Food and Agriculture Organization of the United Nations

WOCAT

The FAO-WOCAT Mapping Approach

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LDN and RS expert for FAO and WOCAT
18.10.2023

Asian knowledge hub on sustainable soil and land management

LAND IS OUR PRIMARY SOURCE OF NATURAL CAPITAL

LAND DEGRADATION is the loss or reduction in land productivity.
When land is degraded, we lose natural capital, and thus all the benefits that land and nature contribute to people.

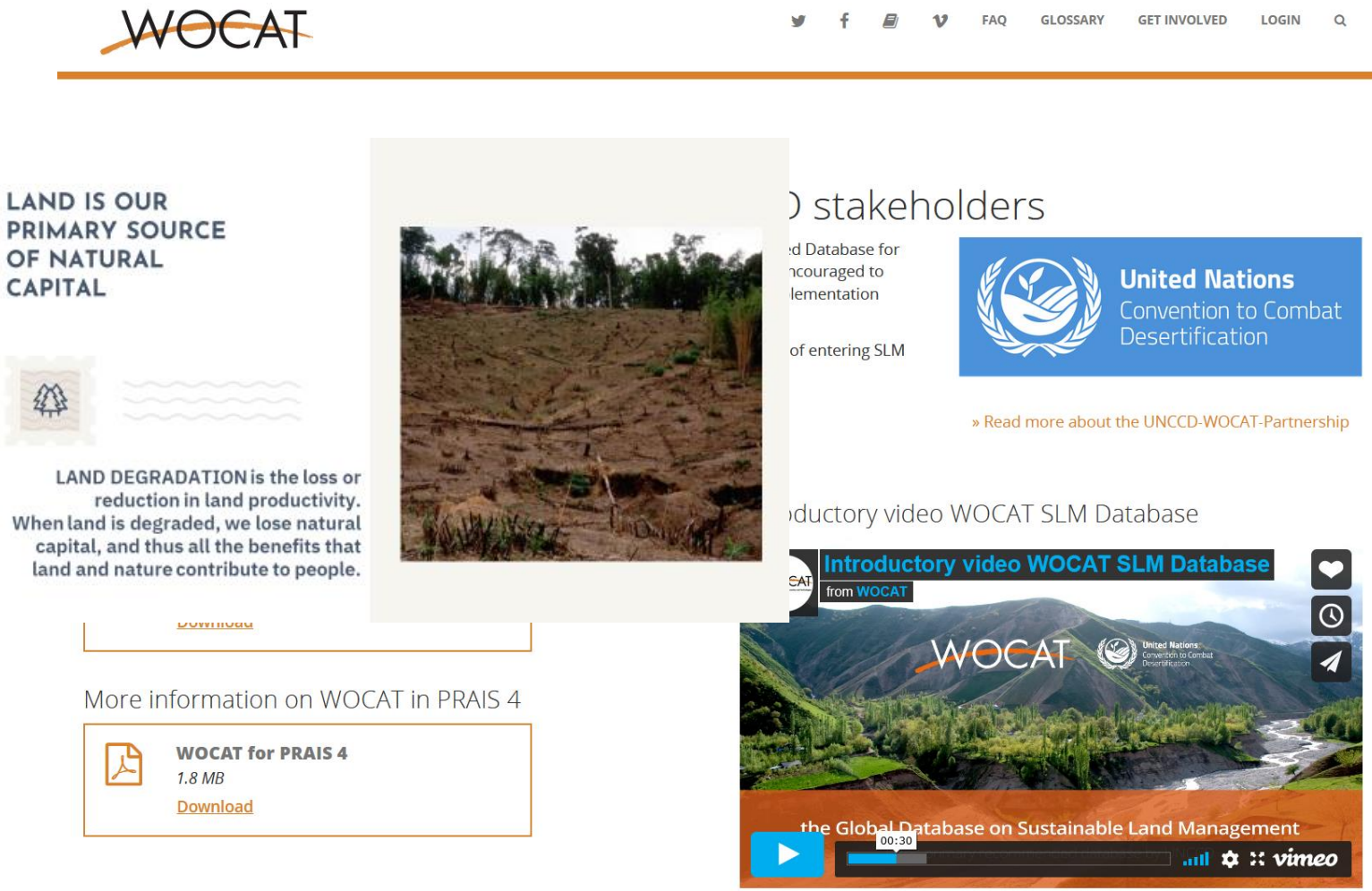
LDN provides a framework for a balanced approach, which considers trade-offs and anticipates new degradation

SLM TECHNOLOGIES & APPROACHES

LANDSCAPE DEVELOPMENT

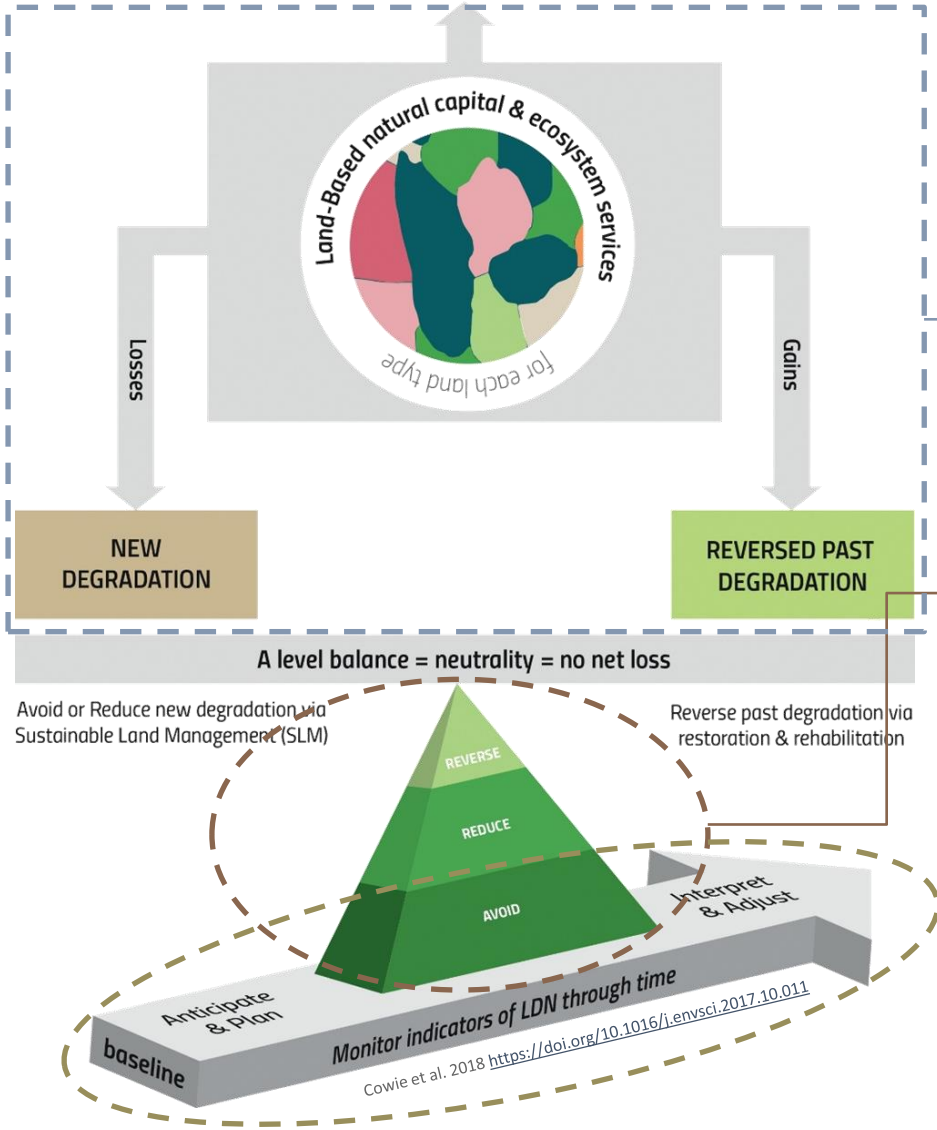
How to add data: UNCCD Reporting process

- Guidelines
- Short video



https://www.wocat.net/library/media/60/

How to support projects and countries in decision making for setting targets, LUP, defining restoration priorities, SLM implementation strategies, investment allocation, monitoring the LDN impact pathway, etc.



