of next steps

- The moderator gives an overview of the next steps
  a. Compilation and analysis of national knowledge base (Figure 2, step N2)
- b. Workshop with national SLM stakeholder for the selection of priority zones for SLM intervention based on the compilation of a national knowledge base (Figure 2, step N3)
- c. Assessment at landscape / local level (Figure 3).

2. Responsibilities for national knowledge base

- The moderator provides a tentative list of components which should be compiled for the national knowledge base (e.g. land use / management maps, land degradation and SLM maps, inventory of existing SLM technology groups and approaches, etc).
- The group agrees on key components to be compiled and distributes responsibilities, mainly to members of the expert group.
- A time line for the compilation is agreed with all participants.

3. Workshop evaluation

- Distribute the workshop evaluation template (Annex 1) and let the workshop participants fill it in.
- Plenary: If there is enough time left, initiate a plenary discussion. Use open questions such as
  a. What are your benefits / gains from the workshop in terms of understanding the meaning of sustainable land management and selecting priority areas for action?
  b. How did you like the way of learning and working (methodology) in the

workshop?
c. Which suggestions do you have to improve the organisation of the workshop?

4. Closure

- Officially close the workshop and thank all participants for their valuable collaboration.

Expected results

- Participants are motivated for and know the next steps of the process at national / subnational level
- Responsibilities for building national knowledge base tentatively agreed
- Participants give feedback on the workshop.

Annex 1: List of WOCAT SLM solution impacts

for use in Part I, Step 3

Has the SLM solution and their impacts contributed to improve livelihoods and human well-being (e.g. education, health)?
no ☐ yes, little ☐ yes, moderately ☐ yes, greatly ☐

What are the specific benefits connected to the impacts of SLM solution?

Benefits related to impacts	On-site and/or off-site?	Intensity? 1=little to 5=greatly
- increased production - increased profit(ability) - reduced land degradation - reduced risk of disasters - reduced workload - payments/ subsidies - rules and regulations (fines)/enforcement - prestige, social pressure/cohesion - affiliation to movement/ project/ group/ networks - environmental consciousness - customs and beliefs, morals - enhanced SLM knowledge and skills - aesthetic improvement - conflict mitigation - other (specify): …… - other (specify): ……		

What are the specific disadvantages connected to the impact of the SLM solution?

Disadvantages related to impacts	On-site and/or off-site?	Intensity? 1=little to 5=greatly
- decreased production - decreased profit(ability) - increased land degradation - increased risk of disasters - increased workload - increased conflicts over land - less prestige, more social pressure - aesthetic damage - other (specify): …… - other (specify): ……		

Have land users spontaneously been adapting this solution?
no ☐ yes, some ☐ yes, all ☐

Has external support (e.g. food-for-work, payments, subsidised machinery) been provided to land users?
no ☐ yes, some ☐ yes, full support ☐

Can the land users sustain what has been implemented through the SLM solution (without external support)?

no ☐ yes ☐ uncertain ☐

Annex 2: Workshop evaluation template

To be filled in by all participants of the Stakeholder Workshop

Personal information:

Sex: male ☐ female ☐ Age: ……..years Name (voluntary):……

Stakeholder category:

☐ Land user / farmer ☐ Local administration ☐ Private sector | (e.g. industry, retailer)

☐ Civil society organization ☐ Subnational administration ☐ Research institute

☐ Advisory service ☐ National administration ☐ Policymaker

☐ Other (please specify): .....

Please indicate how much you agree with the following statements (tick the respective box)

	1 = I strongly agree 2 = I agree 3 = I mildly agree			4 = I mildly disagree 5 = I disagree 6 = I strongly disagree		
In <u>this</u> workshop:	**1**	**2**	**3**	**4**	**5**	**6**
1. All stakeholders whose cooperation is needed to address SLM at national level were represented in the workshop.						
2. I acquired a lot of new knowledge about land-related issues and ways of solving them.						
3. I learned a lot from the knowledge and experience of other stakeholders.						
4. Other stakeholders learned a lot from my knowledge and experience.						
5. All participants were taken seriously,						

regardless of stakeholder category.						
6. There were enough opportunities for informal exchange with other participants.						
7. I obtained a new or better understanding of other stakeholders' positions.						
8. I discovered I shared common interests in regard to land management with stakeholders from categories I had not expected to share common interests with.						
9. I felt that exchange and interaction between different stakeholders took place in an atmosphere of trust.						
10. I felt that the other stakeholders fully understood my position and concerns.						
11. The different stakeholders stuck to their long-held views and positions.						
12. The insights from the workshop made me rethink and change my own position.						
13. I felt that certain people (stakeholder groups or individuals) dominated the discussions.						
14. What I learned in the workshop is very useful for my own work.						

Comments (use additional sheet, if needed):

……
……...

……
……...

INCORPORATING WOCAT/LADA TOOLS IN THE NTABELANGA DAM LAND REHABILITATION PROJECT IN SOUTH AFRICA

WOCAT SYMPOSIUM AND 18TH WOCAT NETWORK MEETING
CALI, COLOMBIA, JUNE 2017

SMC Synergy
Spatial Management Consulting

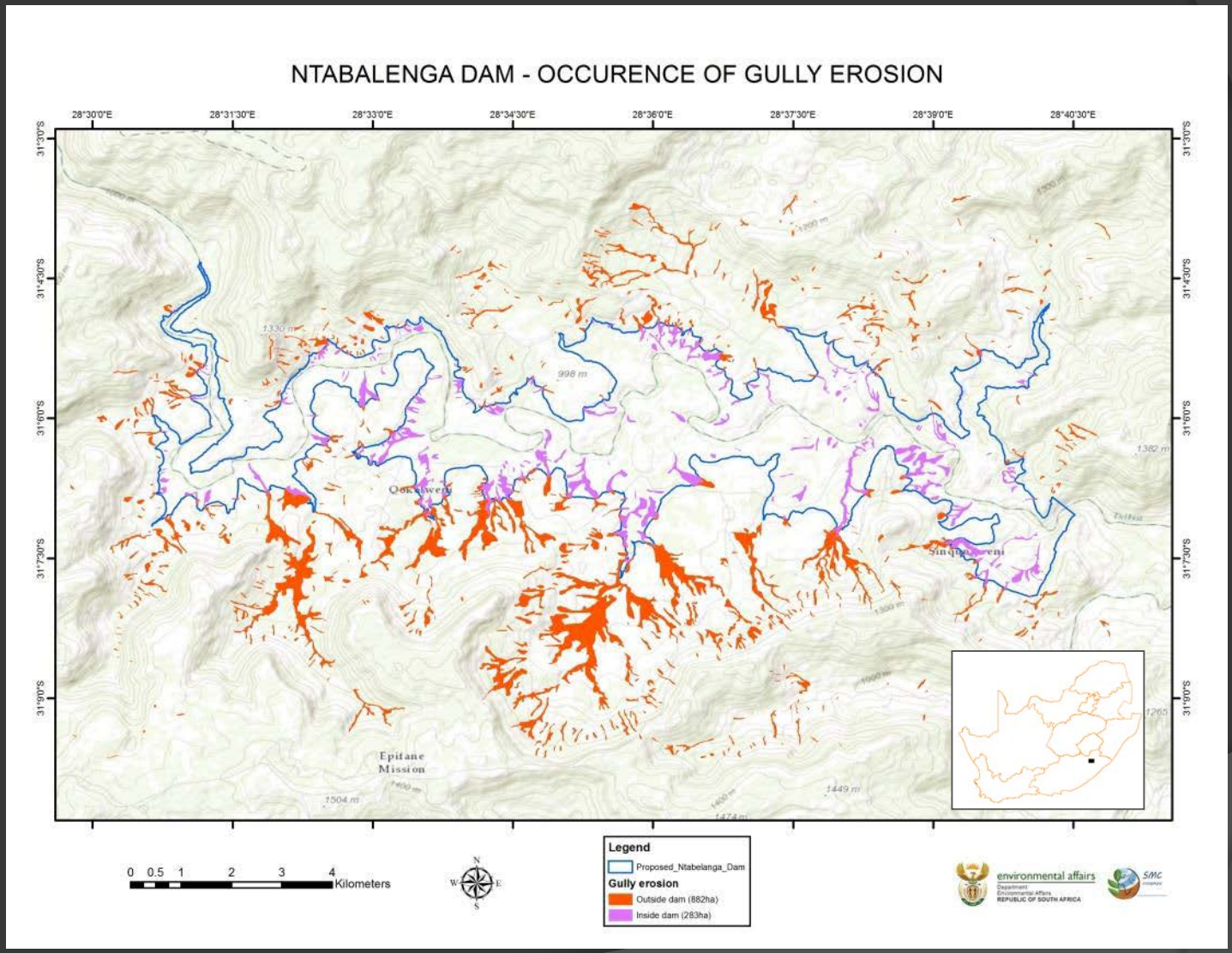
Dirk Pretorius
SMC Synergy
dirk@smc-synergy.co.za

INTRODUCTION

- The Mzimvubu catchment in the Eastern Cape of South Africa is within one of the poorest and least developed regions of the country.
- A catchment rehabilitation and management programme, aimed at restoring eroded land and thereby reducing the levels of sedimentation in the planned Ntabelanga dam, has been initiated by the Department of Environmental Affairs (DEA).
- This project's main aim was to demonstrate the use of WOCAT/LADA tools in mapping the state of land degradation in the catchment around the planned dam and to use the WOCAT knowledge base to identify options for rehabilitation.

SMC
Synergy
Spatial Management
Consulting

PROJECT AREA



SMC Synergy
Spatial Management Consulting

CHALLENGES

- The proposed dam is planned in one of the most degraded areas in South Africa
- Very little expertise on the degradation status of the catchment around the dam
- Demonstrating the value of the WOCAT/LADA tools
- Adapting the WOCAT/LADA methodology to address the objectives of the overall rehabilitation plan at a catchment level

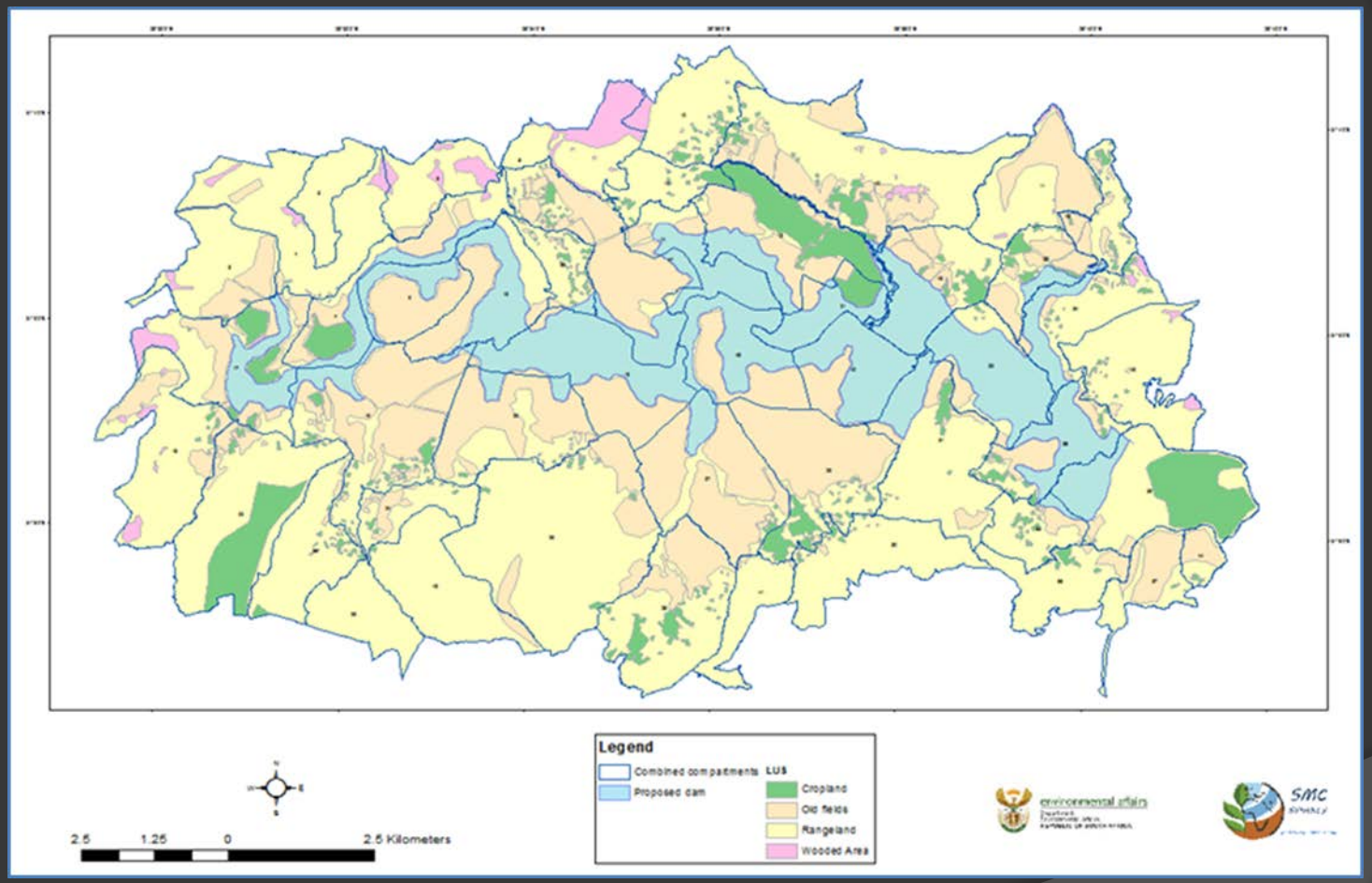
SMC Synergy
Spatial Management Consulting

ACHIEVEMENTS

- Land degradation assessment of the Ntabelanga dam catchment
  - Identified main degradation types
  - Prepared a stratification map based on main land use/cover types and management units (compartments)
  - Acquired all relevant spatial data that could assist with the assessment
  - Developed an online data capturing system
  - Completed the assessment with the aid of remote sensing data and field visits
  - GIS analysis of the data

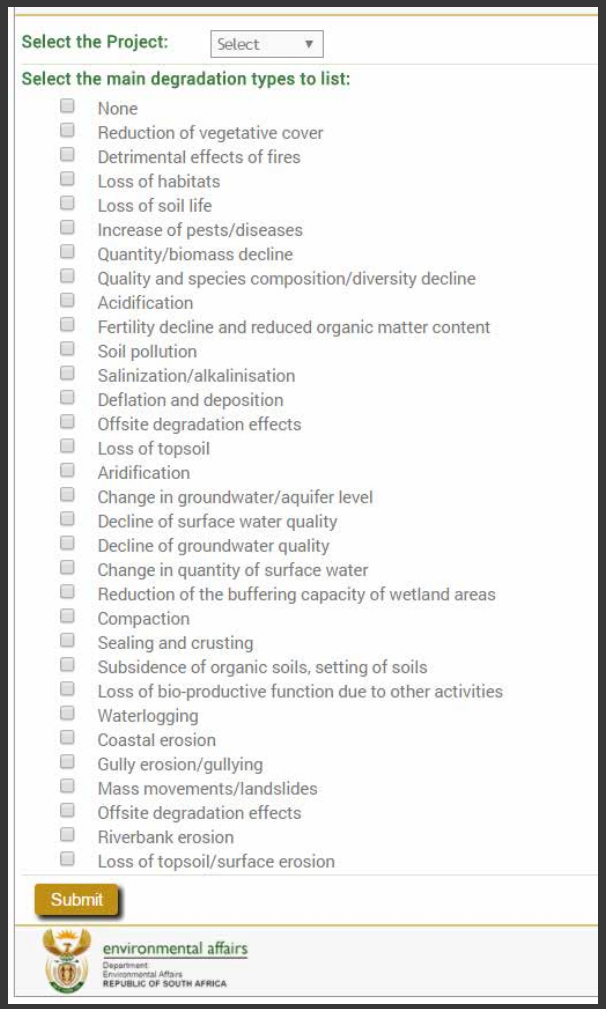
SMC Synergy
Spatial Management Consulting

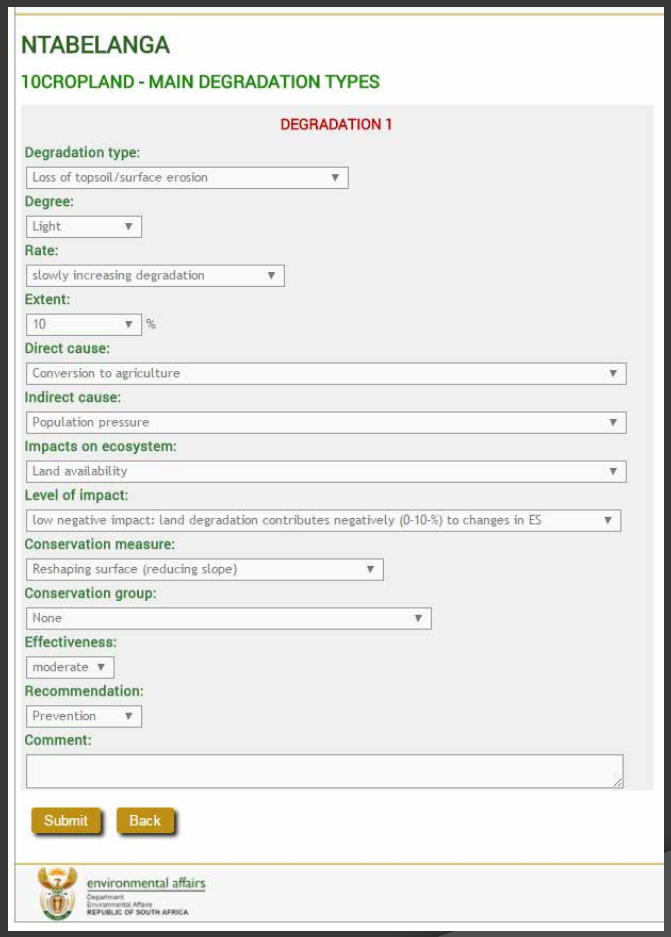
BASE MAP FOR THE DEGRADATION ASSESSMENT



SMC Synergy
Spatial Management Consulting

WEB-BASED LAND DEGRADATION MAPPING SYSTEM





SMC Synergy
Spatial Management Consulting

WEB-BASED LAND DEGRADATION MAPPING SYSTEM

MAPPING UNITS & MAIN DEGRADATION

Export to Excel

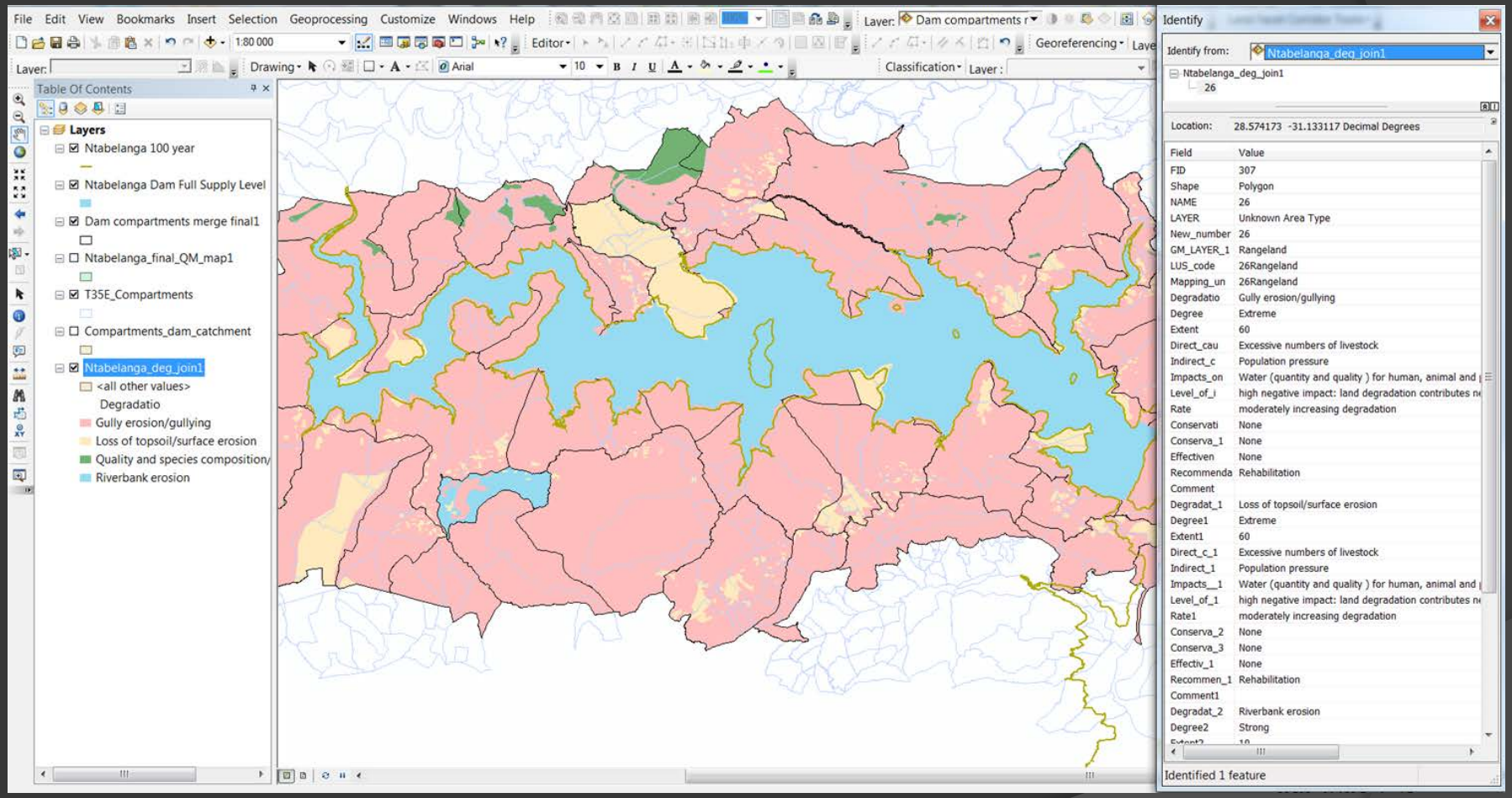
The Degradation upload was successful!