At landscape level there are SDGs synergies, that include diverse land and water dynamics in particular socioeconomic settings. These requires multi-disciplinary, multi-institutional and bottom up approaches that guaranty ownership.

To work with the hierarchy response means to answer a key questions of Land Use Planning, like: **What** to do and **Where**?

Is the intervention working (**Impact**)?
Requires producing information across scales, on many key variables, using diverse methodologies and data sources to go beyond simple LD indicator mapping.

Building Tools, Approaches and Synergies

Achieving Land Degradation Neutrality

IN OUR HANDS
EARTH SUMMIT '92
UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT

Sinergy

SUSTAINABLE DEVELOPMENT GOALS

CBD

United Nations
Convention to Combat Desertification

Synergizing SDG 15

Indicator 15.1.1: Forest area as a proportion of total land area

Indicator 15.2.1: Progress towards sustainable forest management

Indicator 15.3.1: Proportion of land that is degraded over total land area

Indicator 15.4.2: Mountain Green Cover Index

MAPPING LAND DEGRADATION

Is needed for...

Prioritize areas for interventions

Decide what to do where (informed decision making)

Support Land Use Planning processes

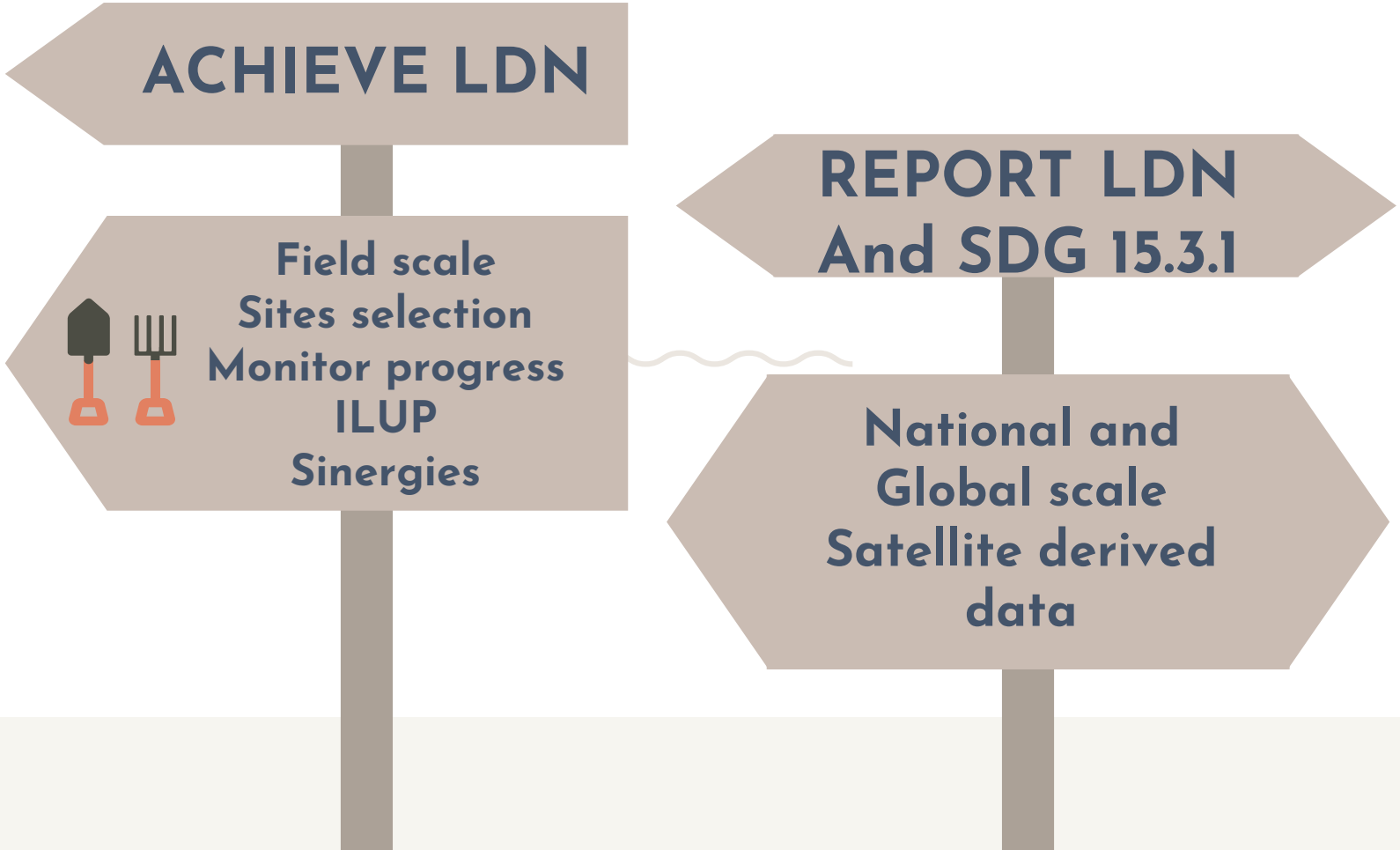
Establish and refine national targets and commitments

Optimize investments by finding synergies among UN conventions and SDGs

Monitor progress towards LAND DEGRADATION NEUTRALITY (LDN)

Report to UNCCD

Coherence of spatially explicit contexts for site selection and monitoring across scales



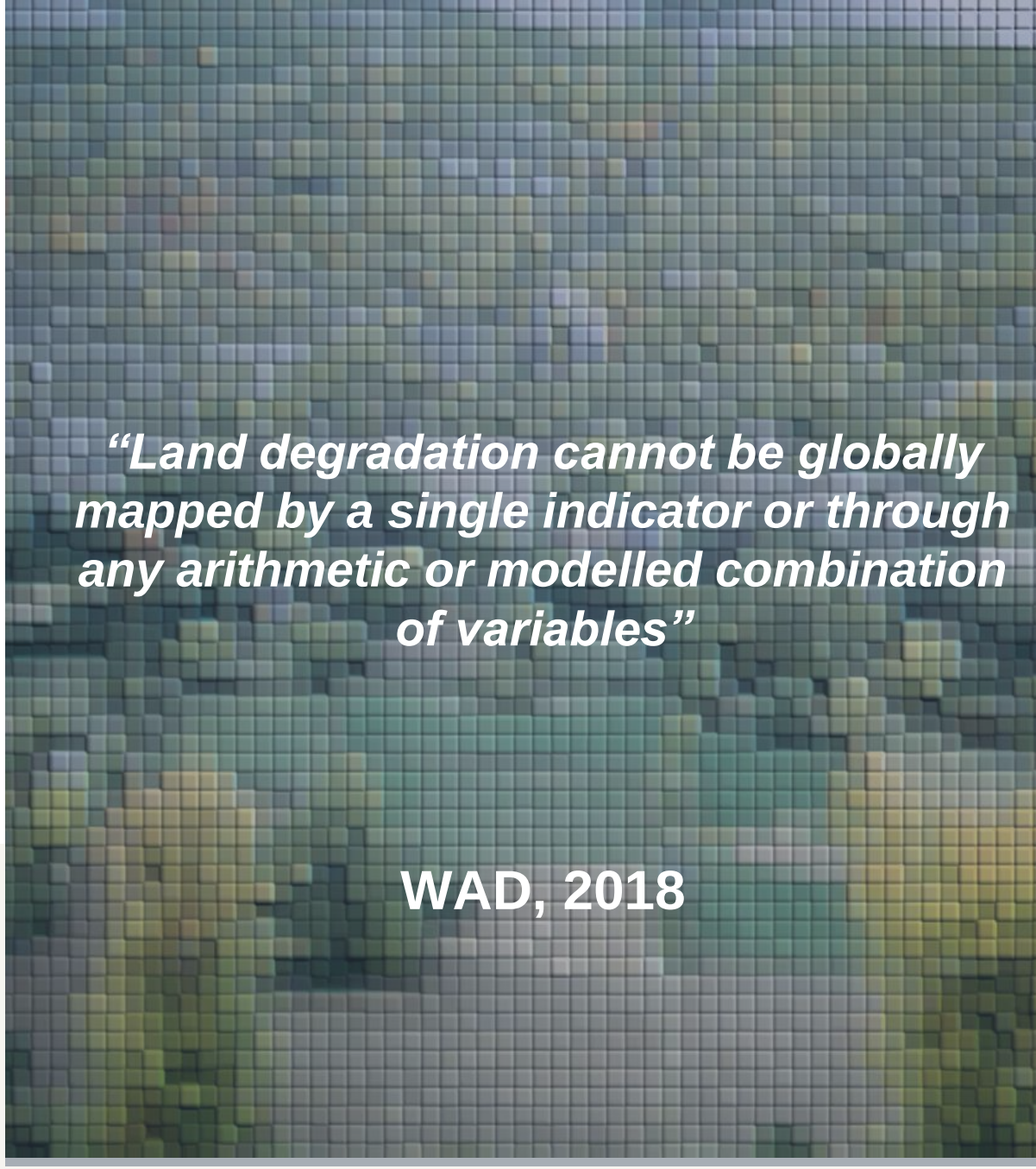
United Nations
Convention to Combat
Desertification