Mapping Unit	Degradation														
	Degradation Type	Degree	Extent	Direct Cause	Indirect Cause	Impacts On Ecosystem Services	Level Of Impact	Rate	Conservation Group	Conservation Measure	Effectiveness	Recommendation	Comment		
10Cropland	Loss of topsoil/surface erosion	Light	10%	Conversion to agriculture	Population pressure	Land availability	low negative impact: land degradation contributes negatively (0-10-%) to changes in ES	slowly increasing degradation	None	Reshaping surface (reducing slope)	moderate	Prevention			
10Old fields	Loss of topsoil/surface erosion	Light	10%	Cultivation of highly unsuitable soils	Population pressure	Land availability	low negative impact: land degradation contributes negatively (0-10-%) to changes in ES	slowly increasing degradation	None	Reshaping surface (reducing slope)	moderate	Prevention			
10Rangeland	Gully erosion/gullying	Moderate	20%	Excessive numbers of livestock	Population pressure	Land availability	high positive impact: land degradation contributes positively (more than 50%) to changes in ES	slowly increasing degradation	None	None	None	Rehabilitation			
	Loss of topsoil/surface erosion	Moderate	20%	Excessive numbers of livestock	Population pressure	Land availability	negative impact: land degradation contributes negatively (10-50%) to changes in ES	slowly increasing degradation	None	None	None	Rehabilitation			
	Quality and species composition/diversity decline	Light	10%	Occurrence and spread of weeds and invader plants	Others	Regulation of scarce water and its availability eg during dry seasons, droughts affecting water and evaporation loss	low negative impact: land degradation contributes negatively (0-10-%) to changes in ES	slowly increasing degradation	None	None	None	Rehabilitation	Check for alien vegetation species		
10Wooded Area	Quality and species composition/diversity decline	Light	10%	Occurrence and spread of weeds and invader plants	Others	Regulation of scarce water and its availability eg during dry seasons, droughts affecting water and evaporation loss	low negative impact: land degradation contributes negatively (0-10-%) to changes in ES	no change in degradation	None	None	None	Prevention	Check for alien vegetation species		
11Cropland	Loss of topsoil/surface erosion	Light	10%	Conversion to agriculture	Population pressure	Land availability	low negative impact: land degradation contributes negatively (0-10-%) to changes in ES	slowly increasing degradation	None	None	None	Prevention			
11Old fields	Gully erosion/gullying	Strong	30%	Cultivation of highly unsuitable soils	Population pressure	Land availability	negative impact: land degradation contributes negatively (10-50%) to changes in ES	moderately increasing degradation	None	Reshaping surface (reducing slope)	moderate	Rehabilitation			

environmental affairs
Department: Environmental Affairs
REPUBLIC OF SOUTH AFRICA

SMC Synergy
Spatial Management Consulting

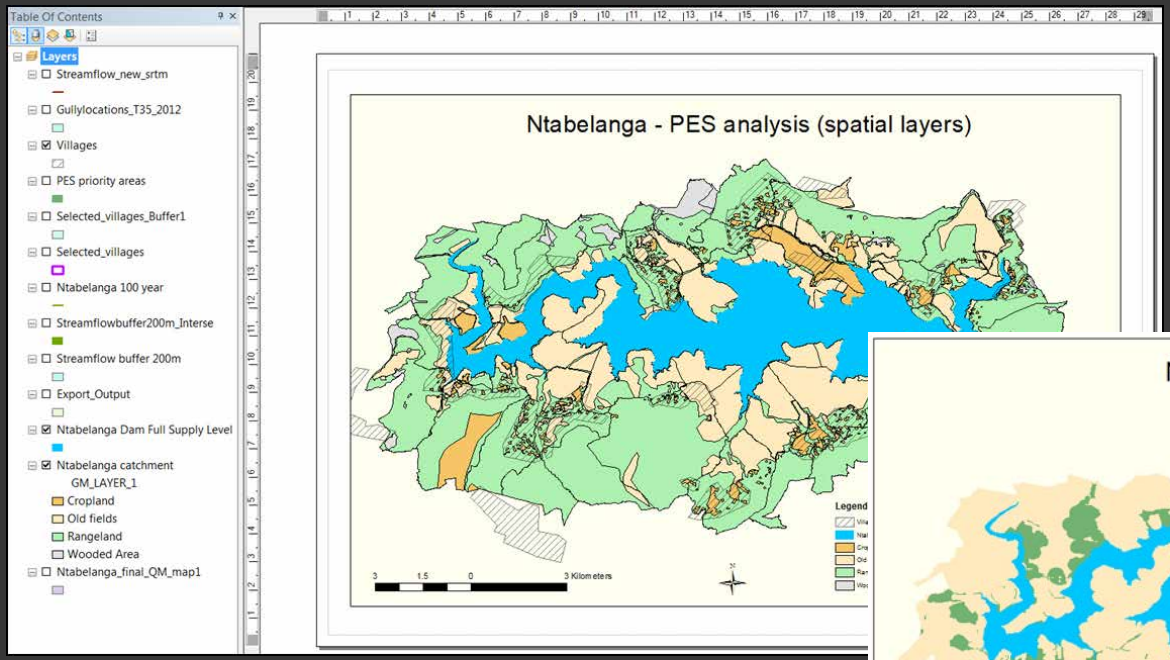
DATA INTEGRATED INTO GIS

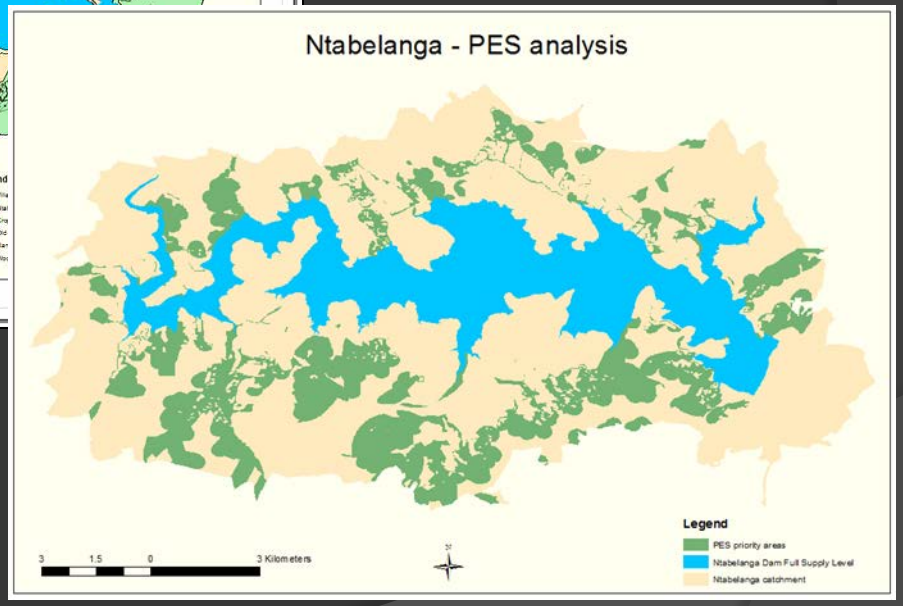


SMC Synergy
Spatial Management Consulting

ANALYSING THE DATA

(IDENTIFY AREAS WHERE PAY FOR ECOSYSTEM SERVICES CAN BE INTRODUCED)

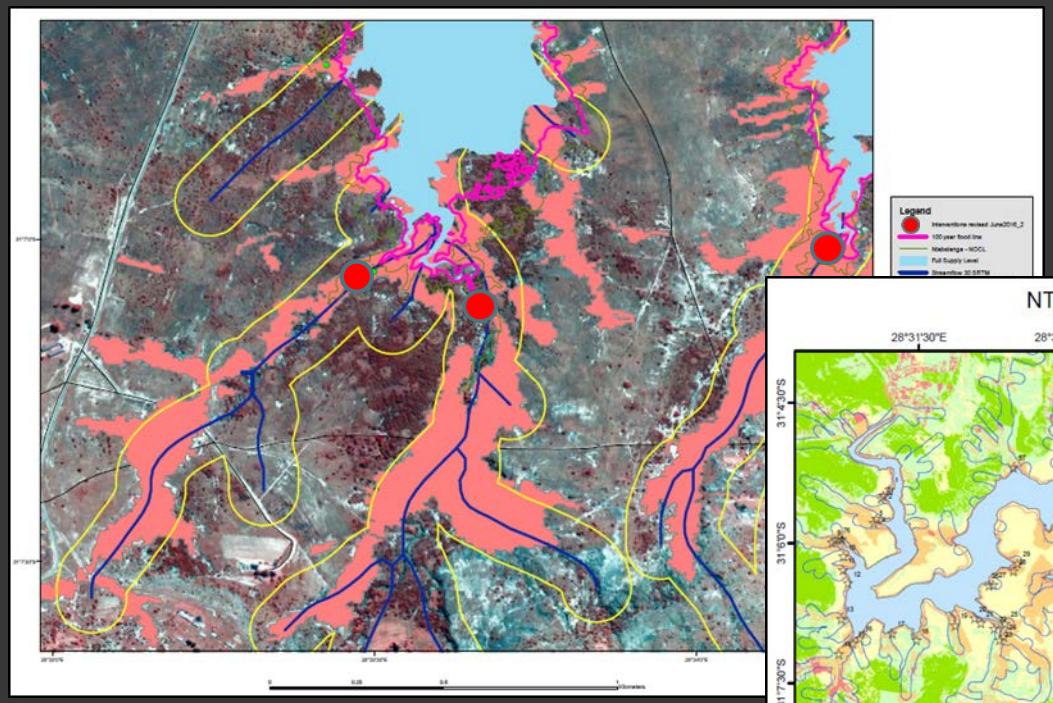


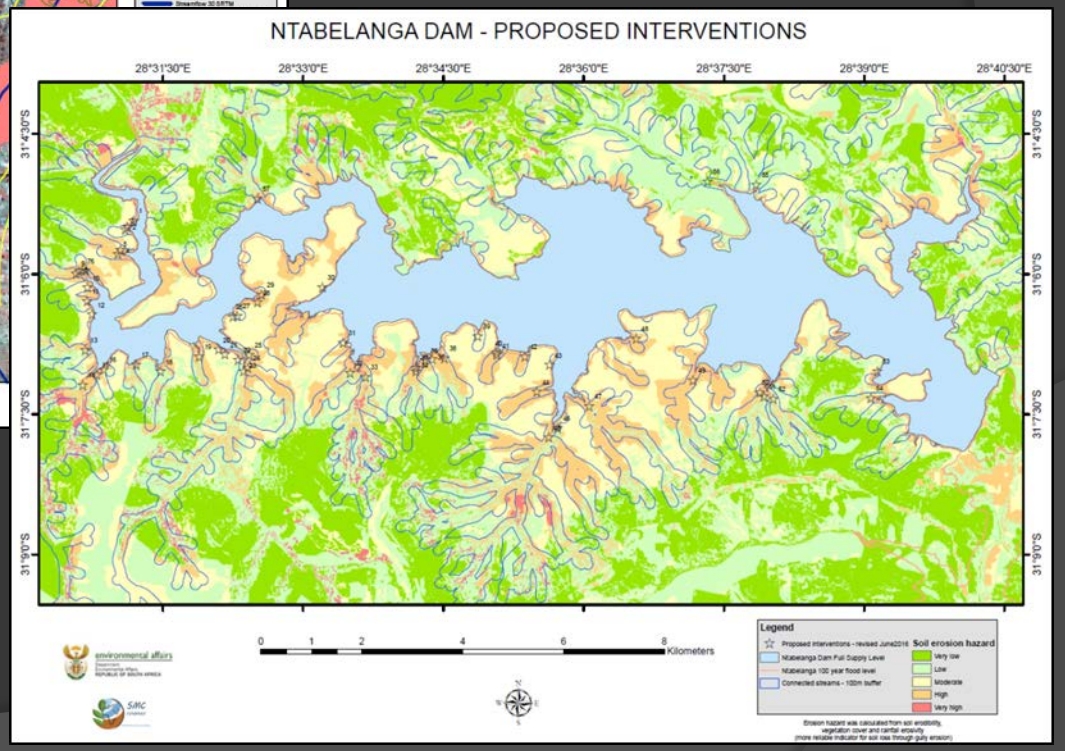


SMC Synergy
Spatial Management Consulting

PROPOSED SITES FOR MAJOR REHABILITATION INTERVENTIONS

(USING AIRBUS PLEIADES SATELLITE DATA, HIGH RESOLUTION DEM, MAPPED GULLY EROSION)





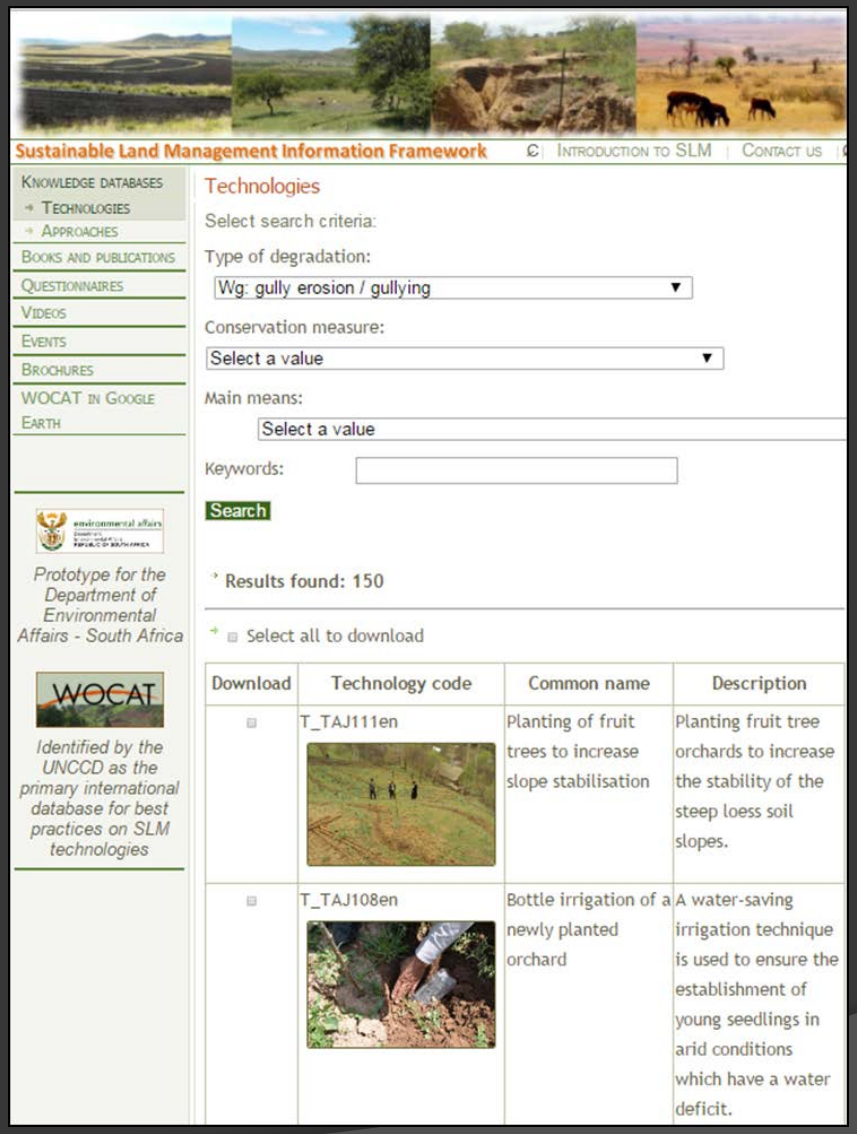
SMC Synergy
Spatial Management Consulting

ACHIEVEMENTS

- Extracted relevant case studies as options for rehabilitation
  - Developed a web service to link with the WOCAT QT and QA database
  - Developed a working “proof of concept” SLM information system for DEA
  - Extracted relevant case studies
  - Developed a simple decision support system to prioritise the extracted case studies
  - Compiled a list of case studies for DEA to consider as options for rehabilitation

SMC
Synergy
Spatial Management
Consulting

WEB-SERVICE LINK TO WOCAT QT AND QA



SMC Synergy
Spatial Management Consulting

SUMMARY OF EXTRACTED CASE STUDIES (90)

environmental affairs
Department:
Environmental Affairs
Republic of South Africa

WOCAT

UNCCD

Primary recommended database

SMC Synergy
Spatial Management Consulting

Id	Code	Common name	Country	Overview	URL	Options to consider
Group: Agroforestry						y = recommended; ? = peruse
284	T_COL002en	Intensive agroforestry system	Colombia	A protective and productive high-input agroforestry system comprising multi-purpose ditches with bunds, live barriers of grass, contour ridging.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=284	y
129	T_CHN021en	Orchard terraces with bahia grass cover	China	Rehabilitation of degraded hillsides through the establishment of fruit trees on slope-separated orchard terraces, with bahia grass planted as protective groundcover.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=129	?
595	T_MOR015en	Gully control by plantation of Atriplex	Morocco	Rehabilitation of a gullied slope and gully control, by plantation of Atriplex halimus fodder shrubs.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=595	?
451	T_IND005en	Agro-forestry	India	Development of degraded lands through plantation of productive tree species for long term benefit (conservation and economic) and cultivation of intercrop for short term benefit.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=451	y
166	T_TAJ003en	Orchard-based agroforestry	Tajikistan	An agroforestry system where legumes and cereals are planted in fruit orchards, giving simultaneous production and conservation benefits.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=166	?
271	T_TAJ111en	Planting of fruit trees to increase slope stabilisation	Tajikistan	Planting fruit tree orchards to increase the stability of the steep loess soil slopes	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=271	?
694	T_TAJ044en	Silvo-pastoralism: Orchard with integrated grazing and fodder production	Tajikistan	Increased productivity of the land by planting fruit trees and conserving the land by restricting the access of livestock resulting in improved runoff retention	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=694	?
686	T_TAJ115en	Gully rehabilitation with native trees	Tajikistan	Vegetative and structural technology for the rehabilitation of an expanded gully	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=686	Y
603	T_MOR014en	Olive tree plantations with intercropping	Morocco	Contour planting of olive trees with crops, legumes and vegetables intercropping	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=603	Y
685	T_TAJ043en	Mixed fruit tree orchard with intercropping of Esparcet and annual crops in Muminabad District	Tajikistan	Orchard based agroforestry established on the hill slopes of Muminabad	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=685	?
1213	T_NIG080en	Assisted natural regeneration	Niger	Assisted natural regeneration (ANR) is an agroforestry technique, which consists in protecting and preserving tree seedlings growing naturally on cropland or forest/rangeland.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=1213	?
260	T_TAJ008en	Orchard-based agroforestry (establishment of orchard)	Tajikistan	Establishment of an orchard intercropping system on severely degraded cropland.	https://qt.wocat.net/qt_summary1.php?lang=english&qt_id=260	?

www.smc-synergy.co.za/downloads/58ecb16d98d5e/SLM_options_Ntabelanga_analyse.pdf)

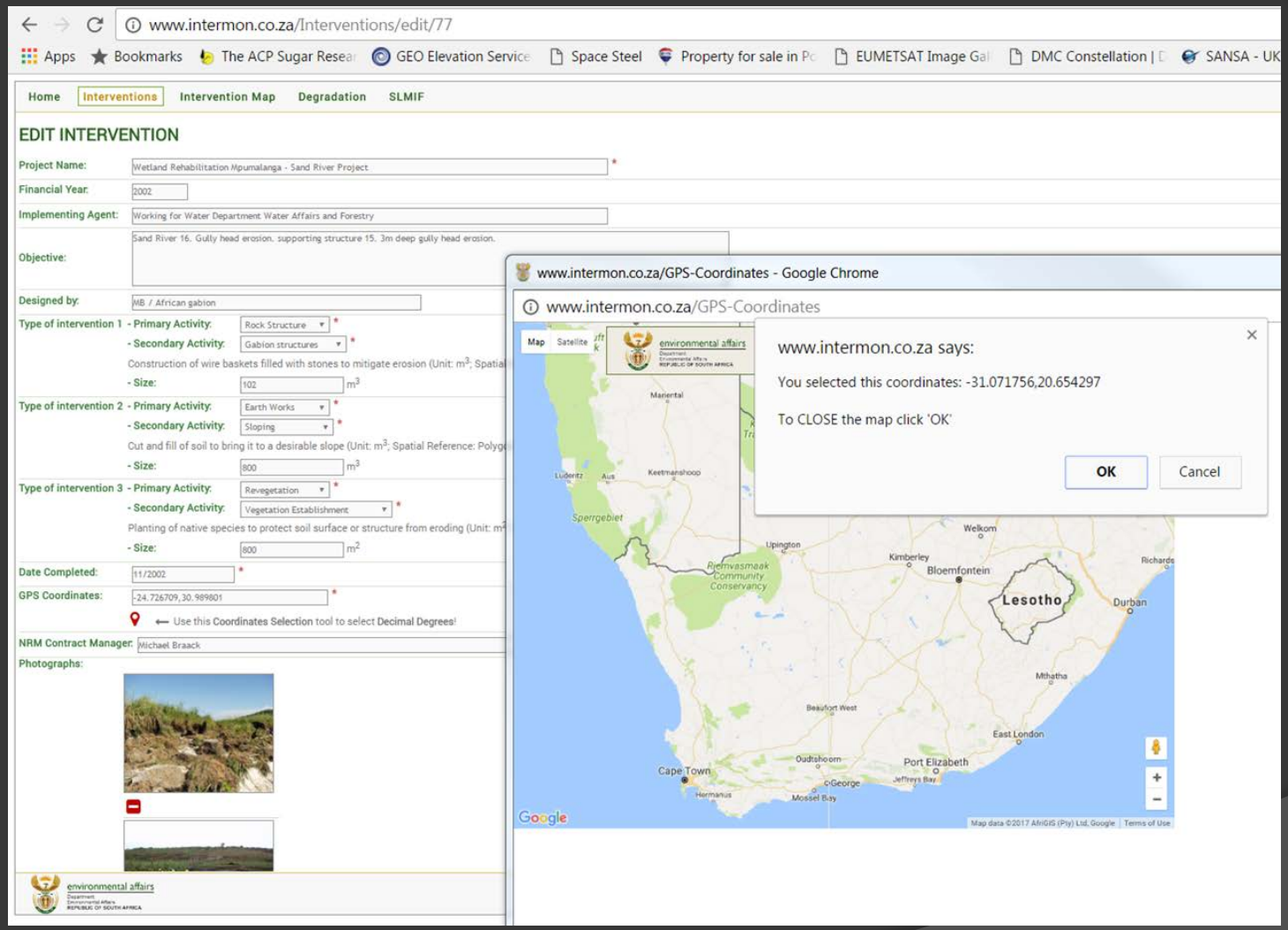
SMC Synergy
Spatial Management Consulting

ACHIEVEMENTS

- Developed a rehabilitation project monitoring and evaluation system
  - Developed an online system to capture intervention projects (www.intermon.co.za)
  - Developed a Google Maps interface to view location of interventions
  - Created Export function to export the information of all captured projects
  - Created a spatial database – link to stand-alone GIS software

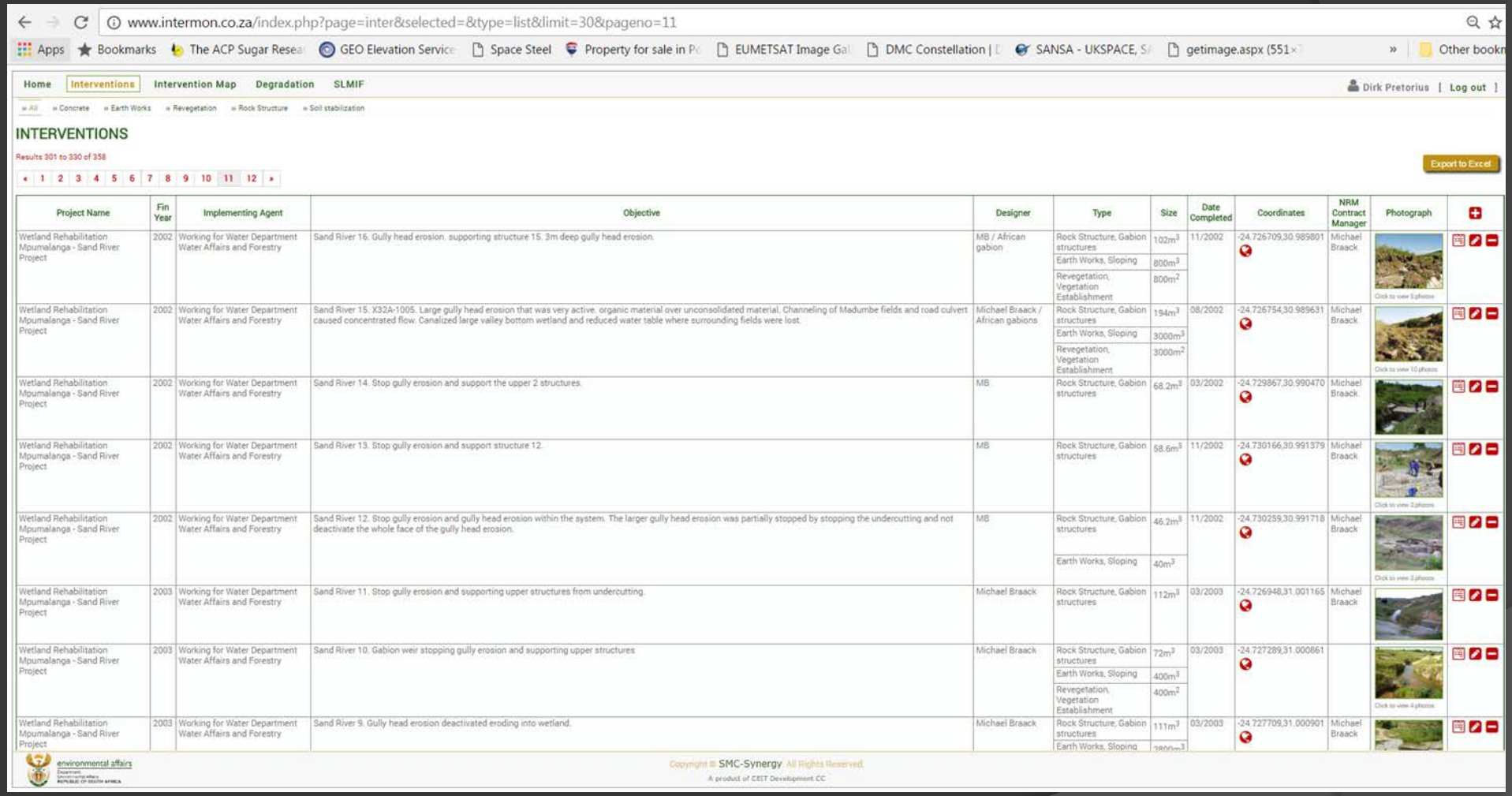
SMC Synergy
Spatial Management Consulting

REHABILITATION PROJECT MANAGEMENT SYSTEM
(DATA CAPTURING)



SMC Synergy
Spatial Management Consulting

REHABILITATION PROJECT MANAGEMENT SYSTEM
(THE DATABASE)



www.intermon.co.za/index.php?page=inter&selected=&type=list&limit=30&pageno=11

Home | Interventions | Intervention Map | Degradation | SLMIF — Dirk Pretorius [Log out]

» All » Concrete » Earth Works » Revegetation » Rock Structure » Soil stabilization

INTERVENTIONS

Results 301 to 330 of 358

« 1 2 3 4 5 6 7 8 9 10 11 12 »

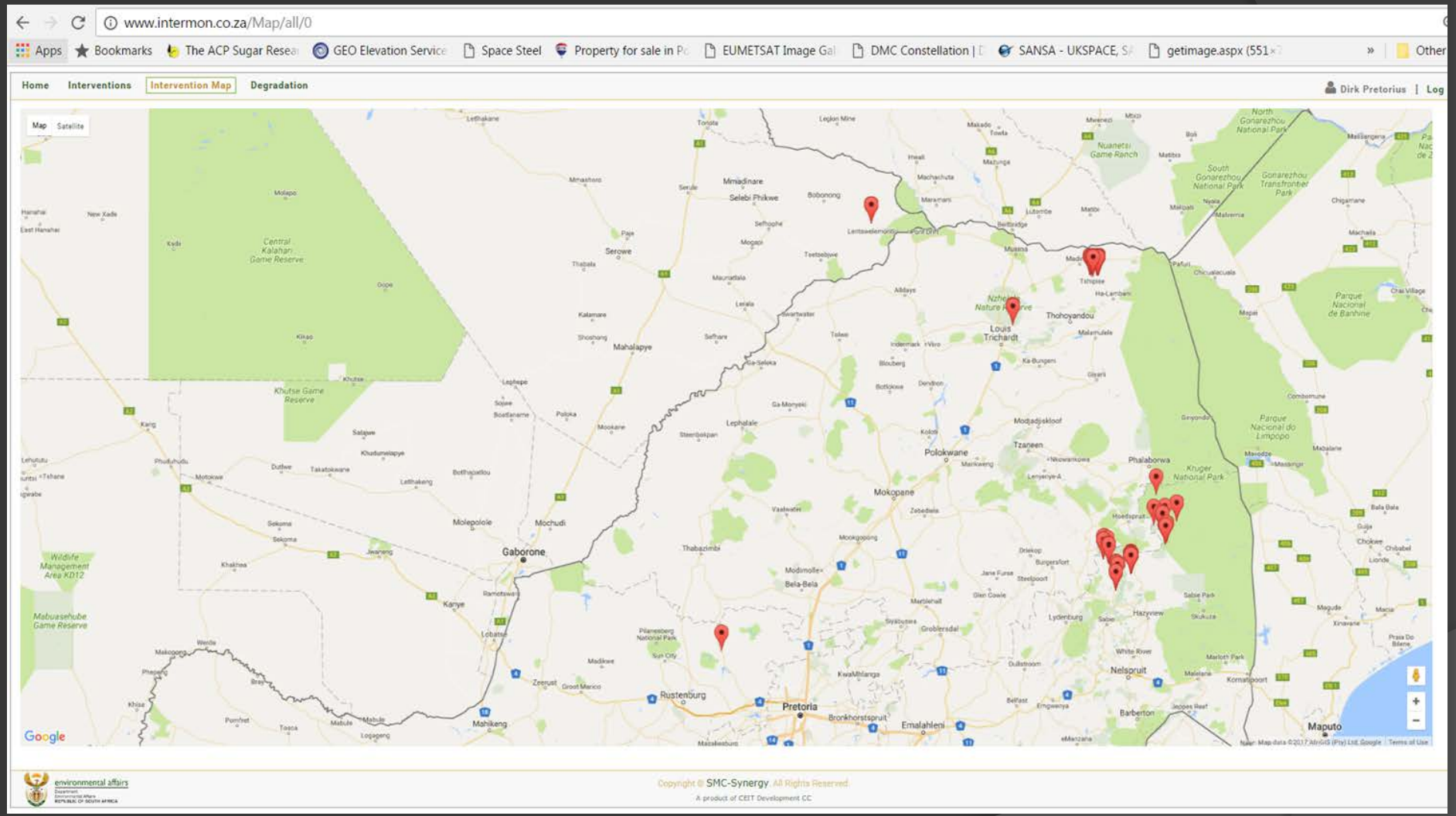
Export to Excel

Project Name	Fin Year	Implementing Agent	Objective	Designer	Type	Size	Date Completed	Coordinates	NRM Contract Manager	Photograph
Wetland Rehabilitation Mpumalanga - Sand River Project	2002	Working for Water Department Water Affairs and Forestry	Sand River 16. Gully head erosion. supporting structure 15. 3m deep gully head erosion.	MB / African gabion	Rock Structure, Gabion structures Earth Works, Sloping Revegetation, Vegetation Establishment	102m³ 800m³ 800m²	11/2002	-24.726709,30.989801	Michael Braack	Click to view 5 photos
Wetland Rehabilitation Mpumalanga - Sand River Project	2002	Working for Water Department Water Affairs and Forestry	Sand River 15. X32A-1005. Large gully head erosion that was very active. organic material over unconsolidated material. Channeling of Madumbe fields and road culvert caused concentrated flow. Canalized large valley bottom wetland and reduced water table where surrounding fields were lost.	Michael Braack / African gabions	Rock Structure, Gabion structures Earth Works, Sloping Revegetation, Vegetation Establishment	194m³ 3000m³ 3000m²	08/2002	-24.726754,30.989631	Michael Braack	Click to view 10 photos
Wetland Rehabilitation Mpumalanga - Sand River Project	2002	Working for Water Department Water Affairs and Forestry	Sand River 14. Stop gully erosion and support the upper 2 structures.	MB	Rock Structure, Gabion structures	68.2m³	03/2002	-24.729867,30.990470	Michael Braack	
Wetland Rehabilitation Mpumalanga - Sand River Project	2002	Working for Water Department Water Affairs and Forestry	Sand River 13. Stop gully erosion and support structure 12.	MB	Rock Structure, Gabion structures	58.6m³	11/2002	-24.730166,30.991379	Michael Braack	Click to view 2 photos
Wetland Rehabilitation Mpumalanga - Sand River Project	2002	Working for Water Department Water Affairs and Forestry	Sand River 12. Stop gully erosion and gully head erosion within the system. The larger gully head erosion was partially stopped by stopping the undercutting and not deactivate the whole face of the gully head erosion.	MB	Rock Structure, Gabion structures Earth Works, Sloping	46.2m³ 40m³	11/2002	-24.730259,30.991718	Michael Braack	Click to view 3 photos
Wetland Rehabilitation Mpumalanga - Sand River Project	2003	Working for Water Department Water Affairs and Forestry	Sand River 11. Stop gully erosion and supporting upper structures from undercutting.	Michael Braack	Rock Structure, Gabion structures	112m³	03/2003	-24.726948,31.001165	Michael Braack	
Wetland Rehabilitation Mpumalanga - Sand River Project	2003	Working for Water Department Water Affairs and Forestry	Sand River 10. Gabion weir stopping gully erosion and supporting upper structures	Michael Braack	Rock Structure, Gabion structures Earth Works, Sloping Revegetation, Vegetation Establishment	72m³ 400m³ 400m²	03/2003	-24.727289,31.000861		Click to view 4 photos
Wetland Rehabilitation Mpumalanga - Sand River Project	2003	Working for Water Department Water Affairs and Forestry	Sand River 9. Gully head erosion deactivated eroding into wetland.	Michael Braack	Rock Structure, Gabion structures Earth Works, Sloping	111m³ 2800m³	03/2003	-24.727709,31.000901	Michael Braack	

environmental affairs

SMC Synergy
Spatial Management Consulting

INTERVENTION MAP



SMC Synergy
Spatial Management Consulting

INTERVENTION MAP – SATELLITE DATA

SMC Synergy
Spatial Management Consulting

OUTLOOK

- Promote the use of the extracted case studies in the overall rehabilitation plan for the Ntabelanga dam catchment
- Promote the use of the WOCAT land degradation data (QM) in decision making
- Demonstrate the use of Intermon to identify new projects for which QT and QA can be completed
- Plan to capture 3 new QT's and 3 QA's in the following 6 months

SMC Synergy
Spatial Management Consulting

WOCAT SLM Watershed Application:

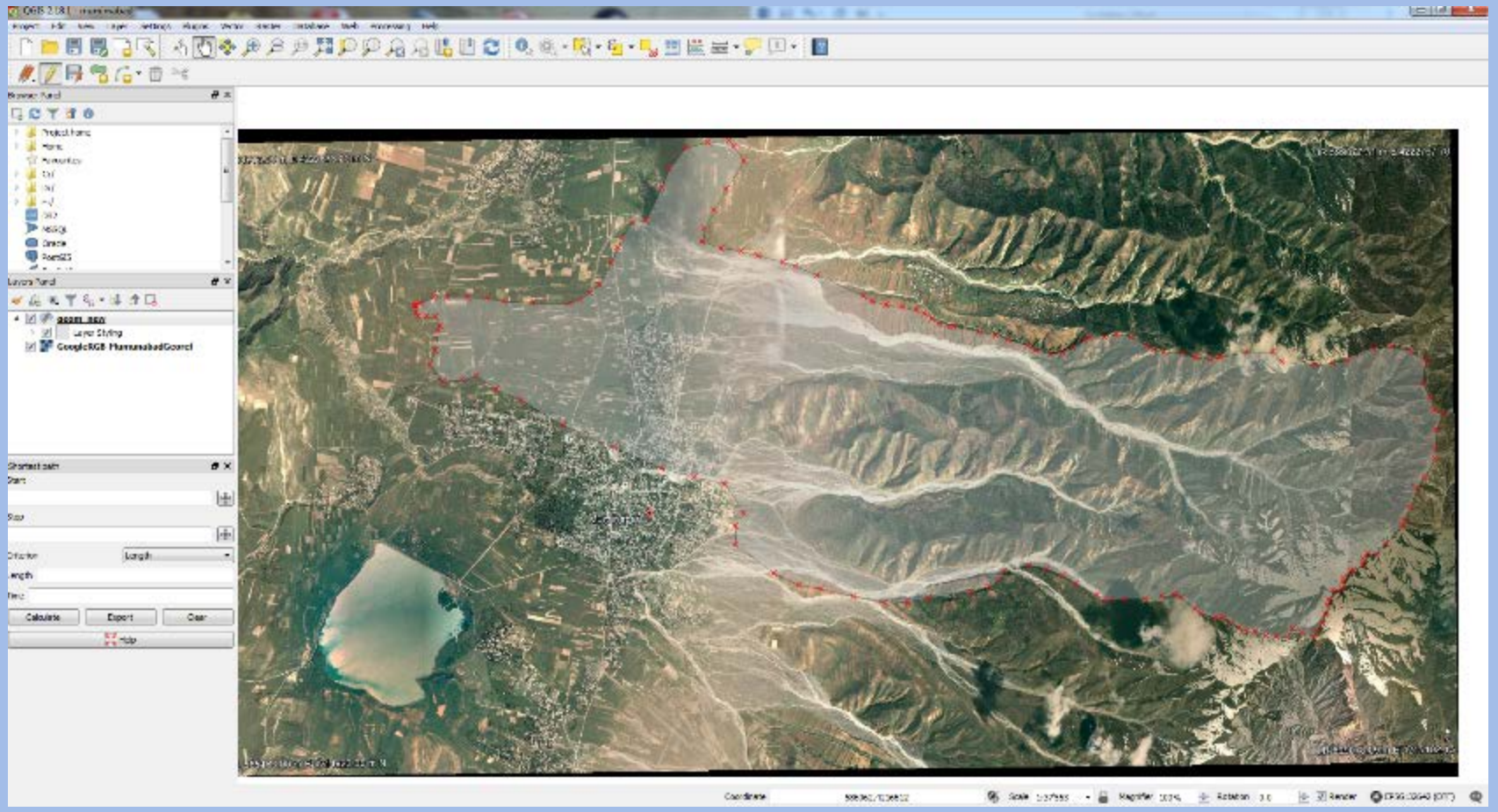
A QGIS application for mapping in Google Earth pictures:

- Land use type
- Assessment of runoff from daily rainfall
- land degradation and SLM and impacts

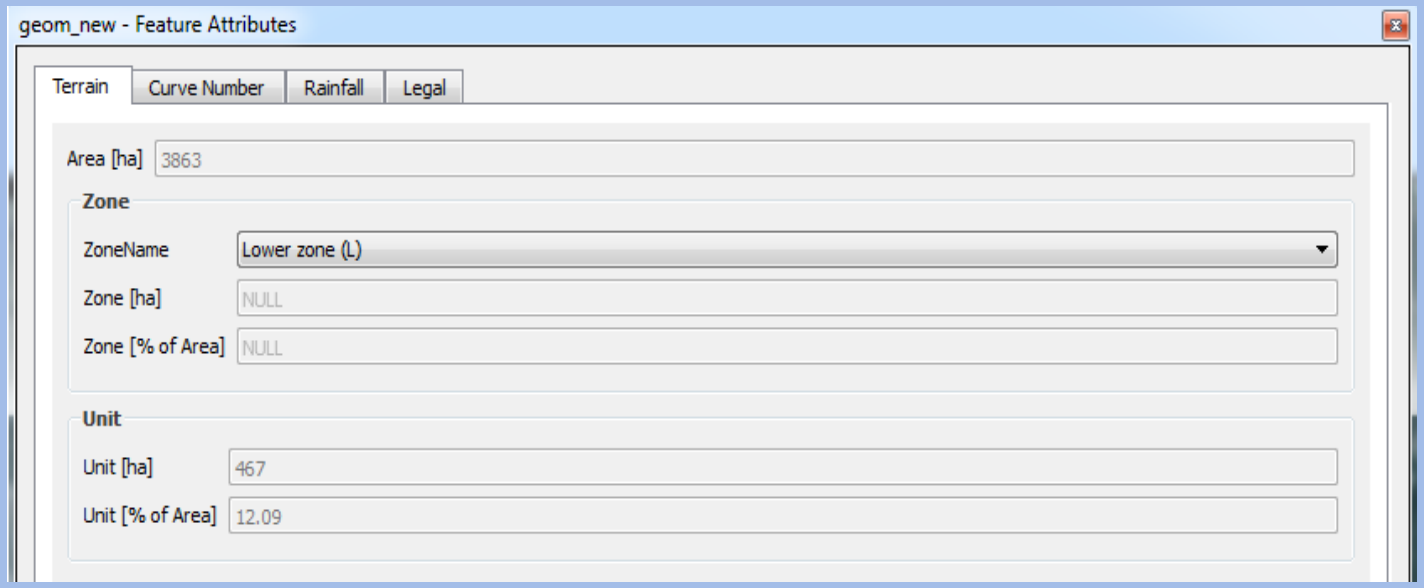
Prototype for testing

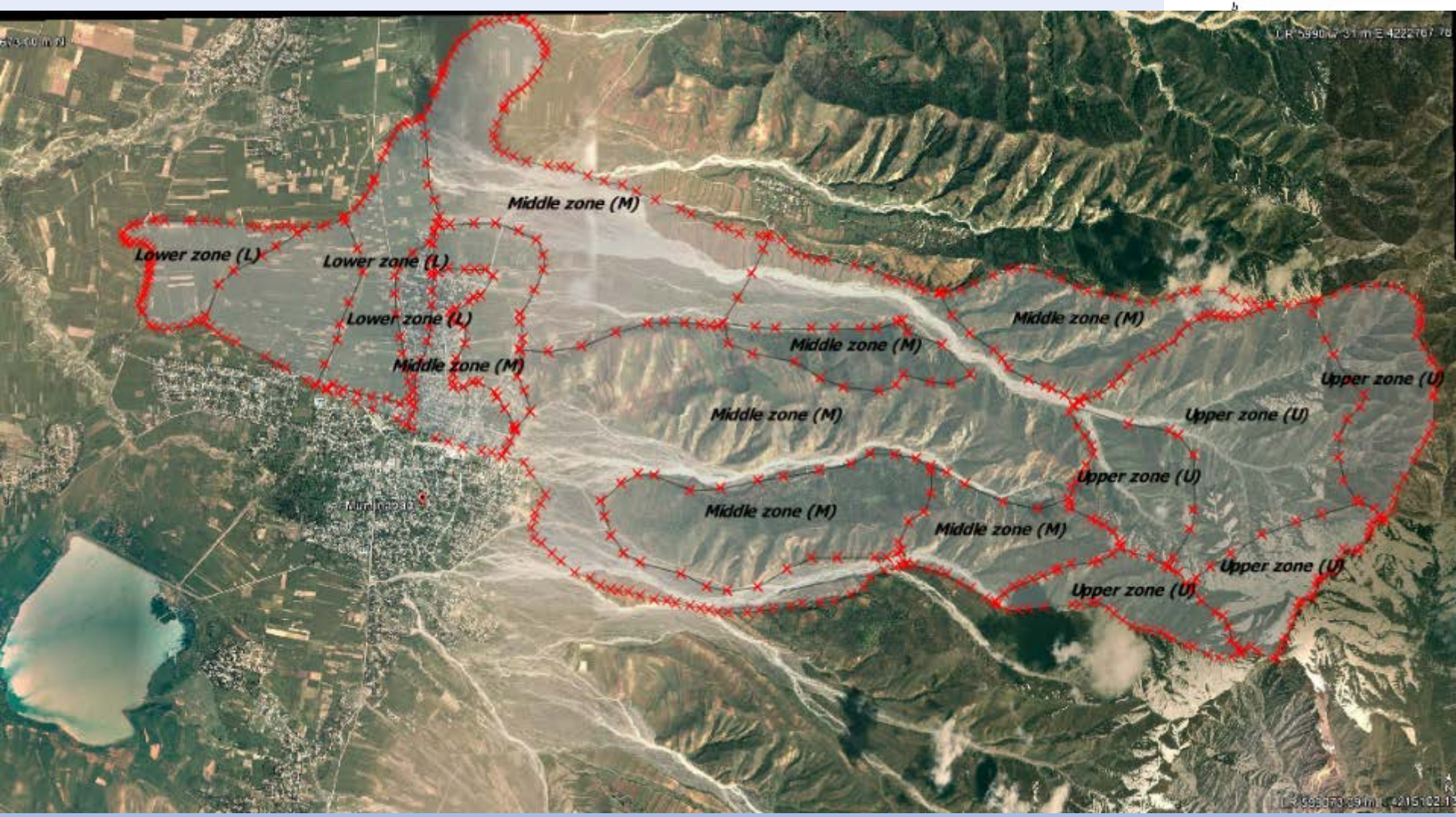
Hanspeter Liniger, Jürg Krauer, Lorenz Joss
June 2017