prais4

MAPPING LAND DEGRADATION IS NOT EASY

Causes, processes and impacts + LD change over space and time

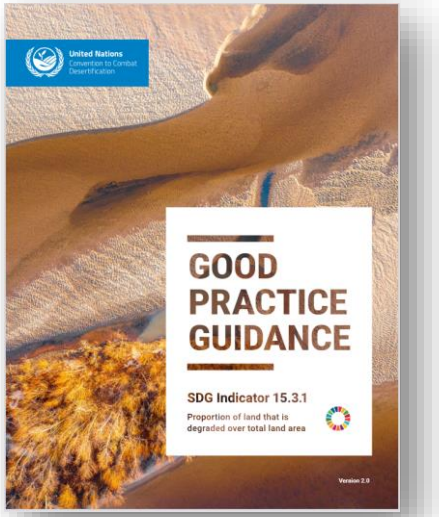
Estimations need to make sense across scales



SDG 15.3.1
PROPORTION OF LAND THAT IS DEGRADED

United Nations
Convention to Combat Desertification

prais4



TRENDS IN LAND COVER

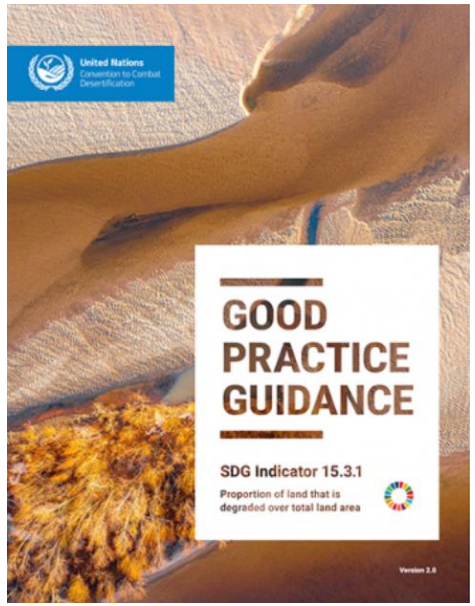
TRENDS IN LAND PRODUCTIVITY

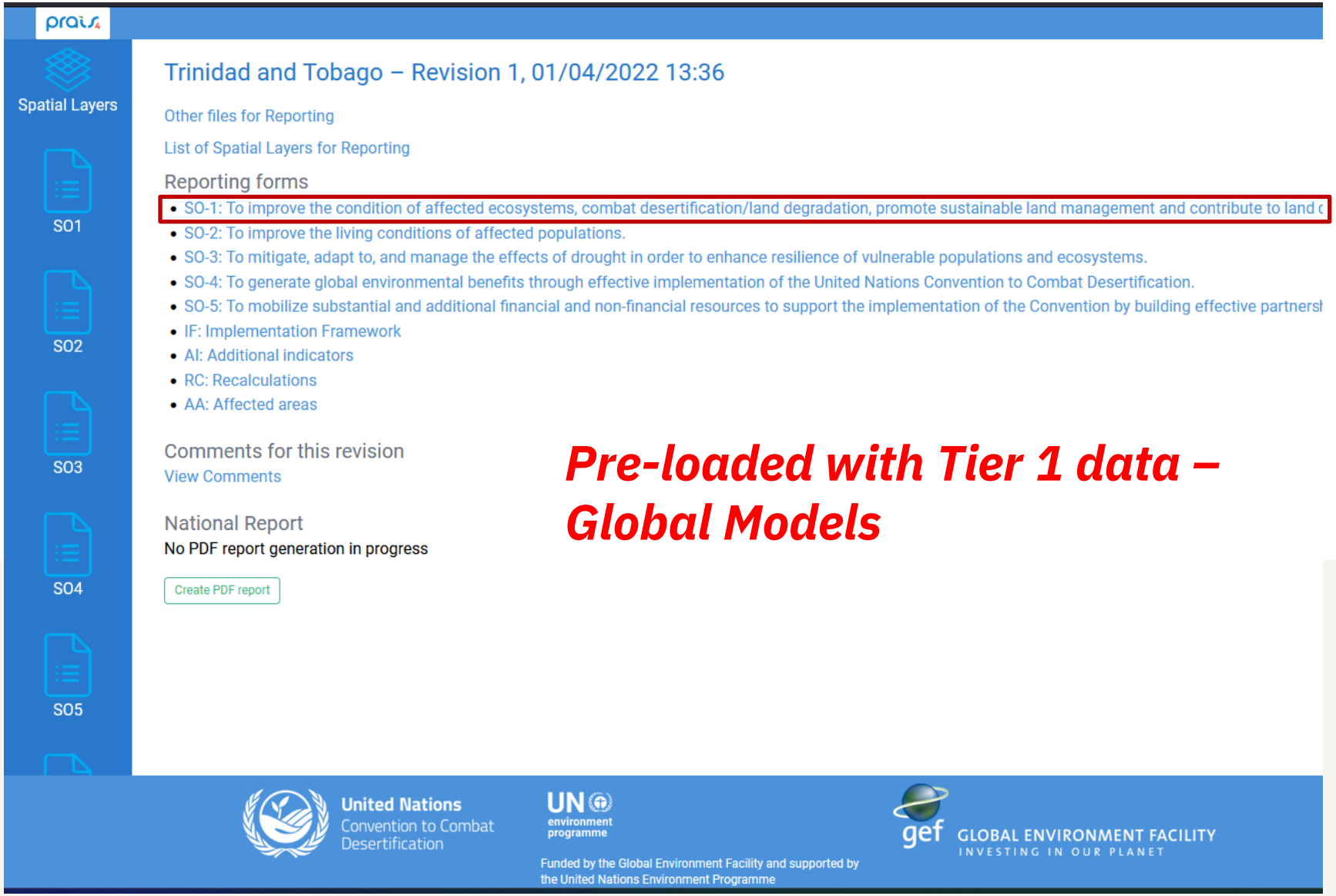
TRENDS IN CARBON STOCKS

*"While it is difficult for a single indicator to fully capture the state or condition of the land, the sub-indicators are **proxies** to monitor the essential variables that reflect the capacity of the land to deliver ecosystem services"* Sims et al. 2021

PRAIS 4 REPORT

Tiered approach



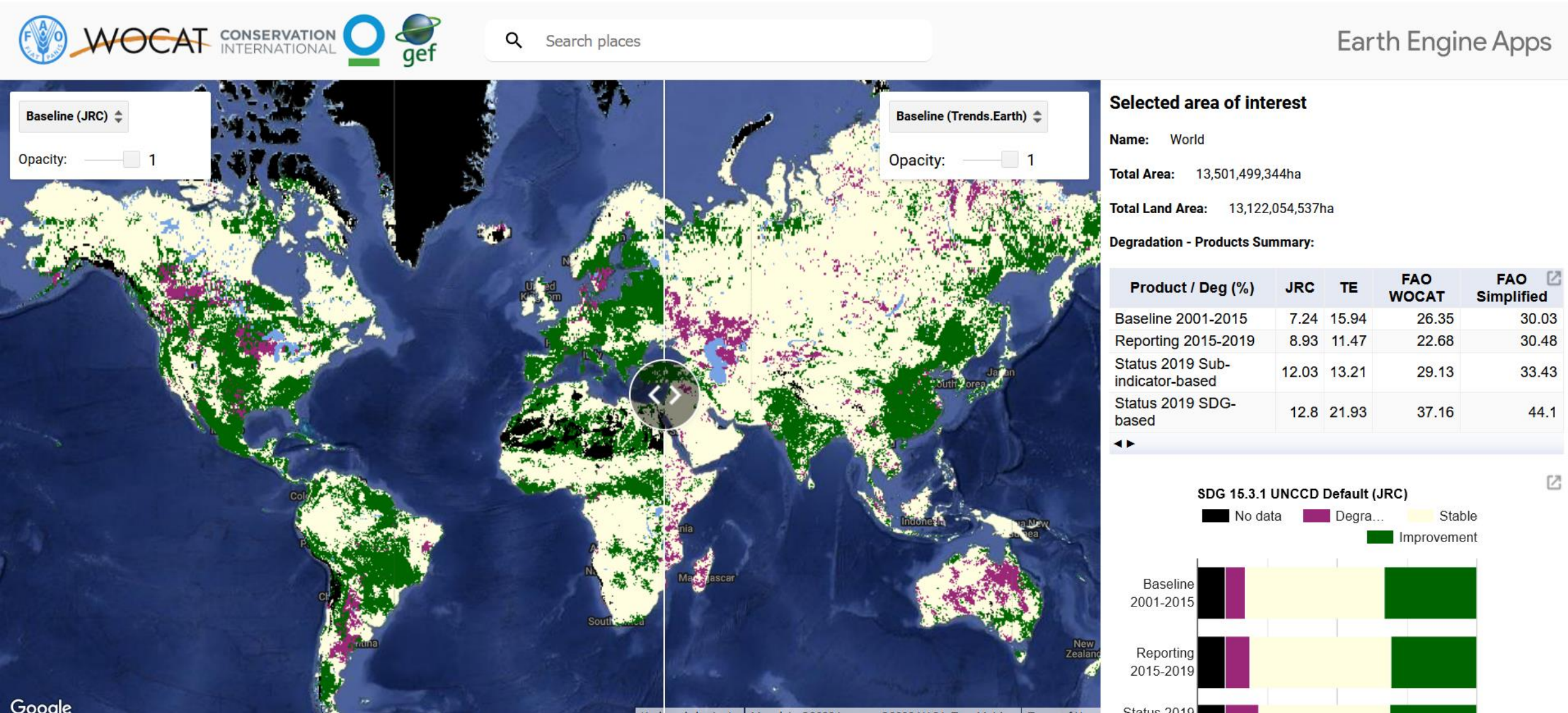


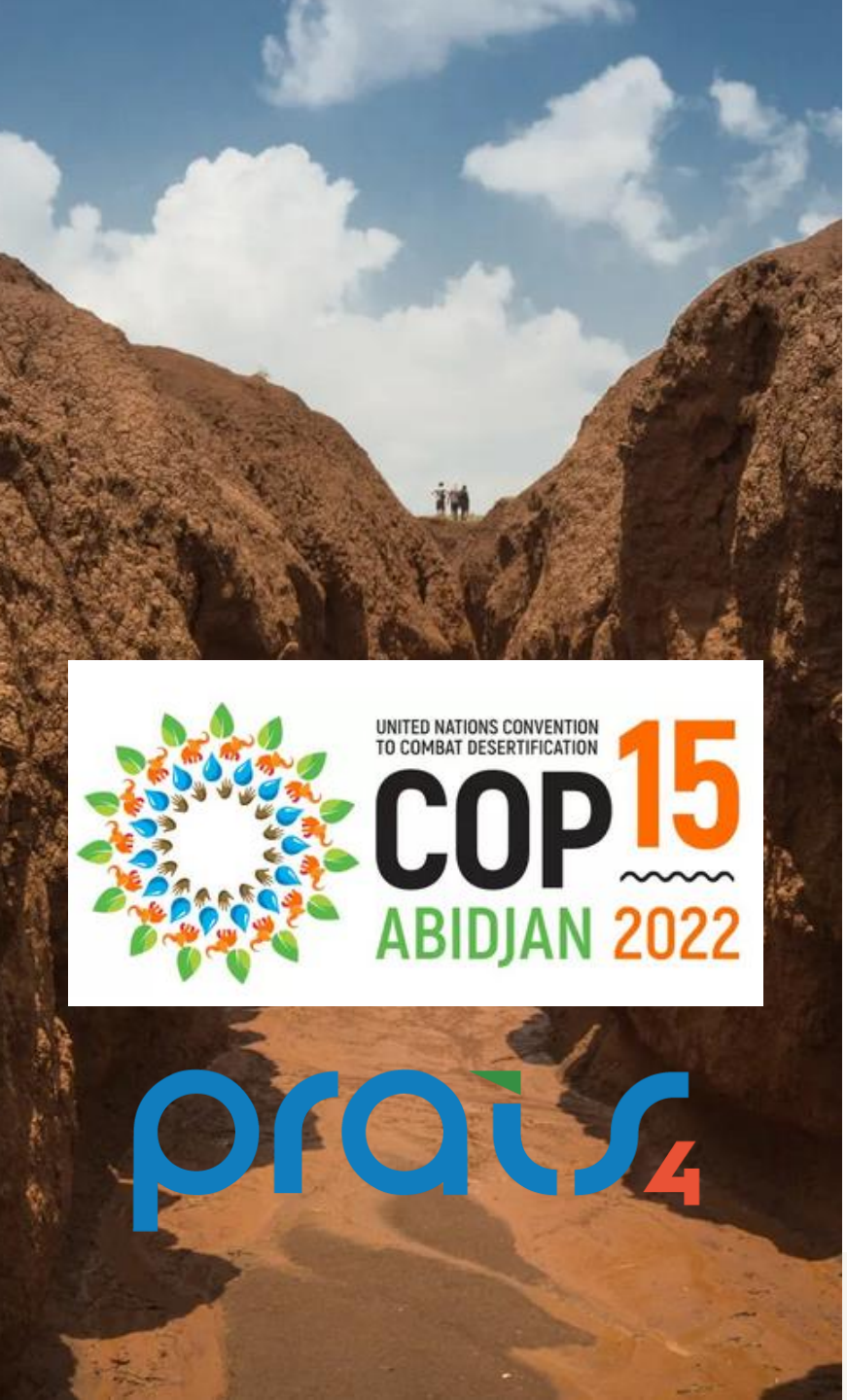
Pre-loaded with Tier 1 data – Global Models

SDG 15.3.1: One Out All Out…

… what is the impact of using different global LPD models?

https://maps.tools4ldn.org/





HOW CAN WE IMPROVE OUR ESTIMATIONS?