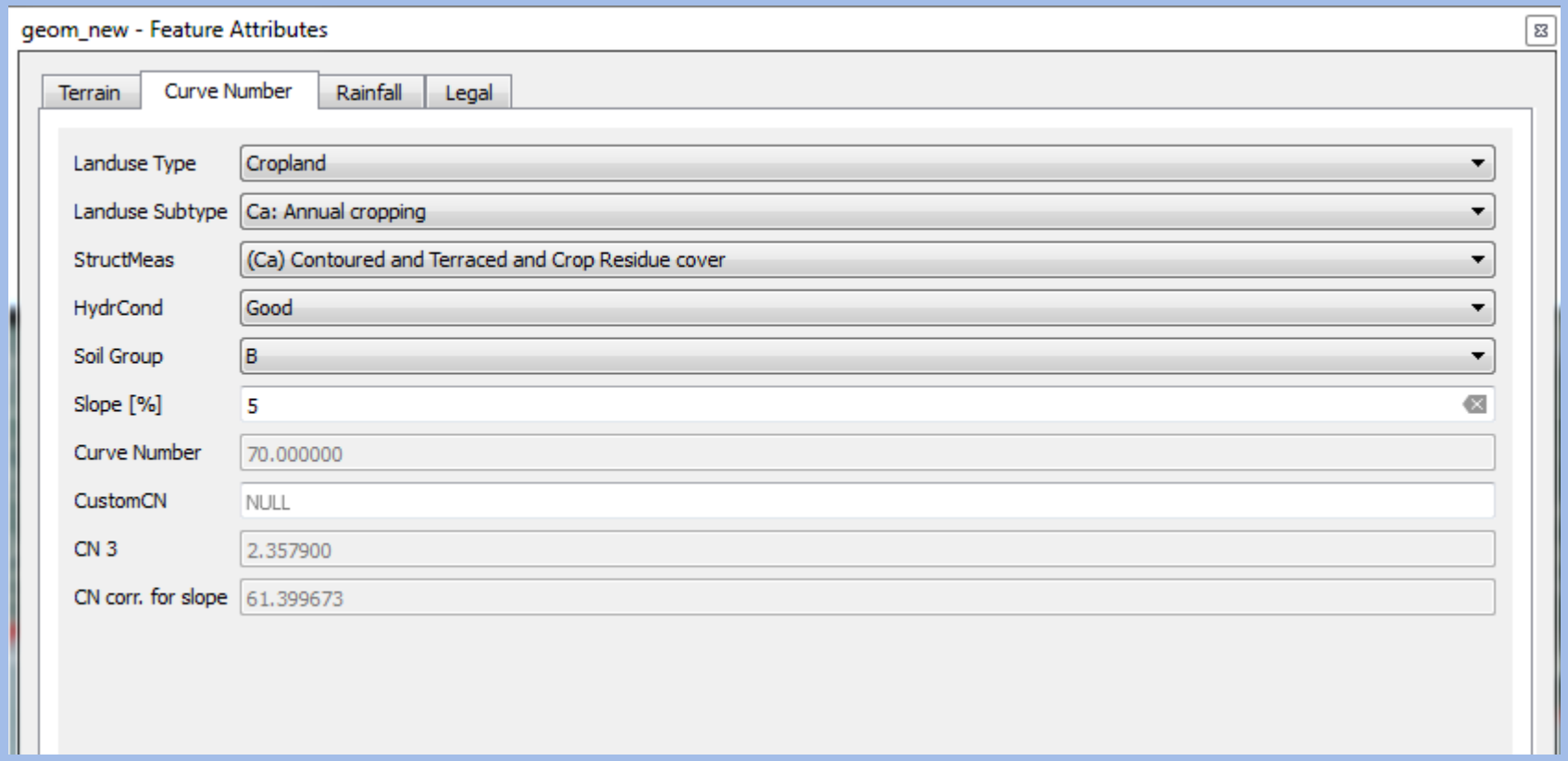
UNIVERSITÄT BERN


Calculate
Export
Clear
Help


Lower zone (L)
Middle zone (M)
Upper zone (U)


geom_new - Feature Attributes
Terrain
Curve Number
Rainfall
Legal
Area [ha]
3863
Zone
ZoneName
Lower zone (L)
Zone [ha]
NULL
Zone [% of Area]
NULL
Unit
Unit [ha]
467
Unit [% of Area]
12.09

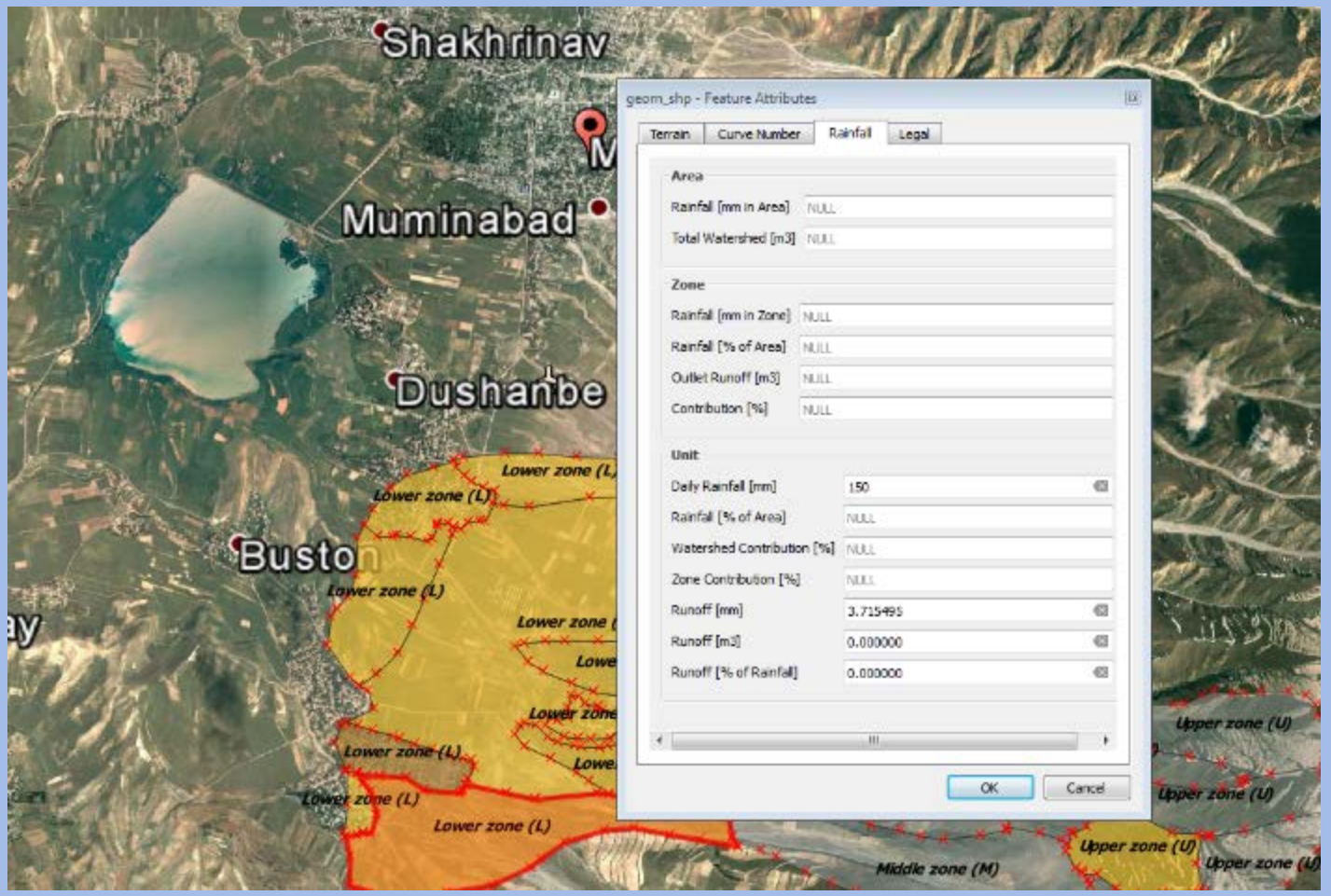

Middle zone (M)
Lower zone (L)
Lower zone (L)
Lower zone (L)
Middle zone (M)
Middle zone (M)
Middle zone (M)
Middle zone (M)
Middle zone (M)
Middle zone (M)
Upper zone (U)
Upper zone (U)
Upper zone (U)
Upper zone (U)
Upper zone (U)

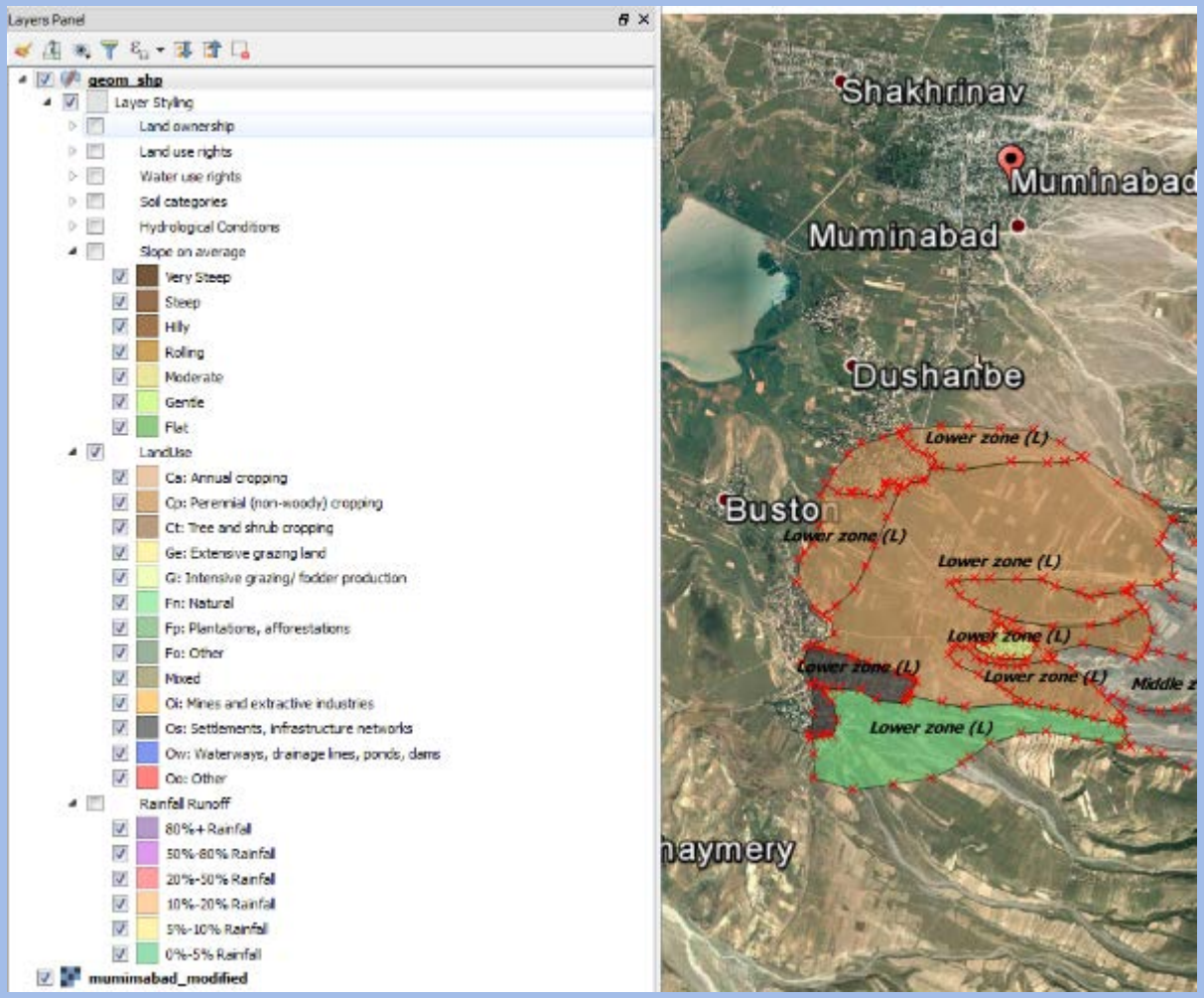

geom_new - Feature Attributes
Terrain
Curve Number
Rainfall
Legal
Landuse Type
Cropland
Landuse Subtype
Ca: Annual cropping
StructMeas
(Ca) Contoured and Terraced and Crop Residue cover
HydrCond
Good
Soil Group
B
Slope [%]
5
Curve Number
70.000000
CustomCN
NULL
CN 3
2.357900
CN corr. for slope
61.399673

Hydrologic Soil Group

- Group A: low runoff potential and high infiltration rates. consist of sand or gravel water transmission rate > 0.30 in/hr.
- Group B: moderate infiltration. consist of silt loam or loam. water transmission rate 0.15-0.30 in/hr.
- Group C: low infiltration. consist of clay or loam layers. water transmission rate is between 0.05-0.15 in/hr.
- Group D: The soils that are likely to generate the highest runoff. mainly of clay, high swelling potential. nearly no infiltration, less than 0- 0.05 in/hr

Land use type	Structural Measure	Version 1 - USDA Only				
Runoff curve numbers for Cropland		**Hydrologic condition**	**A**	**B**	**C**	**D**
Ca: Annual cropping	not specified	Poor	66	76	82	85
		Good	62	73	80	84
	Straight Row	Poor	69	79	86	90
		Good	65	77	84	88
	Straight Row and Crop Residue Cover	Poor	68	78	85	88
		Good	62	74	81	85
	Contoured	Poor	67	77	83	87
		Good	63	74	82	85
	Contoured and Crop Residue Cover	Poor	66	76	82	86
		Good	62	73	81	84
	Contoured and Terraced	Poor	64	73	80	82
		Good	61	71	78	81
	Contoured and Terraced and Crop Residue cover	Poor	63	72	79	81
		Good	60	70	77	80


Shakhrinav
Muminabad
Dushanbe
Buston
Lower zone (L)
Middle zone (M)
Upper zone (U)
geom_shp - Feature Attributes
Terrain
Curve Number
Rainfall
Legal
Area
Rainfall [mm in Area]
NULL
Total Watershed [m3]
NULL
Zone
Rainfall [mm in Zone]
NULL
Rainfall [% of Area]
NULL
Outlet Runoff [m3]
NULL
Contribution [%]
NULL
Unit
Daily Rainfall [mm]
150
Rainfall [% of Area]
NULL
Watershed Contribution [%]
NULL
Zone Contribution [%]
NULL
Runoff [mm]
3.715495
Runoff [m3]
0.000000
Runoff [% of Rainfall]
0.000000
OK
Cancel


Layers Panel
geom_shp
Layer Styling
Land ownership
Land use rights
Water use rights
Soil categories
Hydrological Conditions
Slope on average
Very Steep
Steep
Hilly
Rolling
Moderate
Gentle
Flat
LandUse
Ca: Annual cropping
Cp: Perennial (non-woody) cropping
Ct: Tree and shrub cropping
Ge: Extensive grazing land
Gi: Intensive grazing/ fodder production
Fn: Natural
Fp: Plantations, afforestations
Fo: Other
Mixed
Oi: Mines and extractive industries
Os: Settlements, infrastructure networks
Ow: Waterways, drainage lines, ponds, dams
Oo: Other
Rainfall Runoff
80%+ Rainfall
50%-80% Rainfall
20%-50% Rainfall
10%-20% Rainfall
5%-10% Rainfall
0%-5% Rainfall
mumimabad_modified
Shakhrinav
Muminabad
Muminabad
Dushanbe
Lower zone (L)
Lower zone (L)
Lower zone (L)
Lower zone (L)
Lower zone (L)
Lower zone (L)
Lower zone (L)
Middle z
naymery

How to calculate runoff

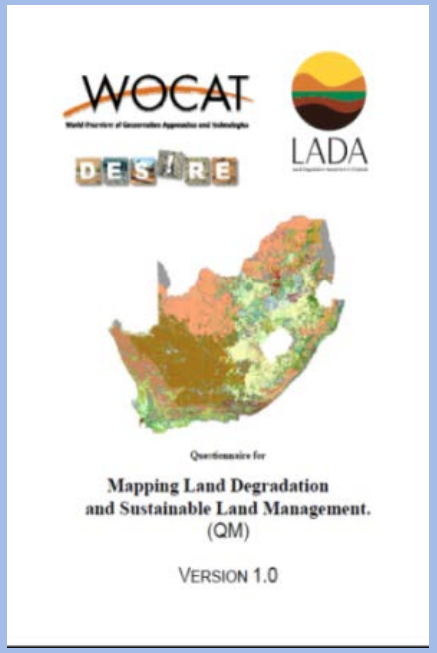
- Delineation of the watershed and 1-3 zones
  → calculates area [ha] of each watershed zone
- Subdivision of the watershed zones (1-3) into land use / management types
  → mapping units
  → calculates surface of the land use type used in each zone
  [ha, % of zone, % of watershed]
- Slope of each land use type [decimal]
- Hydrologic condition and hydrological soil group
  → calculates Curve Number (CN) (based on land use type, hydrologic condition and hydrological soil group)
- Assumption of a daily rainfall event for each zone
  → Calculates runoff [% of rainfall and mm for each mapping unit , % of watershed]
  → Calculates total amount of runoff for the whole catchment [% of rainfall, mm, m^3)
  → Calculates the contribution of each mapping unit to catchment runoff [%, mm and m^3)

Allows to:

- Identify the major contibuting land use / mgt. types and zones
- Change the land use / mgt. and assess the changes in the runoff
- Participatory assessment and negotiation where to make what changes and what the expected is and whether it makes sense

- … in a further stage to be combined with the WOCAT / LADA mapping
- Participatory mapping of land degradation/SLM , causes and impacts
- Participatory decision making on where to make land use /mgt changes

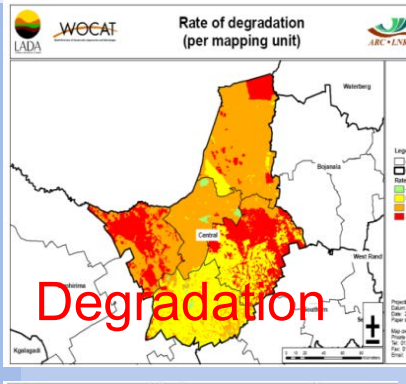
QM-V1.0
WOCAT-LADA Mapping (QM) of Land Degradation &SLM:

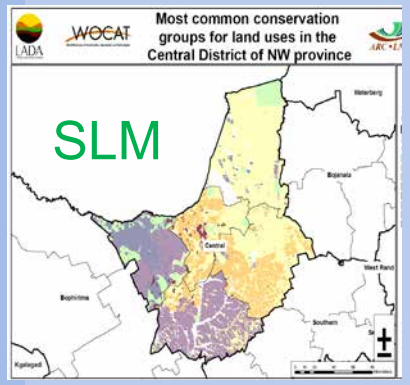


Land Use Systems LUS

Land Use System (LUS)
Type
Area trend
Intensity trend

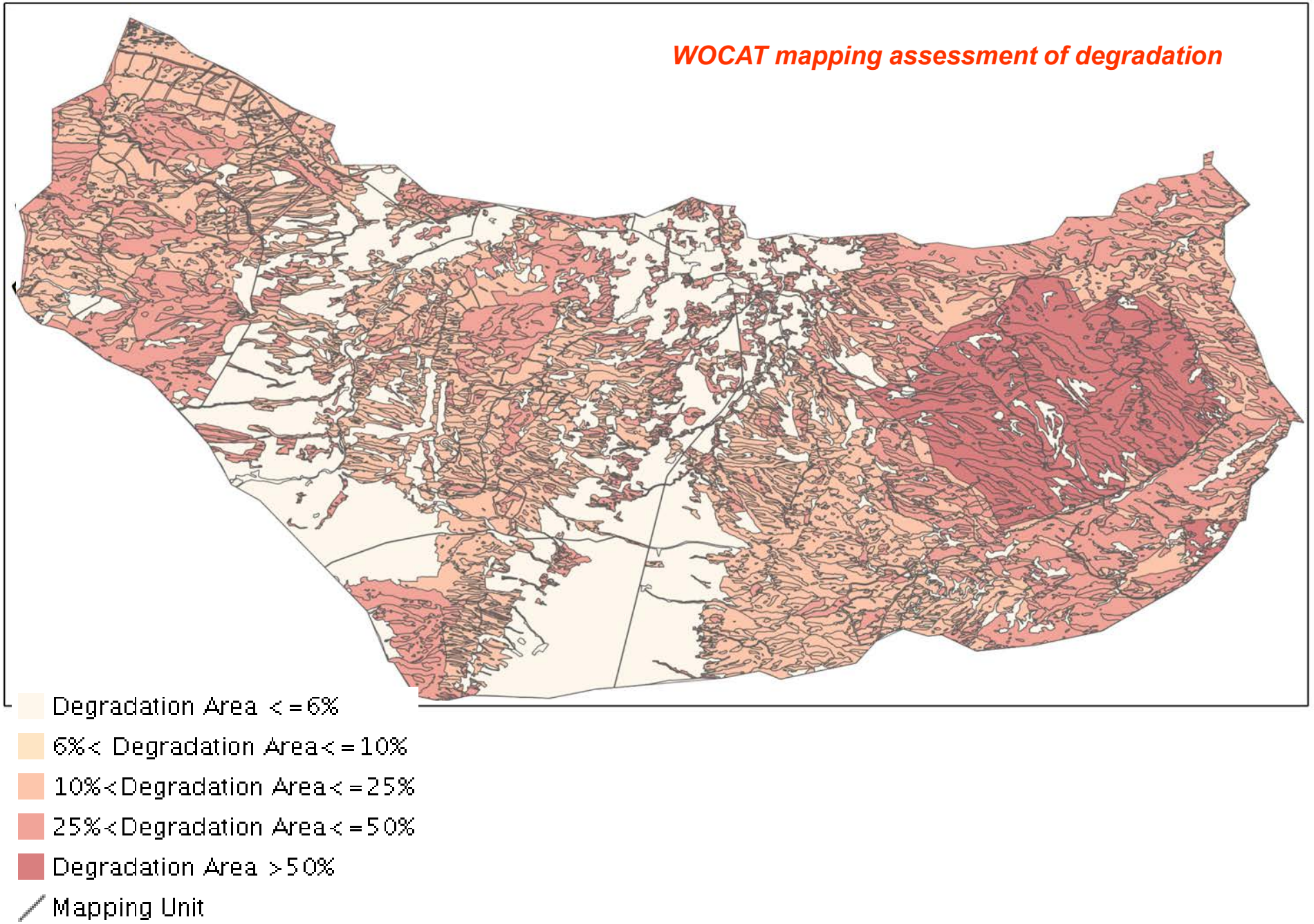
Degradation per LUS	Conservation/SLM per LUS
Type	Name / Group / Measure
Extent (area)	Extent (area)
Degree	Effectiveness
Rate	Effectiveness trend
Impact on ecosystem services (type and level)	Impact on ecosystem services (type and level)
Direct causes	
Indirect causes	Degradation addressed
Recommendation	