CHOOSE BEST AVAILABLE DATA

Increased availability of EOs, national data

EXPLORE DIFFERENT ALGORITHMS

Data is malleable

INTEGRATE EXPERT KNOWLEDGE

Participatory processes improve estimations and create ownership

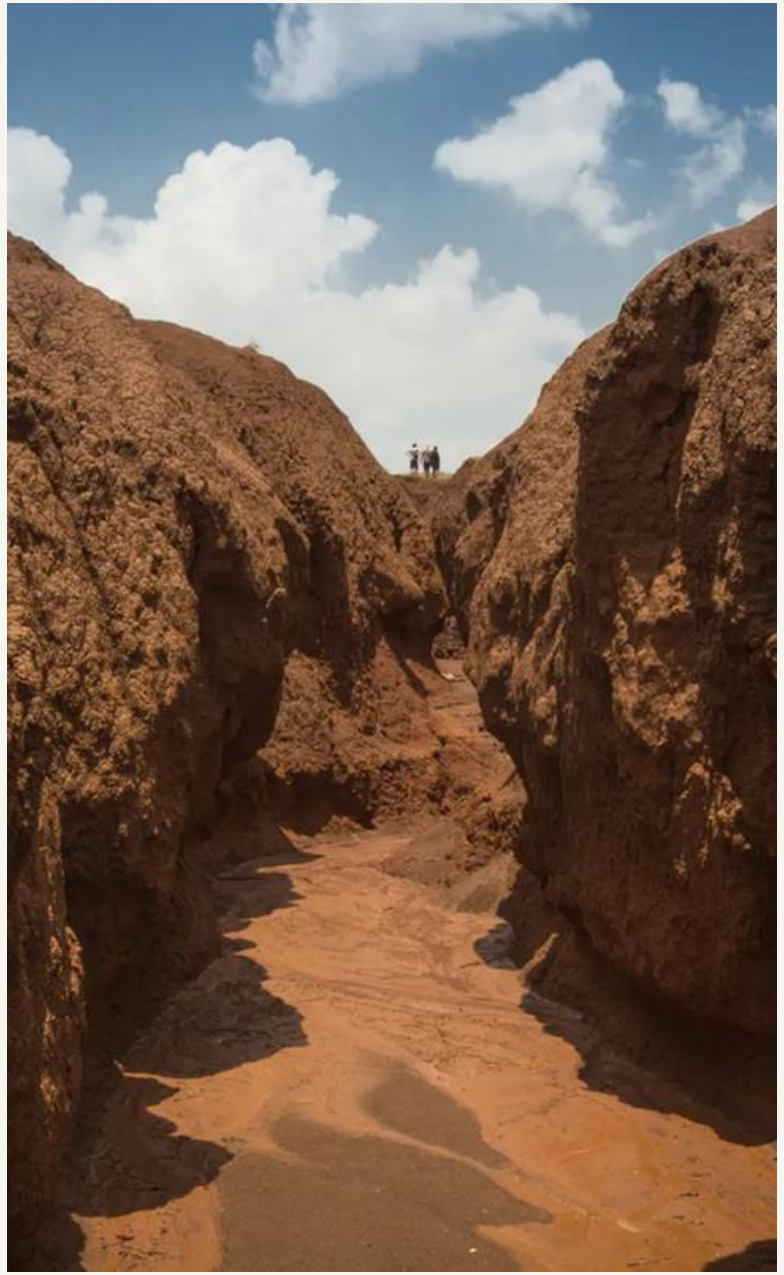
ESTIMATE UNCERTAINTIES

Map uncertainties and obtain error adjusted area estimates

DEFAULT VS REPORTED

Countries used alternative data sources and integrated expert knowledge

There were BIG differences...



PANAMA

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%) ⓘ
Baseline Period ⓘ	6880	9.4
Reporting Period ⓘ	7577	10.4
Change in degraded extent ⓘ	697	

Default

SO1-4.T1: Estimaciones nacionales de la superficie total de las tierras degradadas (en kilómetros cuadrados), y proporción de tierras degradadas en comparación con la superficie terrestre total

	Superficie total de las tierras degradadas (km²)	Proporción de tierras degradadas en comparación con la superficie terrestre total (%)
Período de Referencia	25 891	35 ,2
Período sobre el que se informa	23 679	32 ,2
Variación de la extensión de las tierras degradadas	-2212	

Reported

COLOMBIA

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%)
Baseline Period	85348	7.6
Reporting Period	98370	8.8
Change in degraded extent	13022	

Default

SO1-4.T1: Estimaciones nacionales de la superficie total de las tierras degradadas (en kilómetros cuadrados), y proporción de tierras degradadas en comparación con la superficie terrestre total

	Superficie total de las tierras degradadas (km²)	Proporción de tierras degradadas en comparación con la superficie terrestre total (%)
Período de Referencia	331 897	28 ,8
Período sobre el que se informa	343 934	29 ,8
Variación de la extensión de las tierras degradadas	12037	

Reported

ECUADOR

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%) ⓘ
Baseline Period ⓘ	20352	8.0
Reporting Period ⓘ	25235	10.0
Change in degraded extent ⓘ	4883	

Default

Proportion of degraded land over the total land area (Sustainable Development Goal Indicator 15.3.1)

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%)
Baseline Period	55 555	21 .9
Reporting Period	32 402	12 .8
Change in degraded extent	-23153	

Reported

BOSNIA & HERZEGOVINA

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%) ⓘ
Baseline Period ⓘ	3164	7.9
Reporting Period ⓘ	3164	7.9
Change in degraded extent ⓘ	0	

Default

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%)
Baseline Period	4 319 .47	8 .5
Reporting Period	3 457 .98	6 .8
Change in degraded extent	-861.49	

Reported

TURKIYE

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%) ⓘ
Baseline Period ⓘ	10391	1.4
Reporting Period ⓘ	26385	3.4
Change in degraded extent ⓘ	15994	

Default

Proportion of degraded land over the total land area (Sustainable Development Goal Indicator 15.3.1)

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%)
Baseline Period	109 862 .4974	14 .3
Reporting Period	102 484 .7157	13 .4
Change in degraded extent	-7377.78	

Reported

BHUTAN

SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%) ⓘ
Baseline Period ⓘ	541	2.7
Reporting Period ⓘ	2218	11.1
Change in degraded extent ⓘ	1677	

Default

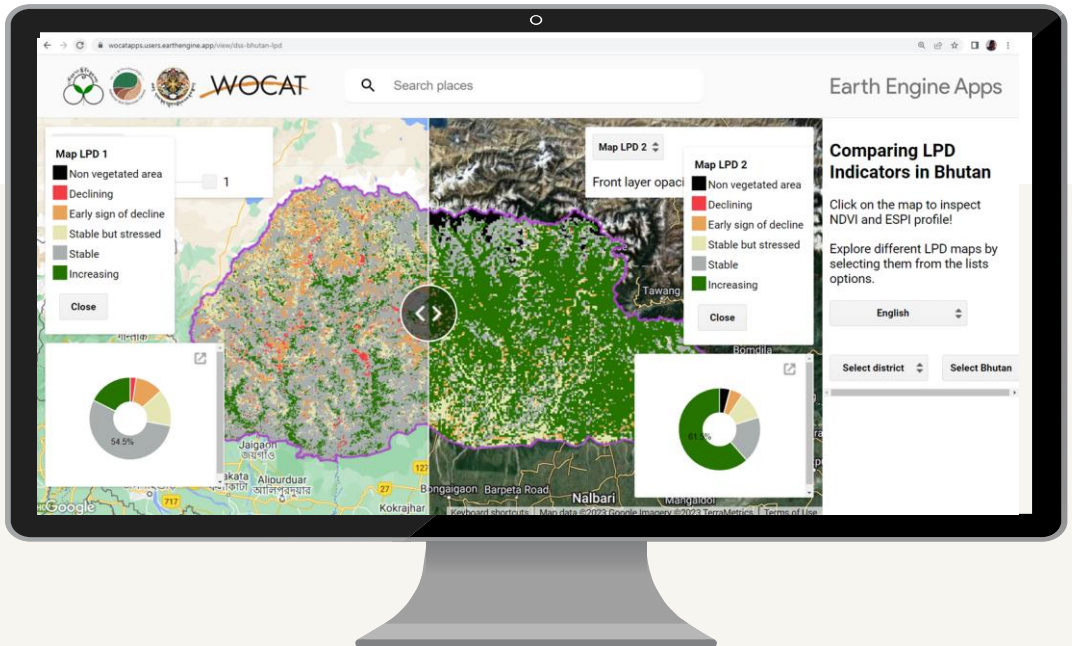
SO1-4.T1: National estimates of the total area of degraded land (in km²), and the proportion of degraded land relative to the total land area

	Total area of degraded land (km²)	Proportion of degraded land over the total land area (%)
Baseline Period	4 607 .57	11 .9
Reporting Period	5 227 .4	13 .5
Change in degraded extent	619.83	

Reported

The most representative LPD map

1.- Which model is best for the Country?
2.- Which processes relate with the “Red areas”?
3.- Which processes relate to “Green areas”?
4.- What is the model that provides the worst results in the Country?



https://wocatapps.users.earthengine.app/view/dss-bhutan-lpd
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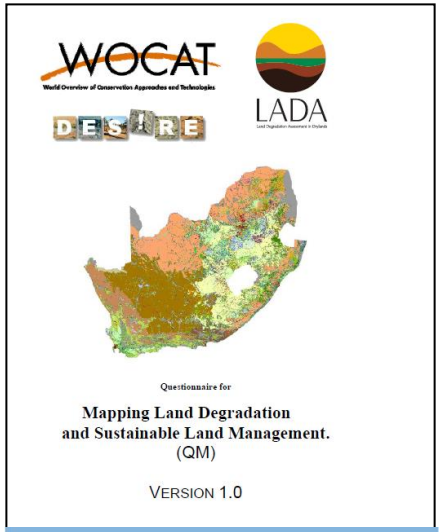
Questionnaire on Mapping Land Degradation and Sustainable Land Management (QM)

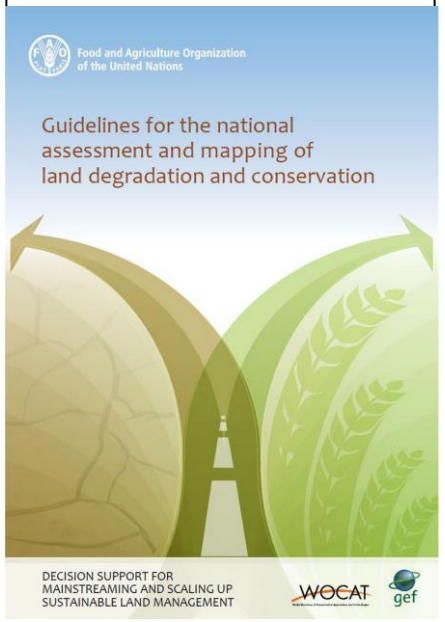
- Overview of where land degradation takes place at what intensity and how land users are addressing this problem through Sustainable Land Management (SLM)

- Land Degradation Assessment in Drylands (LADA) project, the DESIRE project and have streamlined methods to map and document Land degradation (LD) and land improvement

- The QM is being promoted by WOCAT and FAO, has been applied in over 30 countries worldwide.