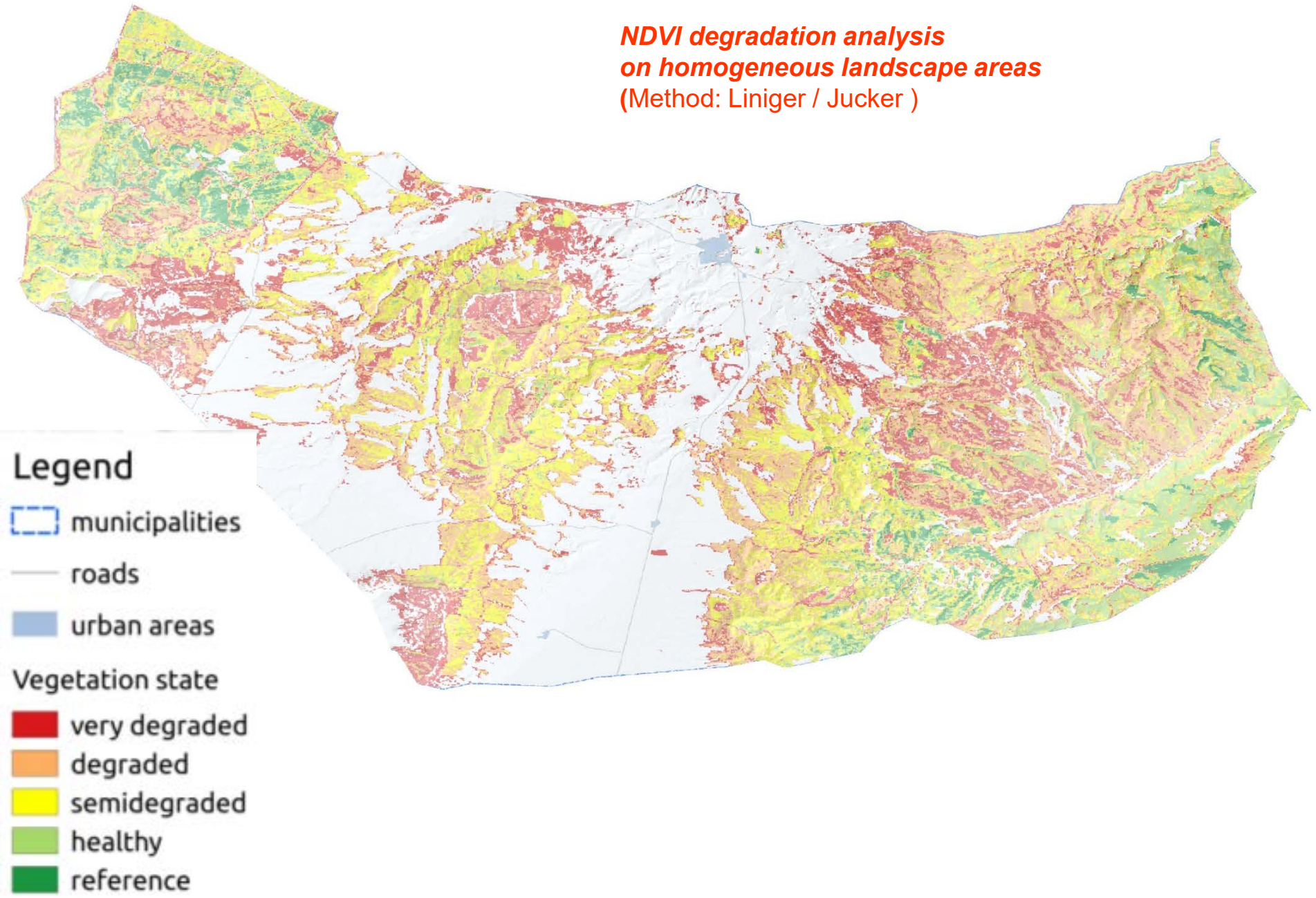


→ Where to invest?

hot spots
bright spots
… and their impacts


WOCAT mapping assessment of degradation
Degradation Area <=6%
6%< Degradation Area<=10%
10%<Degradation Area<=25%
25%<Degradation Area<=50%
Degradation Area >50%
Mapping Unit

NDVI degradation analysis
on homogeneous landscape areas
(Method: Liniger / Jucker)



QM-V2.0: Main suggested changes

Mapping Unit

LM practices

L Degradation

LM practices

Impacts

1) Mapping Unit	2) LUS	3) delineation criteria (e.g. slope)	8) Land Management practices*	9) area (percentage of mapping unit)	10) area trend	11) types of land degradation (type, degree)	20) impacts of land management on Ecosystem Services / Level of impact	21) period of implementation	22) reference QT	23) expert recommendation
Example:										
1	cropland	0-8%	deep tillage	40	-1	Wt 3, Wg 1, Hg 1	P1 -2, P2 -2, E1 -3, E2 -2	1990	none	
			conservation agriculture	5	2	Hp 1, Hq 1	P1 +2, P2 +2, E1 +3, E2 +2	2011	T_XYZ001en	CA is a viable option, maybe contour sowing could be applie
			terraces	15	2	Cp 1				
			contour bunds	40	2					
			*total area (%)****	*100*						
1										
			total area (%)	*100*						
2										
			total area (%)	*100*						
3										
			total area (%)	*100*						
4										
			total area (%)	*100*						
					QM E4	QT Core 3.7; Grado: QM E12	QM E14			

WOCAT - World Overview of Conservation Approaches and Technologies

Questionnaire on
Adaptation of SLM Technologies to Gradual Climate Changes and Climate-Related Extremes

Climate Change Adaptation (CCA)

A tool to help document, assess, and disseminate Sustainable Land Management (SLM) practices

Contents

Introduction to the questionnaire

Definitions

Climate change *refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/ or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC 5th assessment report, Climate Change 2014: Impacts, Adaptation, and Vulnerability*[1]*).*

Exposure *is the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected (IPCC 2014).*

Sensitivity *is the degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to sea level rise) (IPCC 2014).*

Adaptation *is the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC 2014).*

Adaptive capacity *is the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC 2014).*

Resilience *is the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (IPCC 2014. This definition builds on the definition used in Arctic Council [2013]).*

Vulnerability *is the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC 2014).*

A modular framework for the documentation and assessment of SLM practices

The ultimate goal of documenting and assessing land management practices is to share and spread valuable knowledge in land management, support evidence-based decision-making, and scale up identified good/ best practices. To achieve this, it is important to analyse field experiences and gain a better understanding of the reasons behind successful SLM practices, regardless of whether they were introduced by projects or whether they are found in traditional systems.

WOCAT focuses on efforts to prevent and reduce land degradation and restore degraded land through improved ***land management technologies*** *and* ***approaches to implement these****. All practices may be considered, whether they are traditional or indigenous, newly introduced through projects or programmes, adopted and/ or adapted by land users, or recent innovations.*

The WOCAT Core questionnaires on SLM Technologies (QT Core) and SLM Approaches (QA Core) contain key questions on sustainable land management. They are the foundation of the WOCAT knowledge base. Specific modules, such as the Climate Change Adaptation questionnaire (QCCA), can be added to the WOCAT Core questionnaires to gain further in-depth knowledge on a particular topic.

All information documented through WOCAT questionnaires is made available in an open-access ***online database*** *and can be used to disseminate SLM knowledge and improve decision-making for further implementation and spreading of SLM practices.*

The ***QCCA is a supplement to QT Core*** *and helps* ***to assess whether SLM Technologies are or can be further adapted to gradual climate changes and climate-related extremes****. The QCCA focuses on individual SLM Technologies and not on areas or landscapes. It does not replace other tools that are available to assess overall resilience at farm or even landscape level.*

[1] http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-AnnexII_FINAL.pdf

The QCCA is divided into five chapters:

Chapter 1 *starts with general information about the contributors and resource persons; it also links to QT Core, the questionnaire through which the main information on the Technology was gathered.*

Chapter 2 *assesses exposure of the Technology to gradual climate changes and climate-related extremes (disasters). The exposure looks at which climate changes and extremes are occurring in the area where the Technology is applied. First, information about gradual climate changes and extremes is automatically generated (in the online database) by retrieving data from CIAT's Climatewizard. Second, the experiences of land users and field-experienced SLM specialists are collected.*

Chapter 3 *assesses risks and potentials and the sensitivity of the Technology to these.*

Chapter 4 *looks at adaptive capacity to gradual climate changes and climate-related extremes (disasters).*

Chapter 5 *summarizes the conclusions and lessons learnt.*

An ***analysis part*** *will be included in the online database to support the assessment of the vulnerability or resilience of SLM Technologies. The analysis shall help to visualize results using simple graphs and illustrations. The results of the analysis can be used in the* ***decision-support process*** *to negotiate with stakeholders whether Technologies should be adapted or completely changed under different climate change scenarios.*

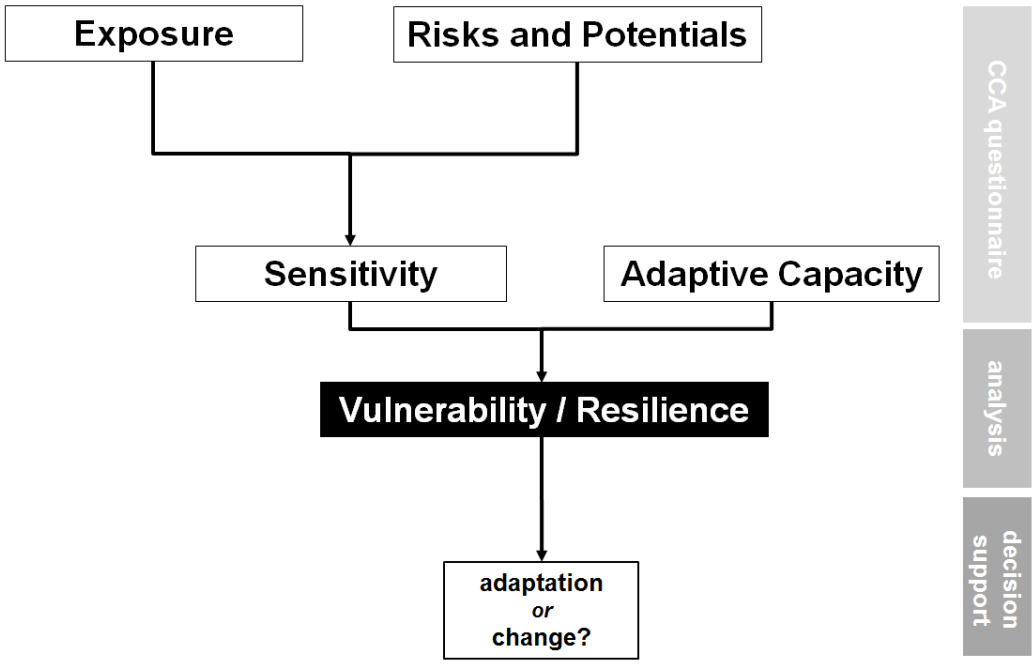


Figure 1: Climate change module comprised of questionnaire, analysis, and decision support

Please read the following notes before filling in the questionnaire:

- *It is recommended that the questionnaire be filled in by a* ***team of SLM specialists – including land users*** *– with different backgrounds and experience, who are familiar with the details of the SLM Technology (technical, financial, socio-economic).*
- ***Answer all questions.*** *If hard or precise data are not available, we ask you to provide a best estimate based on your professional judgement. If certain questions are not applicable or not relevant, indicate "n/a". Remember that the quality of the results depends entirely on the quality of your answers.*
- *Instructions, explanations, definitions, and examples are indicated in italics. Use the definitions given in this document, even if they deviate from your own/ national definitions.*
- *Fill in the questionnaire* ***carefully and legibly****.*
- ***Please enter the information in the WOCAT online database****, see qcat.wocat.net.*

1. General Information

1.1 Name of the SLM Technology (hereafter referred to as the Technology) as per Core Questionnaire on SLM Technologies Question QT Core 1.1

Name: .....

Locally used name: .....

Country: .....

1.2 Contact details of resource persons and institutions involved in the assessment and documentation of the Technology

Compiler

The person who conducted the interviews, compiled the information, and filled in the questionnaire.

Last name: ..... First name(s): ..... ☐ female ☐ male

Name of institution: .....

Address of institution: .....

Postal Code: ..... City: .....

State or District: ..... Country: .....

Phone no. 1: ..... Phone no. 2 (mobile) .....

E-mail 1: ..... E-mail 2: .....

Optional: Add a photo of the compiler and indicate filename here: .....

Key resource person(s)

Person(s) who provided most of the information documented in this questionnaire. These can be land users, SLM specialists (e.g. technical advisers, researchers) or any other person.

Specify the key resource person:

☐ land user* ☐ SLM specialist/ technical adviser ☐ other, specify: …….

Last name: ..... First name(s): ..... ☐ female ☐ male

Name of institution: .....

Address of institution: .....

Postal Code: ..... City: .....

State or District: ..... Country: .....

Phone no. 1: ..... Phone no. 2 (mobile) .....

E-mail 1: ..... E-mail 2: .....

Optional: Provide a photo of the key resource person(s) and indicate filename here: .....

** **Land user**: the person/ entity who implements/ maintains the Technology. The term land user may refer to individual small- or large-scale farmers, groups (gender, age, status, interest), cooperatives, industrial companies (e.g. mining), government institutions (e.g. state forest), etc.*

Name of the institution(s) which facilitated the documentation/ evaluation of the adaptation of the Technology to climate change (if relevant): ……

Name of project which facilitated the documentation/ evaluation of the adaptation of the Technology to climate change (if relevant):
……..

Note: You may upload the logo(s) of your institution/project to the WOCAT database.

Indicate further resource persons who have provided information on the Technology (if relevant):

Resource person 2: ☐ land user ☐ SLM specialist/ technical adviser ☐ other (specify): ……

Last name: ..... First name(s): ..... female ☐ male ☐

Name of institution: .....

Address: .....

..... Country: .....

Phone no. 1: ..... Phone no. 2 (mobile) .....

E-mail 1: ..... E-mail 2: .....

Resource person 3: ☐ land user ☐ SLM specialist/ technical adviser ☐ other (specify): ……..

Last name: ..... First name(s): ..... female ☐ male ☐

Name of institution: .....

Address: .....

..... Country: .....

Phone no. 1: ..... Phone no. 2 (mobile) .....

E-mail 1: ..... E-mail 2: .....

Resource person 4: ☐ land user ☐ SLM specialist/ technical adviser ☐ other (specify): ……..

Last name: ..... First name(s): ..... female ☐ male ☐

Name of institution: .....

Address: .....

..... Country: .....

Phone no. 1: ..... Phone no. 2 (mobile) .....

E-mail 1: ..... E-mail 2: .....

1.3 Conditions regarding the use of data documented through WOCAT

When were the data compiled (in the field)?: ……

The compiler and key resource person(s) accept the conditions regarding the use of data documented through WOCAT:

☐ yes ☐ no

Note: If you do not accept the conditions regarding the use of data documented through WOCAT, you will not be able to enter and edit data in the WOCAT database.

Conditions regarding the use of data documented through WOCAT

- *Data captured through WOCAT questionnaires will be entered, edited, and stored in the WOCAT online database by the compiler or a data entry person assigned by the compiler. Overall responsibility for compilation and data quality lies with the compiler. The compiler, resource persons, and data entry person will be recorded and given credit for the data in the database as well as in any compilation or publication of the documented Technology.*
- *Data stored in the WOCAT database are open access.*
- *Data are made available for users under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.*

You are free to:

- ***Share** — copy and redistribute the material in any medium or format*
- ***Adapt** — remix, transform, and build upon the material*

The licensor cannot revoke these freedoms as long as you follow the following license terms:

2. Exposure

2.1 Climate data on exposure

This section on exposure provides an overview of relevant climate data (historic and future trends) and is generated automatically in the online database through a retrieval of data from the CIAT Climatewizard (based on the geographical location provided in the WOCAT Technology questionnaire QT Core).

2.2 Land users' experiences of gradual climate changes and climate-related extremes (disasters)

This section focuses solely on the experiences of land users and field-experienced SLM specialists. Consider only the location where the Technology is located as indicated in question 2.5 of QT Core.

Note that a first assessment of exposure and sensitivity is provided in question 6.3 of QT Core. Please reflect on the answers provided in QT Core when filling in the table below.

		Experienced by land user(s) and SLM specialist(s) in the last 10 years			***If the gradual climate change/ climate-related extreme is mostly noticeable during specific seasons/months, tick the months below.*** ***If not, keep it blank.***
Type of gradual climate change/ climate-related extreme		*decrease (-)*	*stable*	*increase (+)*	*J F M A M J J A S O N D*
Gradual climate change					
annual temperature		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
seasonal temperature					
indicate season:* ……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
annual rainfall		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
seasonal rainfall					
*indicate season**: ……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
other gradual climate change (specify): ……		☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
Climate-related extremes (disasters)[2]					
Meteorological disasters:					
tropical storm (cyclone, typhoon, hurricane)	frequency	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
	intensity	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
extra-tropical cyclone (winter storm)	frequency	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
	intensity	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
local rainstorm	frequency	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐
	intensity	☐	☐	☐	☐☐☐☐☐☐☐☐☐☐☐☐

[2] *Source: Disaster Category Classification and Peril Terminology for Operational Purposes. CRED and Munich RE. 2009. Working Paper. "Rainstorm" was added to replace "generic (severe) storm"; hailstorm was added; and the disaster subtypes "rockfall", "subsidence", and "animal stampede" were left out.*

local thunderstorm	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
local hailstorm	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
local snowstorm	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
local sandstorm/ dust storm	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
local windstorm	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
local tornado	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
Climatological disasters:			
heatwave	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
cold wave (any time of the year, e.g. frost)	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
extreme cold winter conditions	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
extreme mild winter conditions	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
drought	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
forest fire	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
land fire (grass, shrub, bush)	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
Hydrological disasters:			
general (river) flood	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
flash flood	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
storm surge/ coastal flood	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
landslide/ debris flow	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
avalanche	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
Biological disasters:			
epidemic diseases (viral, bacterial, fungal, parasitic)	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
insect/ worm infestation (grasshoppers/ locusts/ worms, etc.)	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
other climate-related extremes (natural disasters) (specify):……..	frequency	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
	intensity	☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
Other climate-related consequences			
length of growing period		☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
Sea-level rise (gradual change)		☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
snow cover		☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐
other (specify):……		☐ ☐ ☐	☐☐☐ ☐ ☐☐☐☐☐☐☐ ☐ ☐

* *For **temperate, boreal, and polar/ arctic climate** choose: winter, spring, summer, autumn;*

*For **tropics and subtropics** choose: wet/ rainy season, dry season.*

Comments: .....

.....

.....

.....

.....

.....

.....

.....

.....

In the land user's point of view, is there a threshold (in view of frequency and/ or severity of the gradual climate changes or climate-related extremes), which leads to the failure of the Technology?

☐ yes ☐ no ☐ don't know (If **yes**, specify below)

Specify threshold for gradual climate changes:

.....

.....

.....

Specify threshold for climate-related extremes (disasters):

.....

.....

.....

2.3 Experienced climate-related extremes (disasters)

Has the Technology been exposed to climate-related extremes (disasters) in the last 10 years or more?

☐ yes ☐ no (If **yes**, fill in the table below. If **no**, continue with chapter 3)

Use the climate-related extremes (disasters) listed in 2.2 and provide further details, where possible, e.g. on the magnitude of the event. Order according to the importance of the event.

Climate-related extreme	***From Year***	***From Month(s)*** *(if known)*	***To Year***	***To Month(s)*** *(if known)*	***Comments/ specify***
	20..		**20..**		
	20..		**20..**		
	20..		**20..**		
	20..		**20..**		
	20..		**20..**		
	20..		**20..**		
	….		**….**		
	….		**….**		
	….		**….**		
	….		**….**		
	….		**….**		

3. Sensitivity (Risks and Potentials)

3.1 Land degradation types and related sensitivity of the Technology

Sensitivity *is the degree to which the functionality of the Technology is affected by climate variability or change, either adversely (unfavourable influence) or beneficially (favourable influence) (adapted by WOCAT from IPCC 2014).*

Unfavourable influence means the functioning of the Technology is negatively affected, e.g. the extra water of a storm cannot be absorbed and creates additional erosion or even landslides. Beneficial influence means that the Technology benefits from the change or the extreme, e.g. it can store the extra water and thus more water is made available for groundwater recharge. It is also important to mention land degradation processes where the influence is neutral, meaning that the Technology has a buffer to absorb the changes or shocks.

When defining the sensitivity, always compare the Technology not exposed with the same Technology exposed to gradual climate changes and climate-related extremes (disasters).

List one gradual climate change or climate-related extreme to which the Technology is exposed (refer to question 2.2.). Then, list each land degradation type / subcategory addressed by the Technology (question 3.7 of QT Core) and reassess the sensitivity of the Technology in view of the respective gradual climate change and climate-related extreme (disaster) (Table 1). Reassess the sensitivity of the Technology for each land degradation type separately.

Then repeat the same for each of the other gradual climate changes or climate-related extremes to which the Technology is exposed (as listed in question 2.2.)