➢ **QM ultimate goal: to obtain a picture of the distribution and characteristics of LD and SLM activities at a given scale.**



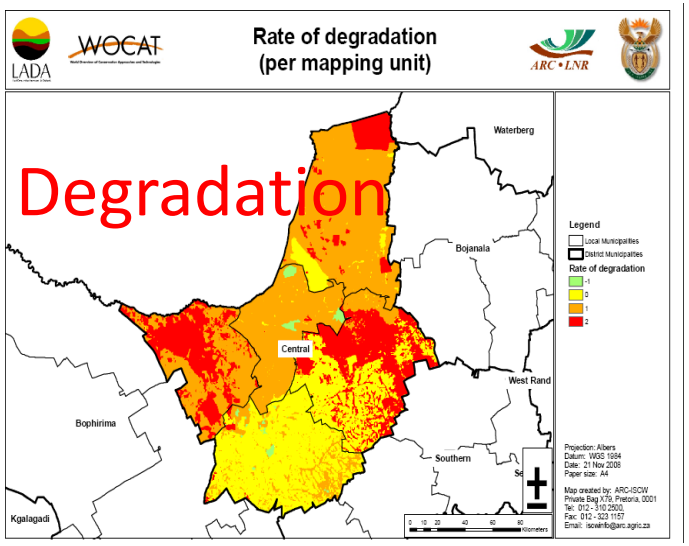


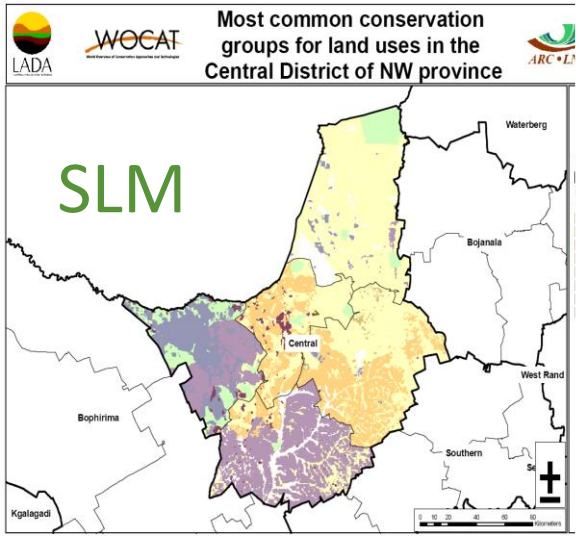
https://www.wocat.net/en/global-slm-database/land-management-mapping-tools

QM – participatory expert assessment (PEA)

- PEA brings together experts, scientists and land users in a workshop to assess different mappings units, drawing on their knowledge and experience of the area
- Experts/specialists/land users with expertise related to land degradation, land management, different land uses, soil and water conservation, biodiversity… in the country /local context
- Discuss, negotiate and fill in the QM tables (supported by documents)

QM results



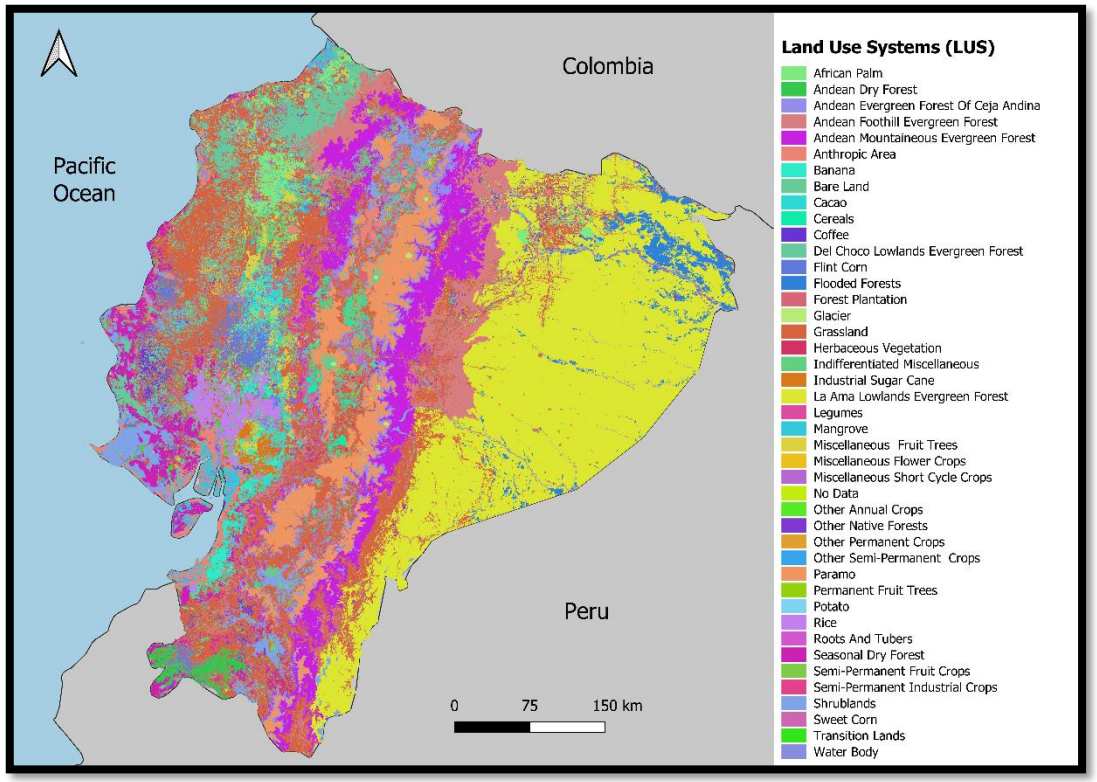


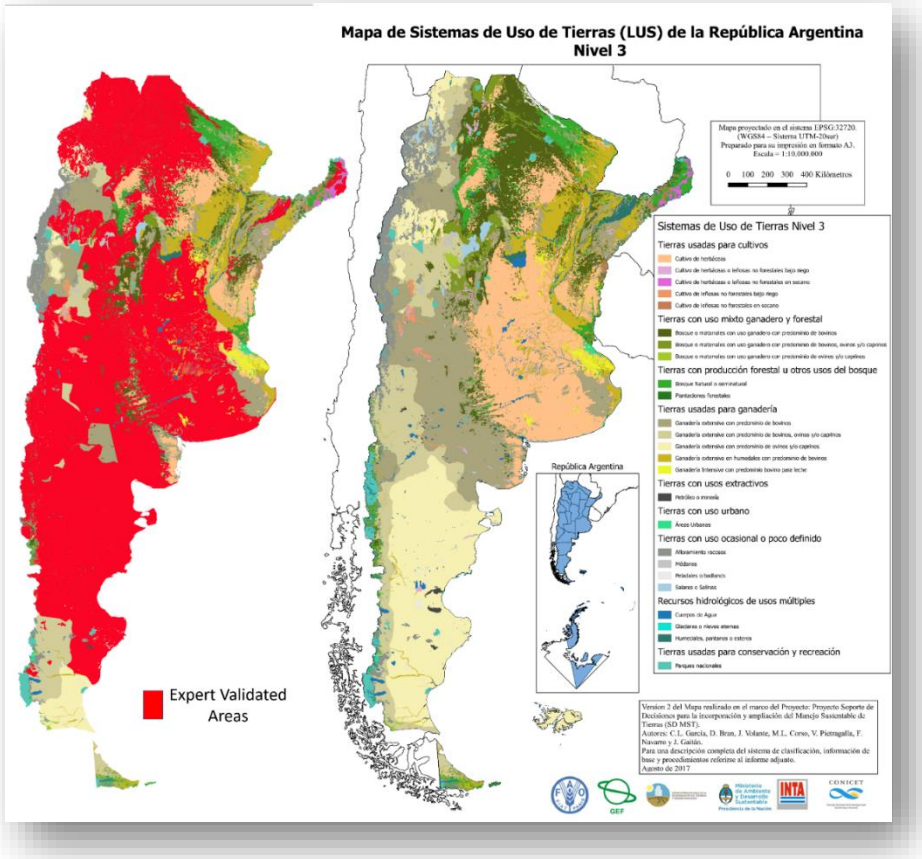
- The QM does not provide a single output
- It depends on the needs and goals of the government/organisations. E.g.
  - Maps showing hot spots of land degradation and green/bright spots where good land management is taking place