If additional land degradation types (not yet listed in QT Core 3.7) are newly occurring (have impacts on the Technology) under gradual climate changes and climate-related extremes (disasters), list and assess them as well (table 2). Assess the sensitivity of the Technology for each land degradation type separately.

Table 1: Reassessment of land degradation types listed in QT Core 3.7

Gradual climate change/ climate-related extreme (disaster)	***Land degradation type addressed by the Technology listed in QT Core 3.7*** *List land degradation types separately for each gradual climate change/ climate-related extreme. The same change/ extreme may have several land degradation types.*	***Sensitivity of the Technology to land degradation type*** *(listed in previous column)* *very unfavourable influence* ☐ *unfavourable influence* ☐ *neutral* ☐ *beneficial influence* ☐ *very beneficial influence* ☐	*Specify/ comments*
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	

Table 2: Assessment of newly occurring land degradation types

Gradual climate change/ climate-related extreme (disaster)	***Land degradation type <u>newly occurring</u> due to gradual climate change/ climate-related extreme (disaster)*** *List one land degradation type per gradual climate change/ climate-related extreme. The same change/ extreme may have several land degradation types.*	***Sensitivity of the Technology to land degradation type*** *(listed in previous column)* *very unfavourable influence* ☐ *unfavourable influence* ☐ *neutral* ☐ *beneficial influence* ☐ *very beneficial influence* ☐	*Specify/ comments*
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
		☐ ☐ ☐ ☐ ☐	
Example: Technology contour bunds on slopes			
Tropical storm (cyclone)	*Wm: Mass movements / landslides*	☐ ✓ ☐ ☐ ☐	*Technology stabilizes slopes. However, with more tropical storms, landslides are happening*
Local rainstorm increase in frequency and intensity	*Wm: Mass movements / landslides*	☐ ✓ ☐ ☐ ☐	*Technology absorbs additional water. However, high recharge of subsurface and groundwater 'favour' land slides*
Local rainstorm increase in frequency and intensity	*Wt: Surface erosion*	☐ ☐ ✓ ☐ ☐	*Technology manages to absorb increased rainfall as it has high infiltration and water storage capacity to avoid runoff*
Local rainstorm increase in frequency and intensity	*Hg: Change in groundwater/ aquifer level*	☐ ☐ ☐ ✓ ☐	*Additional recharge of the groundwater*
Example: Technology orchard-based agroforestry			
Summer rainfall decrease	*Ha: Aridification*	✓ ☐ ☐ ☐ ☐	*Fruit tree species under rainfed production are affected by a decrease in rainfall during the vegetation period*

Degradation types and subcategories (list from question 3.7 in QT Core)

W: Soil erosion by water

- *Wt* — *Loss of topsoil/ surface erosion: even removal of top soil, sheet and interrill erosion*
- *Wg* — *Gully erosion/ gullying*
- *Wm* — *Mass movements/ landslides*
- *Wr* — *Riverbank erosion*
- *Wc* — *Coastal erosion*
- *Wo* — *Offsite degradation effects: deposition of sediments, downstream flooding, siltation of reservoirs and waterways, and pollution of water bodies with eroded sediments*

E: Soil erosion by wind

- *Et* — *Loss of topsoil: uniform displacement*
- *Ed* — *Deflation and deposition: uneven removal of soil material*
- *Eo* — *Offsite degradation effects: covering of the terrain with windborne sand particles from distant sources ("overblowing")*

C: Chemical soil deterioration

- *Cn* — *Fertility decline and reduced soil organic matter content (not caused by erosion): e.g. leaching, soil fertility mining, nutrient oxidation and volatilization (N)*
- *Ca* — *Acidification: lowering of the soil pH*
- *Cp* — *Soil pollution: contamination of the soil with toxic materials*
- *Cs* — *Salinization/ alkalinization: a net increase of the salt content of the (top) soil leading to a productivity decline*

P: Physical soil deterioration

Pc	*Compaction: deterioration of soil structure by trampling or the weight and/ or frequent use of machinery*
Pk	*Slaking and crusting: clogging of pores with fine soil material and development of a thin impervious layer at the soil surface obstructing the infiltration of rainwater*
Pi	*Soil sealing: covering of the ground by an impermeable material (e.g. construction, mining, roads, etc.)*
Pw	*Waterlogging: effects of human-induced water saturation of soils (excluding paddy fields)*
Ps	*Subsidence of organic soils, settling of soil*
Pu	*Loss of bio-productive function due to other activities*

B: Biological degradation

Bc	*Reduction of vegetation cover: increase of bare/ unprotected soil*
Bh	*Loss of habitats: decreasing vegetation diversity (fallow land, mixed systems, field borders), increased fragmentation of habitats*
Bq	*Quantity/ biomass decline: reduced vegetative production for different land use*
Bf	*Detrimental effects of fires (includes low/ high severity of fires): on forest (e.g. slash and burn), bushland, grazing land, and cropland (burning of residues)*
Bs	*Quality and species composition/ diversity decline: loss of natural species, land races, palatable perennial grasses; spreading of invasive, salt-tolerant, unpalatable, species/ weeds*
Bl	*Loss of soil life: decline of soil macro-organisms and micro-organisms in quantity and quality*
Bp	*Increase of pests/ diseases, loss of predators: reduction of biological control*

H: Water degradation

Ha	*Aridification: decrease of average soil moisture content*
Hs	*Change in quantity of surface water: change of the flow regime (flood, peak flow, low flow, drying up of rivers and lakes)*
Hg	*Change in groundwater/ aquifer level: lowering of groundwater table due to over-exploitation or reduced recharge of groundwater; or increase of groundwater table resulting in waterlogging and/ or salinization*
Hp	*Decline of surface water quality: increased sediments and pollutants in fresh water bodies due to point pollution and land-based pollution*
Hq	*Decline of groundwater quality: due to pollutants infiltrating into the aquifers*
Hw	*Reduction of the buffering capacity of wetland areas to cope with flooding and pollution*

3.2 On-and off-site impacts of the Technology under gradual climate changes and climate-related extremes (disasters)

*Below you will find the list of on- and offsite impacts from question 6.1 and 6.2 in QT Core. Fill out the list for **each** gradual climate change and climate-related extreme (disaster) that you have listed in question 2.2. Make as many copies of the list as the number of gradual climate changes and climate-related extremes you have listed in question 2.2. (e.g. if you have listed 3 gradual climate changes and 2 climate-related extremes, have 5 copies of the list available).*

Add the name of gradual climate change/ climate-related extreme in the box below.

First, tick relevant impacts (tick boxes on the left, several answers possible). Then, for each selected impact, tick the extent.

		Very negative (– 50-100%)	Negative (– 20-50%)	Slightly negative (– 5-20%)	Negligible impact	Slightly positive (+5-20%)	Positive (+20-50%)	Very positive (+50-100%)	
On-site impacts									
Socio-economic impacts									
Production									
☐ crop production	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ crop quality	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ fodder production	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ fodder quality	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ animal production	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ wood production	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ forest/ woodland quality	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ non-wood forest production	decreased	☐	☐	☐	☐	☐	☐	☐	increased

☐ risk of production failure	increased	☐	☐	☐	☐	☐	☐	☐	decreased
☐ product diversity	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ production area (new land under cultivation/ use)	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ land management	hindered	☐	☐	☐	☐	☐	☐	☐	simplified
☐ energy generation (e.g. hydro, bio)	decreased	☐	☐	☐	☐	☐	☐	☐	increased
Water availability and quality									
☐ drinking water availability	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ drinking water quality	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ water availability for livestock	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ water quality for livestock	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ irrigation water availability	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ irrigation water quality	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ demand for irrigation water	increased	☐	☐	☐	☐	☐	☐	☐	decreased
Income and costs									
☐ expenses on agricultural inputs	increased	☐	☐	☐	☐	☐	☐	☐	reduced
☐ farm income	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ diversity of income sources	decreased	☐	☐	☐	☐	☐	☐	☐	increased
☐ economic disparities	increased	☐	☐	☐	☐	☐	☐	☐	decreased
☐ workload	increased	☐	☐	☐	☐	☐	☐	☐	decreased
Other socio-economic impacts									
☐ (specify):	……..	☐	☐	☐	☐	☐	☐	☐	……..
☐ (specify):	……..	☐	☐	☐	☐	☐	☐	☐	……..
☐ (specify):	……..	☐	☐	☐	☐	☐	☐	☐	……..
Sociocultural impacts									
☐ food security/ self-sufficiency	reduced	☐	☐	☐	☐	☐	☐	☐	improved
☐ health situation	worsened	☐	☐	☐	☐	☐	☐	☐	improved
☐ land use/ water rights	worsened	☐	☐	☐	☐	☐	☐	☐	improved
☐ cultural opportunities (spiritual, religious, aesthetic etc.)	reduced	☐	☐	☐	☐	☐	☐	☐	improved
☐ recreational opportunities	reduced	☐	☐	☐	☐	☐	☐	☐	increased
☐ community institutions	weakened	☐	☐	☐	☐	☐	☐	☐	strengthened
☐ national institutions	weakened	☐	☐	☐	☐	☐	☐	☐	strengthened
☐ SLM/ land degradation knowledge	reduced	☐	☐	☐	☐	☐	☐	☐	improved
☐ conflict mitigation	worsened	☐	☐	☐	☐	☐	☐	☐	improved
☐ situation of socially and economically disadvantaged groups (gender, age, status, ethnicity etc.)	worsened	☐	☐	☐	☐	☐	☐	☐	improved
Other sociocultural impacts									
☐ (specify):	.....	☐	☐	☐	☐	☐	☐	☐	.....
☐ (specify):	.....	☐	☐	☐	☐	☐	☐	☐	.....
☐ (specify):	.....	☐	☐	☐	☐	☐	☐	☐	.....
Ecological impacts									
Water cycle/ runoff									
☐ water quantity	decreased	☐	☐	☐	☐	☐	☐	☐	increased

☐ water quality	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ harvesting/ collection of water (runoff, dew, snow, etc.)	reduced	☐ ☐ ☐ ☐ ☐ ☐ ☐	improved
☐ surface runoff	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ excess water drainage	reduced	☐ ☐ ☐ ☐ ☐ ☐ ☐	improved
☐ groundwater table/ aquifer	lowered	☐ ☐ ☐ ☐ ☐ ☐ ☐	recharge
☐ evaporation	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
Soil			
☐ soil moisture	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ soil cover	reduced	☐ ☐ ☐ ☐ ☐ ☐ ☐	improved
☐ soil loss	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ soil accumulation	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ soil crusting/ sealing	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ soil compaction	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ nutrient cycling/ recharge	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ salinity	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ soil organic matter/ below ground C	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ acidity	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
Biodiversity: vegetation, animals			
☐ vegetation cover	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ biomass/ above ground C	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ plant diversity	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ invasive alien species	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ animal diversity	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ beneficial species (predators, earthworms, pollinators)	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ harmful species (e.g. mosquitoes)	decreased.	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ habitat diversity	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ pests/ diseases	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
Climate and disaster risk reduction			
☐ flood impacts	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ landslides/ debris flows	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ drought impacts	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ impacts of cyclones, rain storms	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ emission of carbon and greenhouse gases	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ fire risk	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ wind velocity	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	decreased
☐ micro-climate	worsened	☐ ☐ ☐ ☐ ☐ ☐ ☐	improved
Other ecological impacts			
☐ (specify):	……..	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....
☐ (specify):	……..	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....
☐ (specify):	……..	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....
Off-site impacts			
☐ water availability (groundwater, springs)	decreased	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased

☐ reliable and stable stream flows in dry season (incl. low flows)	reduced	☐ ☐ ☐ ☐ ☐ ☐ ☐	increased
☐ downstream flooding*	……...	☐ ☐ ☐ ☐ ☐ ☐ ☐	……...
☐ downstream siltation*	……...	☐ ☐ ☐ ☐ ☐ ☐ ☐	……...
☐ groundwater/ river pollution	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ buffering/ filtering capacity (by soil, vegetation, wetlands)	reduced	☐ ☐ ☐ ☐ ☐ ☐ ☐	improved
☐ wind transported sediments	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ damage on neighbours' fields	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ damage on public/ private infrastructure	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
☐ impact of greenhouse gases	increased	☐ ☐ ☐ ☐ ☐ ☐ ☐	reduced
Other off-site impacts			
☐ (specify):	.....	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....
☐ (specify):	.....	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....
☐ (specify):	.....	☐ ☐ ☐ ☐ ☐ ☐ ☐	.....

**Downstream flooding and downstream siltation can be desired or undesired. Please specify in comments column and indicate whether an increase is positive or negative.*

Comments regarding the impact assessment: .....

.....

.....

.....

.....

.....

3.3 Experienced high-risk times (during the year)

Which are high-risk times during the year and why? (e.g. in terms of growing season)

The explanations below should be based on a discussion with and assessment by the land user(s) and SLM specialist(s) considering the answers provided in the previous questions.

……
……
……
……
……
……
……
……
……
……
……
……
……
……

4. Adaptive capacity

This chapter focuses on the experiences and actions taken by the land user(s) to adapt to gradual climate changes and climate-related extremes (disasters). It also considers the experiences of SLM specialists.

4.1 Modification of Technology

In QT Core question 3.1 the purpose for the introduction of the Technology has been defined. The purpose can either be the introduction of the Technology as an adaptation measure to gradual climate change and climate-related extremes (disasters) or other purposes.

Reflect on the answer provided in QT Core question 3.1 to answer the following questions.

Has the Technology been modified to adapt/further adapt* to gradual climate changes and climate-related extremes (disasters)?

**if it has been introduced as an adaptation measure it might have been further adapted during the course of time*

☐ yes ☐ no (if **yes,** fill in the table below. If **no**, continue with 4.7)

Select which SLM measures were introduced (e.g. stabilize bund with grass) or modified (e.g. increase in height of bund) to adapt/ further adapt the Technology to gradual climate changes and climate-related extremes (disasters). List whether major, medium, or minor modifications were needed and describe these adaptation measures in detail.

Several answers possible

Type of SLM measure (adaptation measure)	***Investment made*** *major medium minor*	***Details (e.g. on design, material/ species)***
☐ Agronomic measures	☐ ☐ ☐	
☐ Vegetative measures	☐ ☐ ☐	
☐ Structural measures	☐ ☐ ☐	
☐ Management measures	☐ ☐ ☐	
☐ Other measures (specify): ……	☐ ☐ ☐	

Comments:

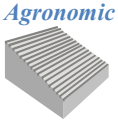
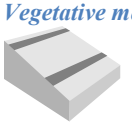
.....

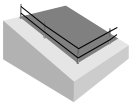
.....

.....

SLM Measures

See explanations below. For more details, see question 3.6 of QT Core.

Agronomic measures 	• *are usually associated with annual crops* • *are repeated routinely each season or in a rotational sequence* • *are of short duration and not permanent* • *do not lead to changes in slope profile* • *are normally independent of slope*
Vegetative measures 	• *involve the use of perennial grasses, shrubs, or trees* • *are of long duration* • *often lead to a change in slope profile* • *are often aligned along the contour or against the prevailing wind direction* • *are often spaced according to slope*
Structural measures	• *are of long duration or permanent* • *often require substantial inputs of labour or money when first installed* • *involve major earth movements and/or construction with wood, stone, concrete, etc. are often carried out to control runoff, erosion and wind velocity and to harvest rainwater*

	• *often lead to a change in slope profile* • *are often aligned along the contour/ against prevailing wind direction* • *are often spaced according to slope*
Management measures 	• *involve a fundamental change in land use* • *usually involve no agronomic and structural measures* • *often result in improved vegetative cover* • *often reduce the intensity of use*
Other measures	• *Any measures which do not fit into the above categories*
Combinations	• *occur where different measures complement each other and thus enhance each other's effectiveness* • *may comprise any two or more of the above measures*

Example: Earth bunds stabilized with grass introduced to adapt to gradual climate changes and climate-related extremes

Type of SLM measure	***Investment made*** *major medium minor*	***Details (e.g. on design, material/ species)***
☐ Agronomic measures	☐ ☐ ☐	
X Vegetative measures	☐ X ☐	*Local grass species that are adapted to the local climate were planted on the bunds. Local grass species can easily be purchased for a reasonable price on the local market.*
X Structural measures	X ☐ ☐	*The height of the bunds has been increased by 1m mainly with labour support from the community.*
☐ Management measures	☐ ☐ ☐	
☐ Other measures (specify): ……	☐ ☐ ☐	

4.2 Success of adaptation measures

Have the adaptation measures been successful?

☐ yes ☐ no

Specify why yes/ no:

……

……

……

4.3 Timing of adaptation measures

When were these adaptation measures taken?

☐ less than 5 years ago
☐ 5 to 10 years ago
☐ 10 to 30 years ago
☐ over 30 years ago

4.4 Motivation to apply adaptation measures

By whom/ what were (the) land user(s) motivated or inspired to apply these adaptation measures?

☐ land user(s) alone (self-initiative)
☐ other land user(s)
☐ mainly land user(s) but supported by SLM specialist(s)
☐ mainly input from SLM specialist(s)

□ only SLM specialist(s)
□ media, other communication channels
□ other (specify): ……..

If SLM specialists were involved, were these from:

□ agricultural advisory services
□ research
□ projects and programmes of development cooperation/ international organizations
□ other (specify): ……..

Comments:
.....

.....

.....

4.5 Technical training on adaptation measures

Did the land user(s) get any technical training on adaptation measures?

□ yes □ no

If yes, by whom?

□ agricultural advisory services
□ research
□ projects and programmes of development cooperation/ international organizations
□ other (specify): ……..

Comments:
.....

.....

.....

4.6 Costs and inputs for the adaptation measures

*QT Core questions 4.5 and 4.7 asked for the overall costs of the Technology. In the table below, list **only costs which were created for adaptation measures** to gradual climate change and climate-related extremes.*

***Note:** Costs and inputs specified should refer to the Technology area/ Technology unit defined below.*

Specify how costs and inputs were calculated:
□ per Technology area → indicate size and area unit: …… (e.g. 24 acres, 4.5 hectares)
If using a local area unit, indicate conversion factor: 1 hectare =……
□ per Technology unit: → specify unit: …….. (e.g. watering point, energy saving stove, stone line)
specify volume, length, etc. (if relevant): …….. (e.g. stone lines: 250 m, dam: 20,000 m^3)

Specify currency used for cost calculations: □ US Dollars □ other/ national currency (specify): .....
You can use US dollars (USD) or any other national currency. Indicate all costs using the same currency.

Indicate exchange rate from USD to local currency (if relevant): 1 USD =.....

Indicate average wage cost of hired labour per day: …….

If possible, break down the costs for adaptation measures according to the following table, specifying inputs and costs per input. If you are unable to break down the costs, give an estimation of the total costs for the adaptation of the Technology:……

Several answers possible

Input	Specify input*	Unit**	Quantity	Costs per Unit	Total costs per input	% of costs borne by land users
Labour						
Equipment						
Plant material						
Fertilizers and biocides						
Construction material						
Other						
			Total costs for the adaptation of the Technology			

* ***Specify inputs:***
- ***Labour*** *includes total person days, be they paid or unpaid (e.g. contributed by family members). For "Costs per Unit" indicate daily wage for hired labour. If relevant, differentiate between skilled and unskilled labour.*
- ***Equipment*** *includes tools, machine hours, animal traction, etc. Cost calculation for machine hours and animal traction should be based on hiring costs – even if the machinery/ animals are owned by the land user.*
- ***Plant material*** *includes seeds, seedling, cuttings, etc.*
- ***Fertilizers and biocides****: compost/ manure, inorganic fertilizer, herbicides, pesticides, etc.*
- ***Construction material*** *includes timber, stones, earth, cement, pipes, tanks, etc.*

** ***Units:*** *person-days, kg, litres, pieces, etc.*

If not 100% of the costs were borne by land user(s), indicate who funded the remaining costs: …….

Comments:

.....

.....

4.7 Suggestions regarding future adaptation of the Technology

What are potential measures that could be taken to further adapt the Technology to gradual climate changes and climate-related extremes?

The suggestions below should be based on a discussion with and assessment by the land user(s) and SLM specialist(s).

.....

.....

.....

.....

.....

.....

.....

4.8 Assets of land users supporting their capacity to adapt to gradual climate changes and climate-related extremes (disasters)

Explain below which assets land users have that support them to deal with gradual climate changes and climate-related extremes (disasters). This question does not specifically refer to the Technology but should help in the understanding of which assets are available and can be made use of to adapt to gradual climate changes and climate-related extremes (disasters).

This question is based on the livelihoods framework (www.eldis.org/vfile/upload/1/document/0901/section2.pdf) with the following "five capitals": financial, social, human, physical, and natural.

Capital	*low*	*moderate*	*high*	***Comments*** *(specify, if relevant, if these assets are mainly relevant for gradual climate changes or climate-related extremes (disasters)*
Financial capital				
☐ financial resources from on-farm income	☐	☐	☐	.....
☐ financial resources from off-farm* income at household level	☐	☐	☐	.....
☐ remittance income at household level	☐	☐	☐	.....
☐ household savings	☐	☐	☐	.....
☐ loan options	☐	☐	☐	.....
☐ access to market	☐	☐	☐	.....
☐ other (specify): ……..	☐	☐	☐	.....
Social capital				
☐ connection to social networks (e.g. associations, village organizations)	☐	☐	☐	.....
☐ stability of social environment	☐	☐	☐	.....
☐ access to education and training (advisory service)	☐	☐	☐	.....
☐ access to information and knowledge on land management	☐	☐	☐	.....
☐ good communication and knowledge sharing mechanisms between land users and other stakeholders	☐	☐	☐	.....
☐ access to reliable weather forecast information	☐	☐	☐	.....
☐ access to early warning systems related to climate extremes (disasters)	☐	☐	☐	.....
☐ supportive legal framework in place	☐	☐	☐	.....
☐ supportive policies in place	☐	☐	☐	.....
☐ clear institutional responsibilities for climate change adaptation	☐	☐	☐	.....
☐ other (specify): ……...	☐	☐	☐	.....
Human capital				
☐ knowledge on adequate and timely adaptation in land management	☐	☐	☐	.....
☐ other (specify): ……...	☐	☐	☐	.....
Physical capital				
☐ availability of labour force at household	☐	☐	☐	.....

level

□ level of household and community infrastructure	□	□	□	.....
□ availability of construction material and equipment	□	□	□	.....
□ availability of energy supply	□	□	□	.....
□ other (specify): ……	□	□	□	.....