    → **Where to invest?**
  - Maps for the most prominent LD types
  - Maps showing conservation
  - Maps of Causes for LD or Impact in ES

STEP 1) QM – Preparation of the base map

- Land use systems as base map
- often countries/projects opt to create a new/updated LUS map
- If no LUS map is available, any other land use/land cover map can be used or adapted.





STEP 2) QM - Land Use System assessment

- Estimation of the **increase or decrease in area** over the past 10 years
- Estimation of the **increase or decrease of the intensity** of each LUS

Table 1: Land use system (Example)

Name: ___*First name Last name*_____ **Country:** __*South Africa*

Mapping Unit Id (LUS + admin. unit): 113 *(Savanna + Ratlou municipality)*

Land Use System (Step2)		
a) LUS area trend	b) LUS intensity trend	c) Remarks (e.g. reasons for trend)
2	*1*	*Increased grazing pressure due to growing numbers of livestock*

Area trend 2 = area coverage is rapidly increasing in size; i.e. > 10% of the LUS area/10 years

Intensity trend 1 = moderate increase

STEP 3) QM – Land Degradation assessment

Degradation per LUS
Type
Extent (area)
Degree
Rate
Direct causes
Indirect causes
Impact on ecosystem services (type and level)
Recommendation

Data entry table:

Table 2: Land degradation (Example)

Name: ___*X Y*_____ **Country:** __*South Africa*
Mapping Unit Id (LUS + admin. unit): 113 *(Savanna + Ratlou municipality)*

Land degradation (Step 3)									
a) Type (state)			b) Extent	c) Degree	d) Rate	e) Direct causes	f) Indirect causes	g) Impact on ecosystem services	h) Remarks
i	*ii*	*iii*							
Ha	*Pc*		*15%*	*2*	*1*	*g1, e1, f4,*	*p, h, t*	*P1-3, E2-2*	*Degradation is concentrated in NW communal grazing are of District*
Bs			*10%*	*2*	*-3*	*g1, g3*	*e, g*	*P1-2, S3-1*	*g3: change of livestock composition from large to small stock*

QM – Land Degradation assessment

- Determine the **major types of land degradation** (WOCAT 2008) presently occurring under each land use system

QM – Land Degradation assessment

W: Soil erosion by water

Wt	loss of topsoil (surface erosion)
Wg	gullying (gully erosion)
Wm	mass movements
Wr	riverbank erosion
Wc	coastal erosion
Wo	offsite degradation

E: Soil erosion by wind

Et	loss of topsoil
Ed	deflation and deposition
Eo	offsite effects

C: Chemical soil deterioration

Cn	fertility decline and reduced organic matter content
Ca	acidification
Cp	soil pollution
Cs	salinisation/alkalinisation

P: Physical soil deterioration

Pc	compaction
Pk	sealing and crusting
Pw	waterlogging
Ps	subsidence of organic soils, settling of soil
Pu	loss of bio-productive function due to other activities (eg construction, mining)

B: Biological degradation

Bc	reduction of vegetation cover
Bh	loss of habitats
Bq	quantity / biomass decline
Bf	detrimental effects of fires
Bs	quality and species composition / diversity decline
Bl	loss of soil life
Bp	Increase of pest / diseases, loss of predators

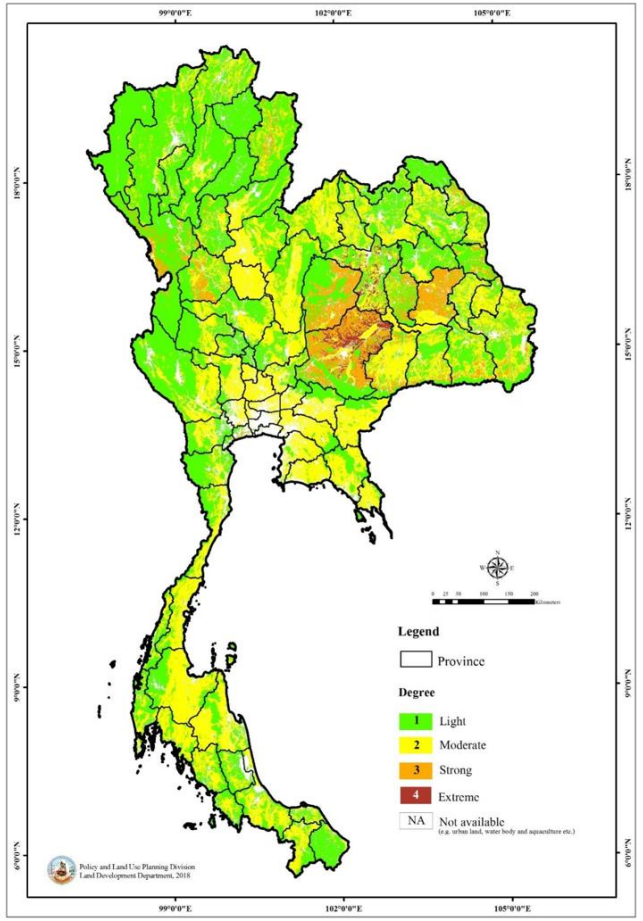
H: Water degradation

Ha	aridification / soil moisture problem
Hs	change in quantity of surface water
Hg	change in groundwater / aquifer level
Hp	decline of surface water quality
Hq	decline of groundwater quality
Hw	reduction of the buffering capacity of wetland areas

QM – Land Degradation assessment

- Determine the **degree of degradation**: intensity of the land degradation process

1. **Light:** there are some indications of degradation, but the process is still in an initial phase. It can be easily stopped and damage repaired with minor efforts.
2. **Moderate**: degradation is apparent, but its control and full rehabilitation of the land is still possible with considerable efforts.
3. **Strong**: evident signs of degradation. Changes in land properties are significant and very difficult to restore within reasonable time limits.
4. **Extreme**: degradation beyond restoration.



QM – Land Degradation assessment

- Determine the **direct causes of land degradation**

s: Soil management: improper / cultivation of unsuitable soils …
a: Crop and rangeland management: improper …
f: Deforestation and removal of natural vegetation
e: Over-exploitation of vegetation for domestic use
g: Overgrazing
i: Industrial activities and mining
u: Urbanisation and infrastructure development
p: Discharges leading to point contamination of surface and ground water resources
q: Causes leading to non-point contamination of surface and ground water resources
w: Disturbance of the water cycle
o: Over abstraction of water
n: Natural causes