Natural capital

□ soil properties (depth, fertility, etc.)	□	□	□	.....
□ water availability and quality	□	□	□	.....
□ plant material and resources (diversity, valuable species, varieties)	□	□	□	.....
□ animal resources (diversity, breeds)	□	□	□	.....
□ enabling climatic conditions (temperature, rainfall, microclimate)	□	□	□	.....
□ other (specify): ……	□	□	□	.....

** **Off-farm income:** income other than from the use of cropland, grazing land, forest and mixed land (e.g. business, trade, manufacturing, industry).*

Comments:

.....

.....

.....

5. Conclusions and lessons learnt

Give a concluding statement about the Technology with regard to gradual climate changes and climate-related extremes (disasters).

5.1 Strengths/ advantages/ opportunities of the Technology

1).....

.....

2).....

.....

3).....

.....

5.2 Weaknesses/ disadvantages/ risks of the Technology and ways of overcoming them

List the main weaknesses/ disadvantages of the Technology with regard to gradual climate changes and climate-related extremes (disasters) and suggest ways they can be overcome.

Weaknesses/ disadvantages/ risks	***How can they be overcome?***
1)	1) .....
.....	.....
.....	.....
2)	2) .....
.....	.....
.....	.....
3)	3) .....
.....	.....
.....	.....

6. References and links

Indicate sources of information used for the compilation of information in this questionnaire.

6.1 Methods/ sources of information

Which of the following methods/ sources of information were used?

	Specify (e.g. number of informants)
☐ field visits, field surveys	.....
☐ interviews with land users	.....
☐ interviews with SLM specialists/ experts	.....
☐ compilation from reports and other existing documentation	.....
☐ other (specify):	.....

6.2 References to available publications

List relevant publications relating to the Technology (reports, manuals, training materials, case studies, etc.). Upload those publications that are available as soft copies to the database.

Title, author, year, ISBN	Available from where? Costs?
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

6.3 Links to relevant information available online

Title/ description	URL
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

CIAT

International Center for Tropical Agriculture
Since 1967 / Science to cultivate change

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CCAFS

PARTNERSHIPS FOR SCALING
CLIMATE SMART AGRICULTURE (P4S - CSA)

Climate Smart Agriculture:

Finding Real-World Solutions to Tackle the Climate Change Challenge

15 June 2017
Cali, Colombia

Evan Girvetz

e.girvetz@cgiar.org

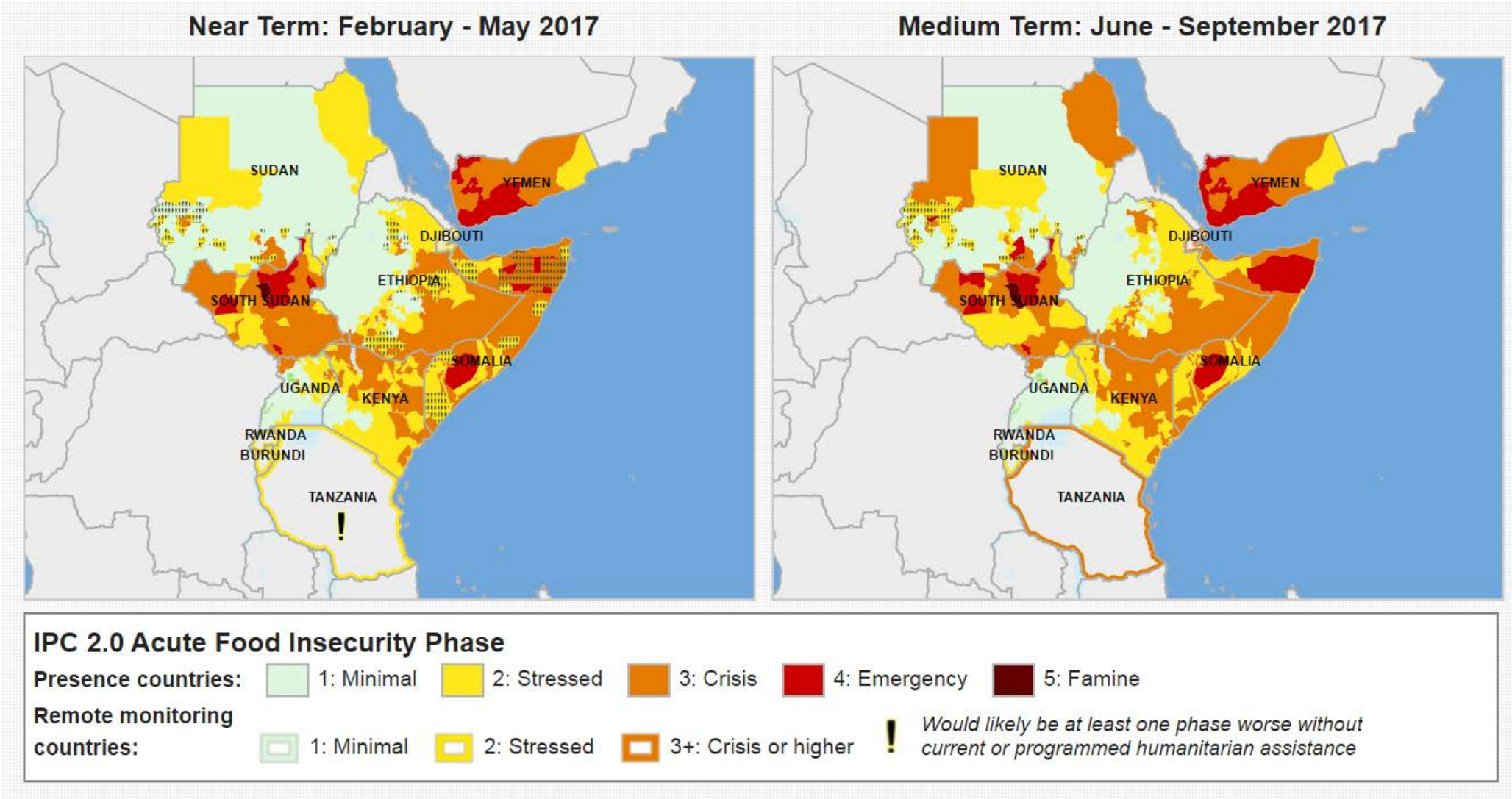

2°
TWO DEGREES CELSIUS COULD DECIDE OUR FATE

Turn Down the Heat

Why a 4°C Warmer World Must be Avoided

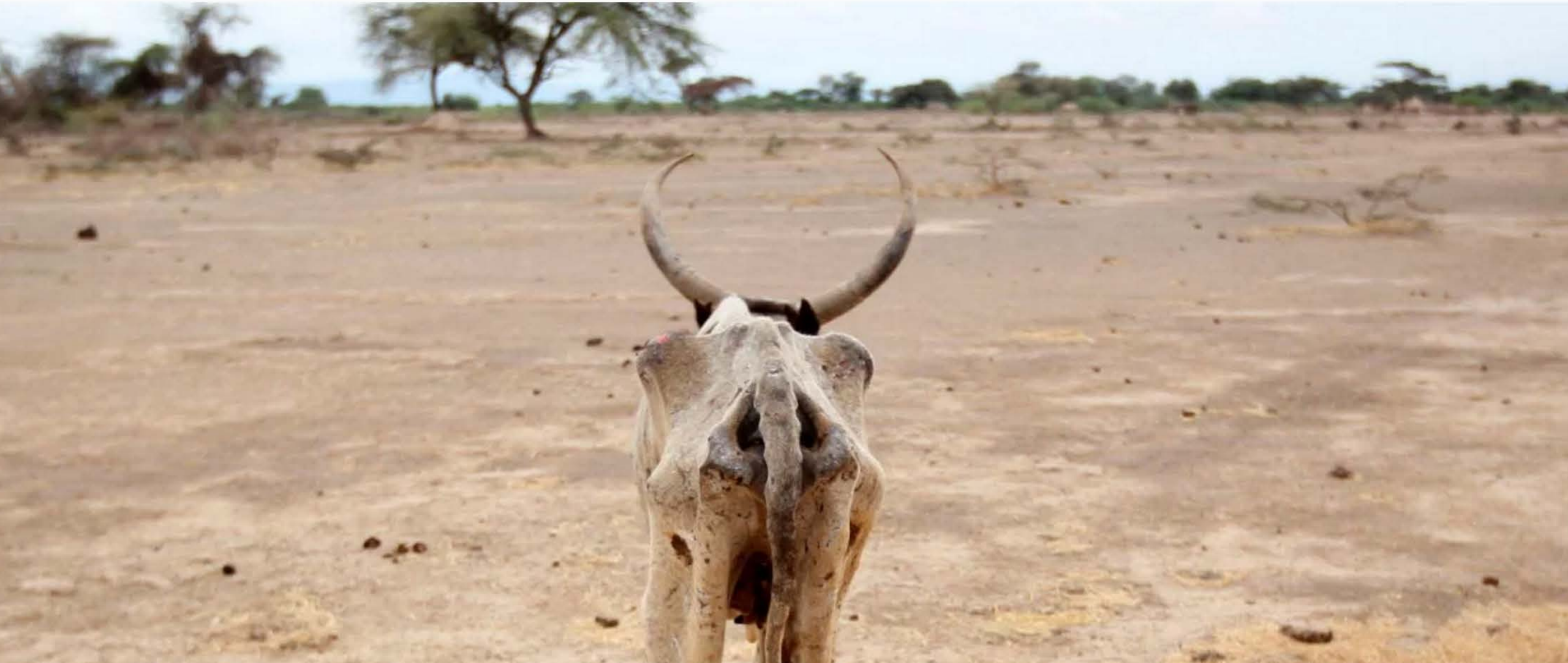
THE WORLD BANK

Current Drought Causing Food Insecurity and Famine in Sudan, Yemen and Horn of Africa



FIRST COME THE RAINS

After its worst drought in 50 years, Ethiopia is being lashed by floods




http://www.wallpapersmash.com

The Risks are Real

What is Climate Smart Agriculture?

CSA is **NOT** just a set of practices, BUT **an approach to developing the technical, policy and investment conditions** to achieve sustainable agricultural development for food security under climate change.

FAO, unpublished

Relative importance among CSA components is context specific

A.

NIGER

Farmer managed natural regeneration

- **5 million ha of land restored, over 200 million trees re-established**
  - **Additional half a million tonnes of grain per year**
  - **Reduces drought impacts**
  - **Sequestration of carbon in soil and trees**

RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security

CGIAR CCAFS

Bringing back the Sahel's 'underground forest'

CCAFS, 2014 -- CSA Success Stories

Zai, Half-moons and Stone Bunds Deliver Water and Nutrients

- Shallow bowls filled with compost or manure
- Shown to double cereal yields

CCAFS, 2014 -- CSA Success Stories

AFRICA

Seeds and value chains: Drought tolerant maize

CCAFS, 2014 -- CSA Success Stories

- More than 100 new varieties released across 13 countries; 2 million smallholders

•Yields up to 35% more grain

•Resilience to drought

• Reduces need to use more land

CGIAR RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security CCAFS

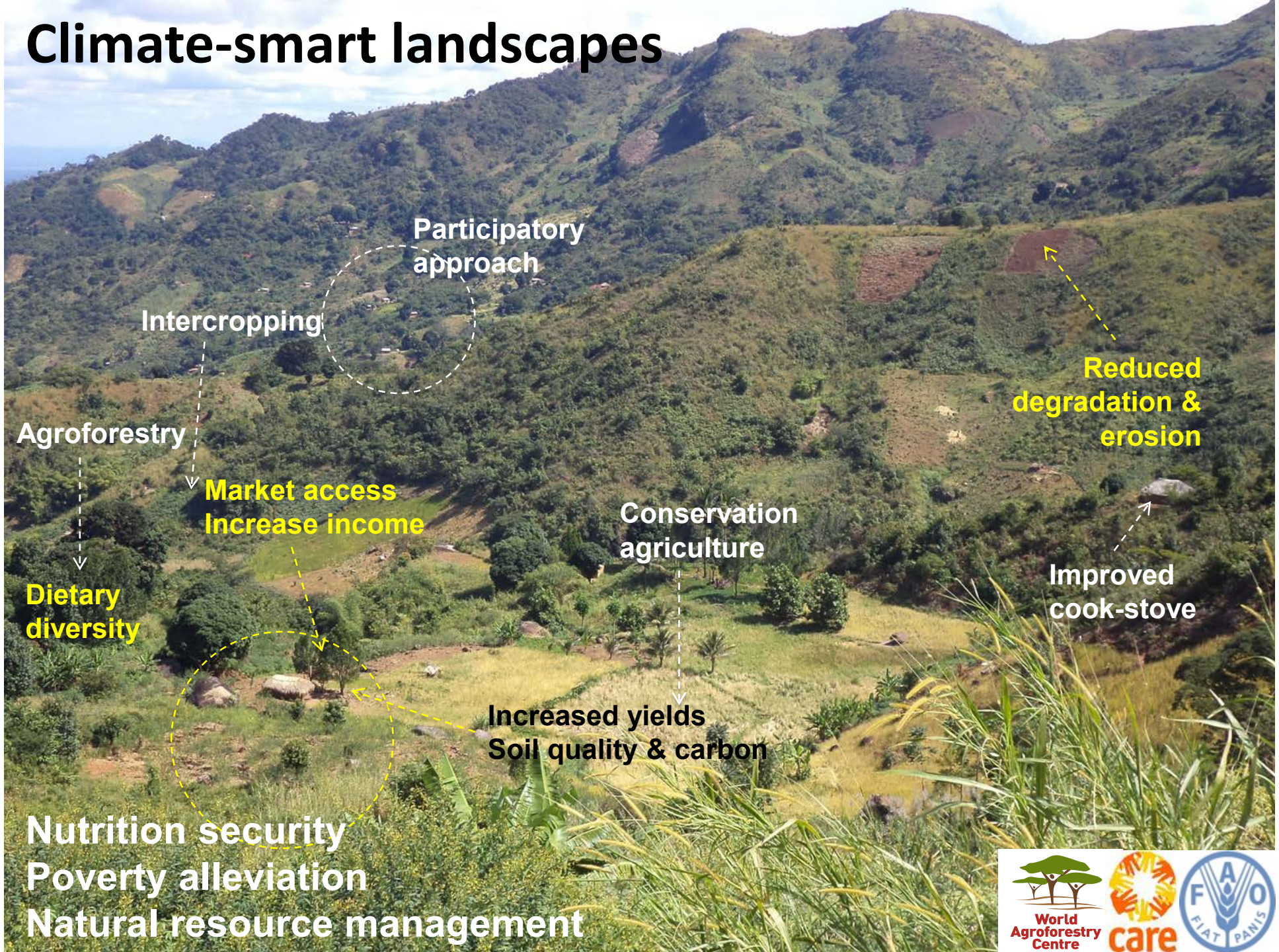
Ethiopia's Productive Safety Net Programme

CCAFS, 2014 -- CSA Success Stories

- Farmers with 3 months food shortage in 3 years work public works projects for food and cash.
- Reduced the 'hunger gap' – the period during which households ran short of food

http://hdl.handle.net/10568/34042

Climate-smart landscapes



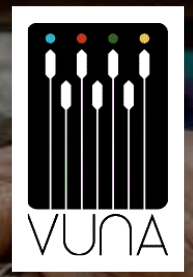
World Agroforestry Centre

care

FAO FIAT PANIS

Africa CSA Alliance

GACSA
GLOBAL ALLIANCE FOR CLIMATE-SMART AGRICULTURE



WOCAT Climate Change
Web Application Draft Mock-up


Google Maps
https://www.google.co.ke/maps/@15.4328795,27.1366379,3.5z?hl=en
Evan
Click on any location globally for climate information related to WOCAT conservation agriculture technologies
Denmark
Belarus
Poland
Germany
Ukraine
Austria
Romania
Kazakhstan
Italy
Spain
Portugal
Greece
Turkey
Uzbekistan
Kyrgyzstan
Turkmenistan
North Atlantic Ocean
Mediterranean Sea
Tunisia
Syria
Iraq
Iran
Afghanistan
Pakistan
Nepal
India
Morocco
Algeria
Libya
Egypt
Western Sahara
Saudi Arabia
Oman
Mauritania
Mali
Niger
Chad
Sudan
Yemen
Gulf of Aden
Arabian Sea
Bay of Bengal
Burkina Faso
Guinea
Nigeria
Ethiopia
South Sudan
Ghana
Laccadive Sea
Gulf of Guinea
Somalia
Kenya
Gabon
DR Congo
Tanzania
Angola
Zambia
Mozambique
Namibia
Zimbabwe
Madagascar
Botswana
Indian Ocean
South Africa
Google
WOCAT
World Overview of Conservation Approaches and Technologies
CIAT
International Center for Tropical Agriculture
Since 1967 / Science to cultivate change
Map data ©2016 Google, INEGI
Terms
Privacy
maps.google.com
Send feedback
1000 km

Location: Nairobi, Kenya

15.4328 S, 27.1366 E

	Historic trend (1981-2015)	Future Projected Change in 2050	Future Projected Change in 2090
Temperature			
Annual Temperature	0.4	2.1	4.2
Winter Temperature	0.6	2.4	4.8
Spring Temperature	0.5	2.1	4.2
Summer Temperature	0.3	1.8	3.6
Autumn Temperature	0.3	1.9	3.8
Wet / Rainy Season Temperature	0.4	2.4	4.8
Dry Season Temperature	0.3	2.2	4.4
Annual Rainfall			
Total Amount	-134	256	603
Number of Rain Days	-3.1	4.6	10.2
Winter Rainfall			
Total Amount	-40.2	76.8	180.9
Number of Rain Days	-6.1	4.8	11.9
Intensity	-0.3	-1.1	-2.6
Spring Rainfall			
Total Amount	-53.6	-95.5	-180.8
Number of Rain Days	-8.0	-6.4	-16.0
Intensity	-1.9	-2.2	-4.9

Scroll down to see other climate change metrics

WOCAT
World Overview of Conservation Approaches and Technologies

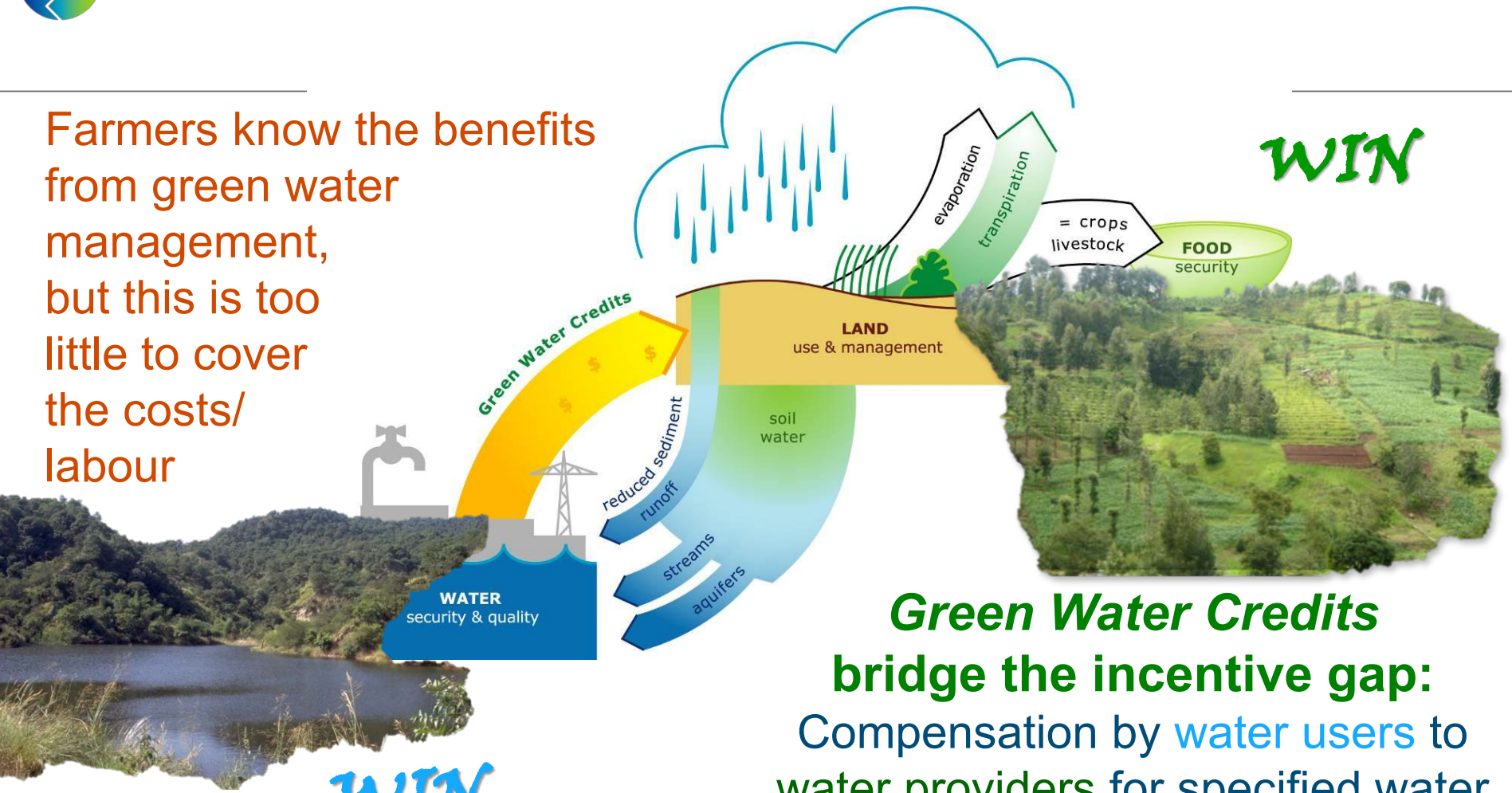
CIAT
International Center for Tropical Agriculture
Since 1967 / Science to cultivate change

ISRIC World Soil Information

Godert van Lynden

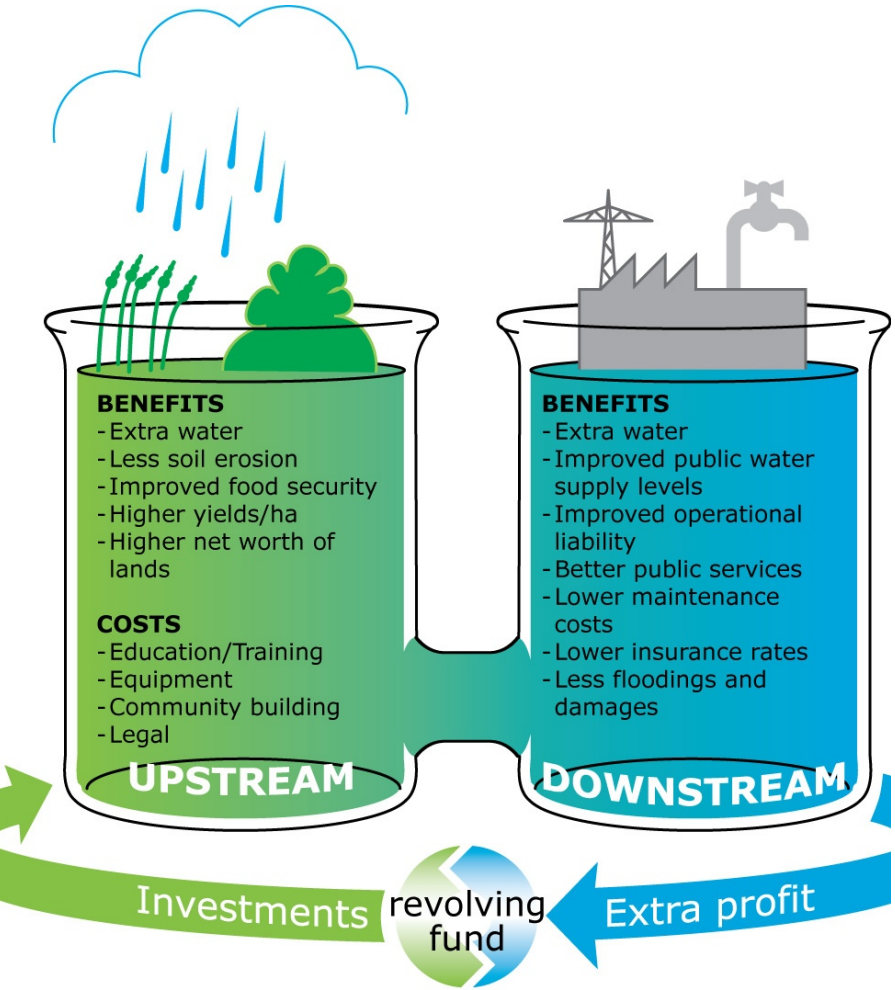
Bridging the Incentive Gap

Farmers know the benefits from green water management, but this is too little to cover the costs/ labour

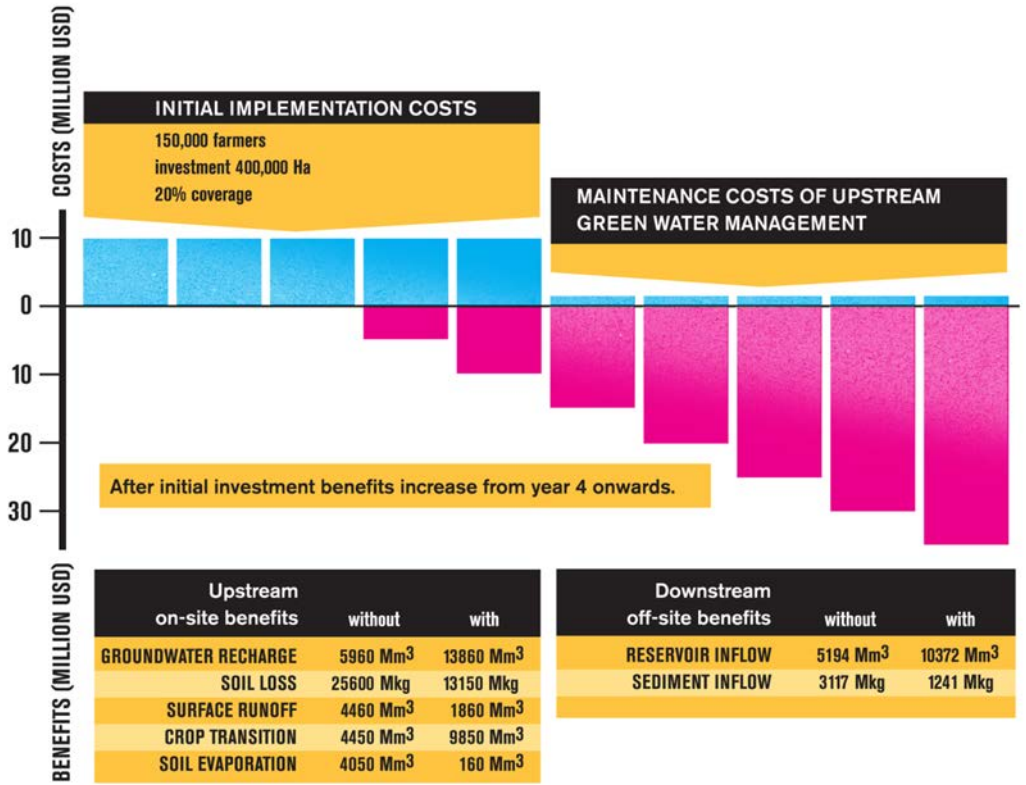


Green Water Credits
bridge the incentive gap:
Compensation by water users to water providers for specified water management services

Targets / Potential benefits



GREEN WATER CREDITS



Upstream on-site benefits	without	with
GROUNDWATER RECHARGE	5960 Mm^3	13860 Mm^3
SOIL LOSS	25600 Mkg	13150 Mkg
SURFACE RUNOFF	4460 Mm^3	1860 Mm^3
CROP TRANSITION	4450 Mm^3	9850 Mm^3
SOIL EVAPORATION	4050 Mm^3	160 Mm^3

Downstream off-site benefits	without	with
RESERVOIR INFLOW	5194 Mm^3	10372 Mm^3
SEDIMENT INFLOW	3117 Mkg	1241 Mkg

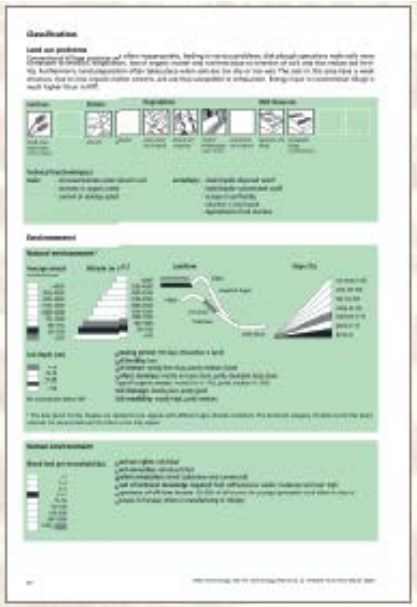
ISRIC World Soil Information

Biophysical domain

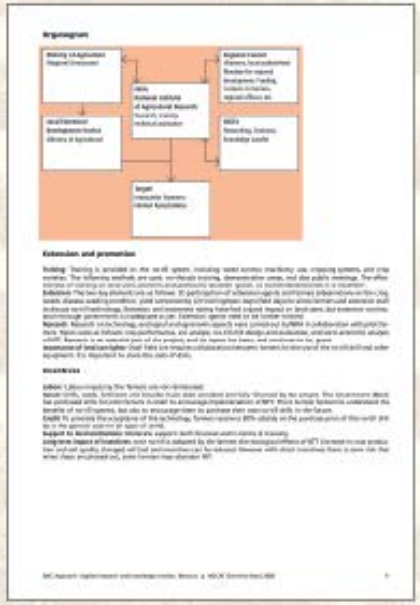
Better soil and water management can also greatly increase water supply downstream and improve rural livelihoods and

farmers are aware of this, but cannot (or do not want to) make the investments

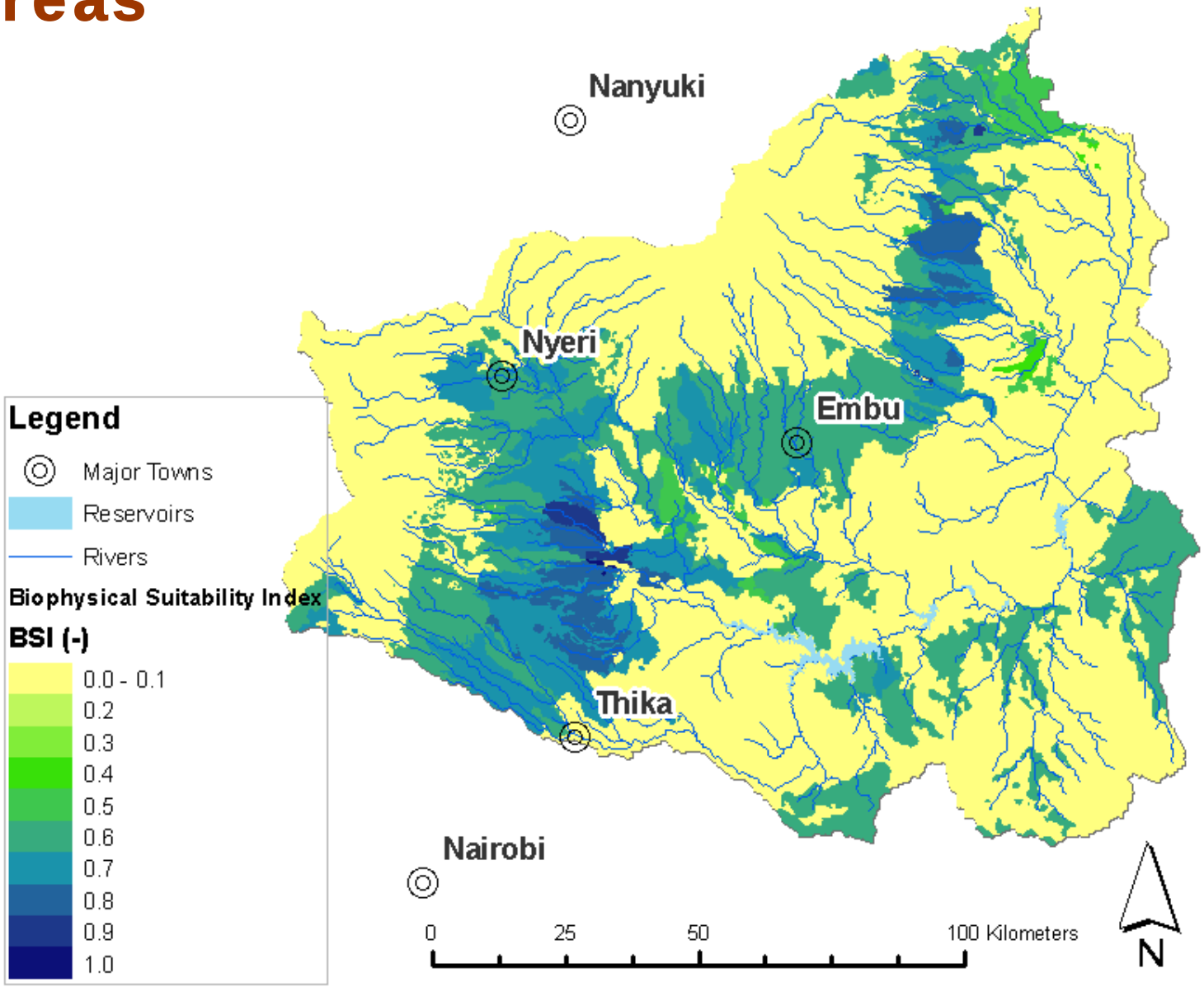
Technologies



Approaches



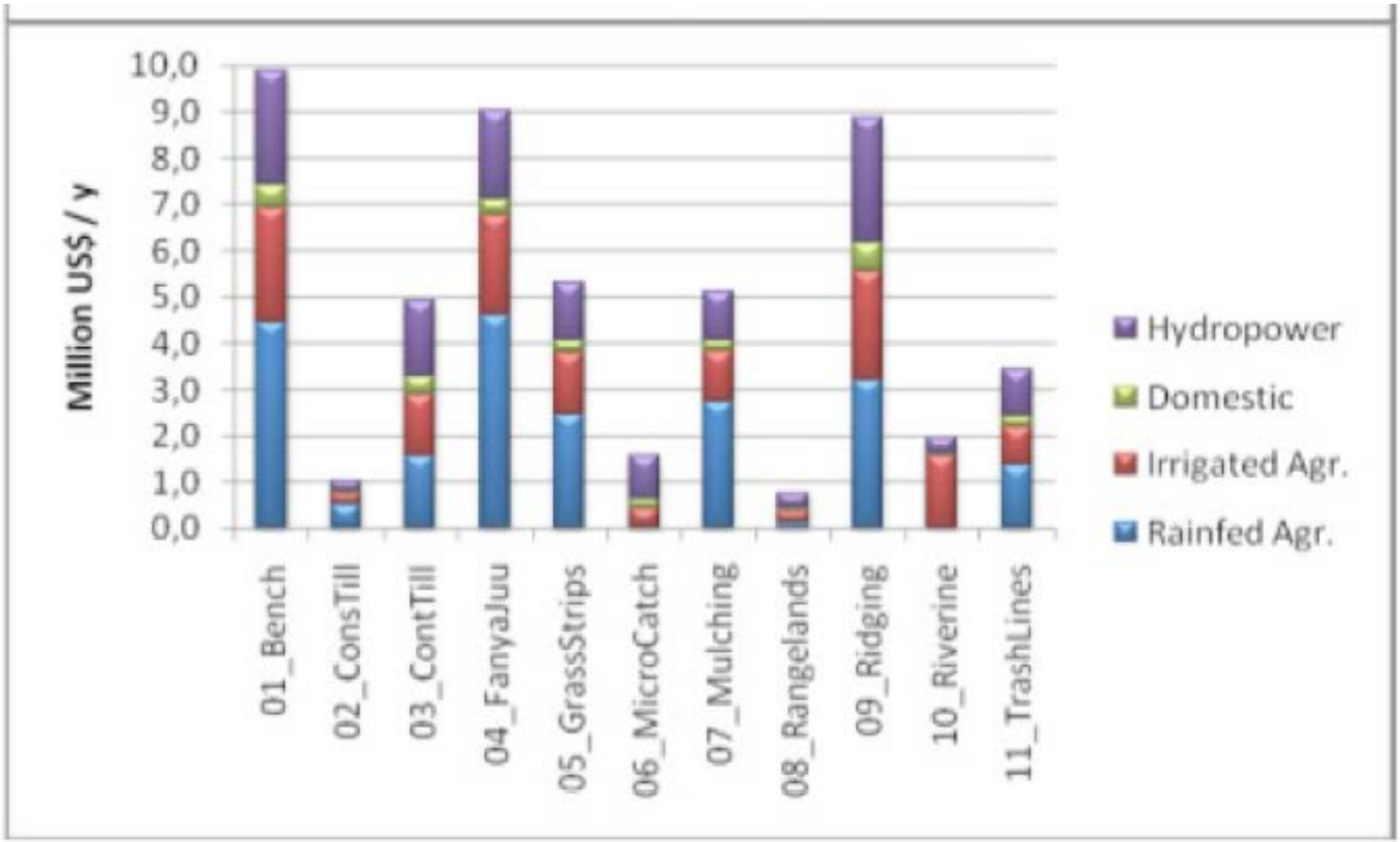
Spatial distribution of potential target areas



Socio-economic analysis

- **Identification** of existing and potential strategies with a participatory learning approach;
- **Assessment:** evaluation, documentation and sharing of strategies with the standardised WOCAT questionnaires;
- **Selection** of the most promising strategies with a decision support tool, based on land user preferences;
- **Implementation** of the selected SLM technology and impact monitoring

Economic analysis



Changes in revenues for the four main water use sectors

More information...

www.isric.org

www.isric.org/projects/green-water-credits-gwc

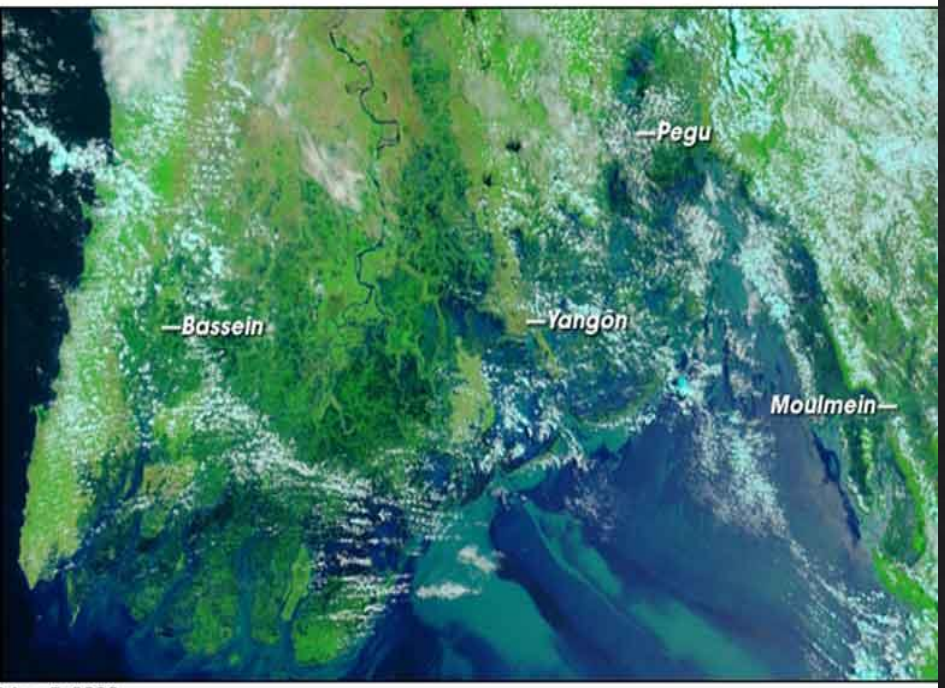
www.wocat.net

Godert.vanlynden@wur.nl

On- and Off-site Impact Assessement of Landmanagement

Does unsustainable land management play a role on the extent of disasters?

April 15, 2008



May 5, 2008

Myanmar, Cyclone Nargis 2008:

- Advanced deforestation in coastal areas paved the way for this deadly disaster.
- Ca. 140‘000 deaths
- Total damage ($): 4‘000 M

Drought in Somalia 2010:

- Unsustainable land management aggravated the situation. The conversion of woodlands into farmland, is recognized to generate an even drier climate.
- Ca. 20’000 deaths
- Damage: loss of soil fertility, huge crop failure and high mortality rate of livestock

Earthquake (followed by landslides and debris flows) in China (Sichuan) 2008:

- Destabilisation of hillside enforced the risk of landslides after an earthquake
- Ca. 88‘000 deaths
- Total damage ($): 84 M

Conclusion

- Unsustainable land management can clearly be identified as a central factor related to the extent of disasters.
- But: No consciousness within the population!

On- and Off-site Impact Assessment of Land management
-
Case Study in Haiti

Master Thesis at the Institute of Geography, University of Bern

Joana Eichenberger

Supervisors: Dr. Hanspeter Liniger and Prof. Dr. Chinwe Ifejika Speranza

Why Haiti?

https://www.youtube.com/watch?v=cKW53FrLMq8

https://www.youtube.com/watch?v=fObjWotlONY

Haiti vs. Dominican Republic

		Haiti	% of population	Dominican Republic	% of population
Population 2015		10'710'000		10'530'000	
Total events		63		38	
Storms	Events	26		18	
	Total deaths	4'332	0.04%	226	0%
	Total affected	3'120'284	29.13%	285'842	2.71%
Floods	Events	37		20	
	Total deaths	3'090	0.03%	740	0.01%
	Total affected	646'521	6.04%	225'945	2.15%

- Location:
  - Caribbean plate → earthquakes
  - Caribbean → hurricanes
- EM-DAT: Natural hazards 2000-2016
  - 67 Events (excl. biological events)
  - Haiti had more deaths and affected people than Dom. Republic

→ Link to deforestation?

Aims and Methods

Objective

Quantify cost-benefits/impacts of LD/SLM

- Compare deforested watersheds to forested (/afforested) watersheds regarding water quantity and quality
  - On-site: watershed areas
  - Off-site: Impacts on lowland rivers, groundwater

Methods

- Rough method: such as spade diagnosis, infiltration capacity, erosion damage mapping,…
- Qualitative social interviews
- Maybe some simple modelling (e.g. Run off curve number)

Fieldwork

- When: October/November
- Where: Léogâne (SRC-Project)

Fig. 5: Léogâne, Haiti

Expected Impacts of (af-)forested Watersheds:

On-site

Soil:

- Higher infiltration capacity
- Less soil erosion

Water:

- Reduce runoff

Off-site

- Disaster Risk Reduction: Floods, Drought
- Water security (quantity and quality)

Challenges

- New disasters till October/November
- Fieldwork length: 1month with Swiss Red Cross in Léogâne
- Watersheds: enough comparable watersheds in SRC-Project-Region?

Examples Comparable Watersheds

Fig. 6: Where to compare bare soil with vegetation cover

Examples Comparable Watersheds

Fig. 6: Where to compare bare soil with vegetation cover

References

- Kreft, S., D. Eckstein, I. Melchior (2017): Global Climate Risk Index 2017 – Who Suffers most from extreme Weather Events? Weather-related Loss Events in 2015 and 1996-2015. Bonn, Germany, Germanwatch.
- NIZAR, M. (2009): Learning from Cyclone Nargis. Investing in the environment for livelihoods and disaster risk management. –United Nations Environment Programme 2009, 3.
- UNISDR (2009): UNISDR Terminology on Disaster Risk Reduction. United Nations, p.10f.
- XU, C., X. XU, G. YU (2012): Earthquake triggered landslide hazard mapping and validation related with the 2010 Port-au-Prince, Haiti earthquake. -Disaster Advances 2012, Vol 5, No. 5, p. 1297.
- ZENG, N. (2003): Drought in the Sahel. -Science 2003, No. 302, p. 999.

Images:

- Fig. 1: http://news.bbc.co.uk/2/hi/uk/7389848.stm [10.06.2017].
- Fig. 2: http://blog.kulikulifoods.com/wp-content/uploads/2014/08/drought18-8b9a6db718dda8f9f968da97316f9c0a2daa3655.jpg [10.06.2017].
- Fig. 3: https://www.usgs.gov/media/images/damage-2008-great-sichuan-earthquake-china [10.06.2017].
- Fig. 4: Own representation based on EM-DAT
- Fig. 5: https://commons.wikimedia.org/wiki/File:Haiti_topographic_map-fr.svg [10.06.2017].
- Fig. 6 & 7: Google Earth