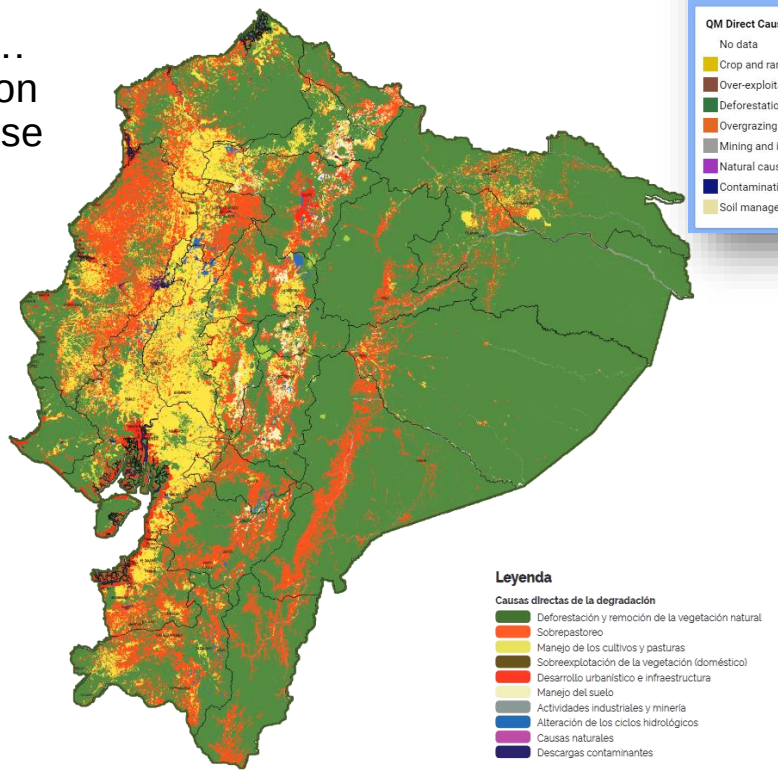
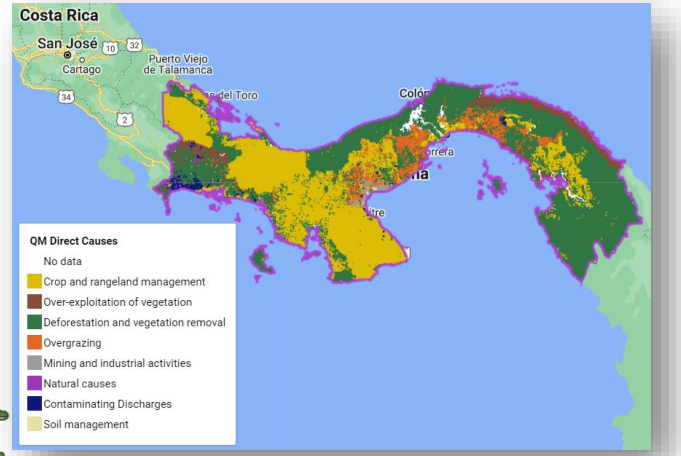


Figura 3. Principales causas directas de la degradación de la tierra.
Fuente: MAE. 2018. Documento de la Evaluación de la Tierra del Ecuador. Proyecto Apoyo a la Toma de Decisiones para la Integración y Ampliación del Manejo Sostenible de la Tierra. Ministerio del Ambiente del Ecuador y FAO.



QM – Land Degradation assessment

- Determine the **indirect causes of land degradation**

  p: Population density

  t: Land tenure

  h: Poverty / wealth

  l: Labour availability

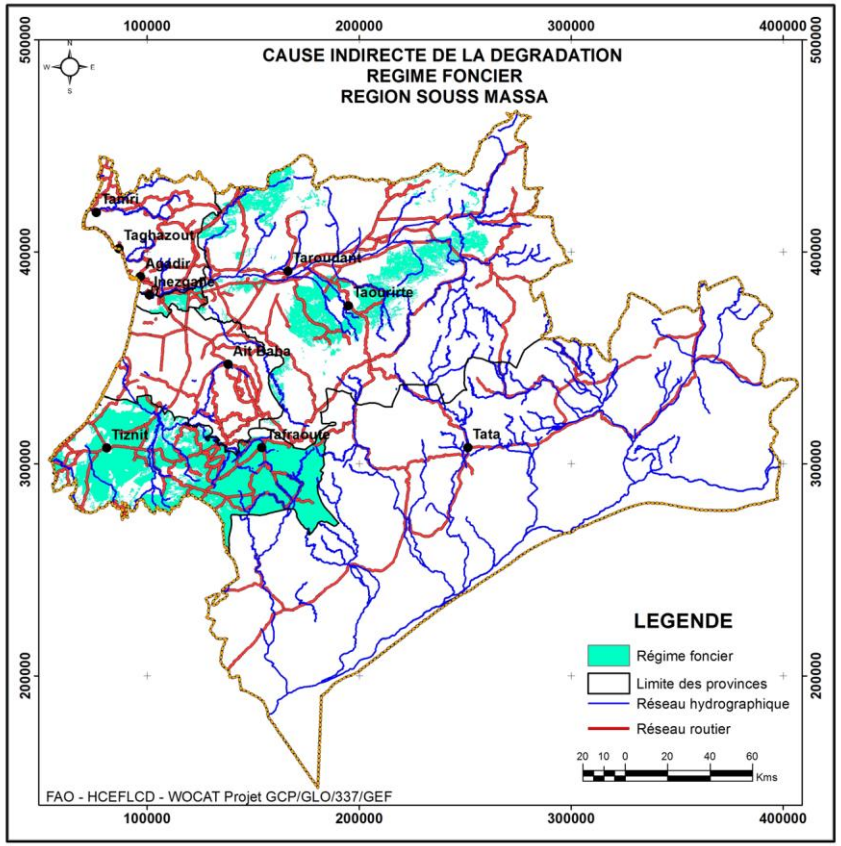
  r: Inputs and infrastructure

  e: Education, access to knowledge and support services

  w: War and conflict

  g: Governance / institutional

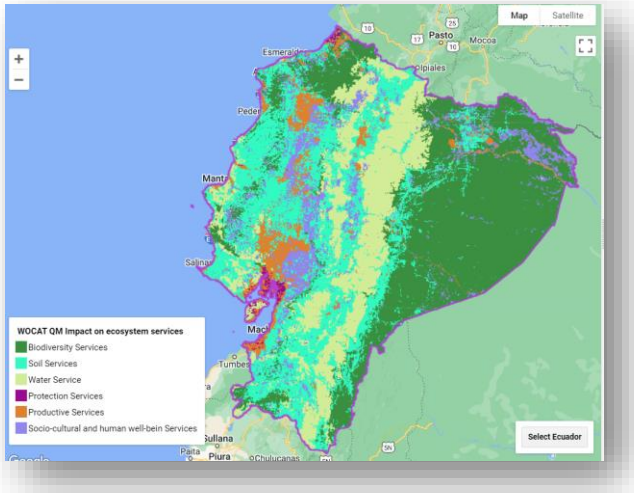
  o: Others (specify)



QM – Land Degradation assessment

Define the **impact on ecosystem services** (WOCAT 2008) including level of impact

P	**Productive Services & indicators**
(P1)	production (of animal / plant quantity and quality including biomass for energy) and risk
(P2)	water (quantity and quality) for human, animal and plant consumption
(P3)	land availability
E	**Ecological services (regulating / supporting) & indicators**
(E1)	water cycle: floods, storms, excessive rains
(E2)	water cycle: drought, dry season flow, availability of water
(E3)	organic matter status
(E4)	soil cover (vegetation, mulch, etc.)
(E5)	soil structure: surface (eg sealing and crusting) and subsoil affecting infiltration, water and nutrient holding capacity, salinity etc.
(E6)	nutrient cycle (N, P, K) and the carbon cycle (C)
(E7)	soil formation (including wind-deposited soils)
(E8)	biodiversity
(E9)	greenhouse gas emission
(E10)	(micro)-climate (wind, shade, temperature, humidity)
S	**Socio-cultural services and human well-being & indicators**
(S1)	spiritual, aesthetic, cultural landscape and heritage values, recreation and tourism,
(S2)	education and knowledge (including indigenous knowledge)
(S3)	conflicts
(S4)	food security, health and poverty
(S5)	net income
(S6)	private and public infrastructure (buildings, roads, dams, etc.)



-3	high negative influence: land degradation contributes negatively (more than 50%) to changes in ES
-2	negative influence: land degradation contributes negatively (10-50%) to changes in ES
-1	low negative influence: land degradation contributes negatively (0-10-%) to changes in ES.
0	no impact, i.e. no or negligible change ecosystem service
+1	low positive influence: land degradation contributes positively (0-10%) to the changes in ES
+2	positive influence: land degradation contributes positively (10-50%) to the changes in ES
+3	high positive influence: land degradation contributes positively (more than 50%) to changes in ES.

STEP 4) QM – Sustainable Land Management assessment

Conservation/SLM per LUS
Name / Group / Measure
Extent (area)
Effectiveness
Effectiveness trend
Impact on ecosystem services (type and level)
Degradation addressed

Data entry table:

Table 3: Conservation (Example)

Name: ___*X Y*_____ **Country:** __*South Africa*

Mapping Unit Id (LUS + admin. unit): **113** *(Savanna + Ratlou municipality)*

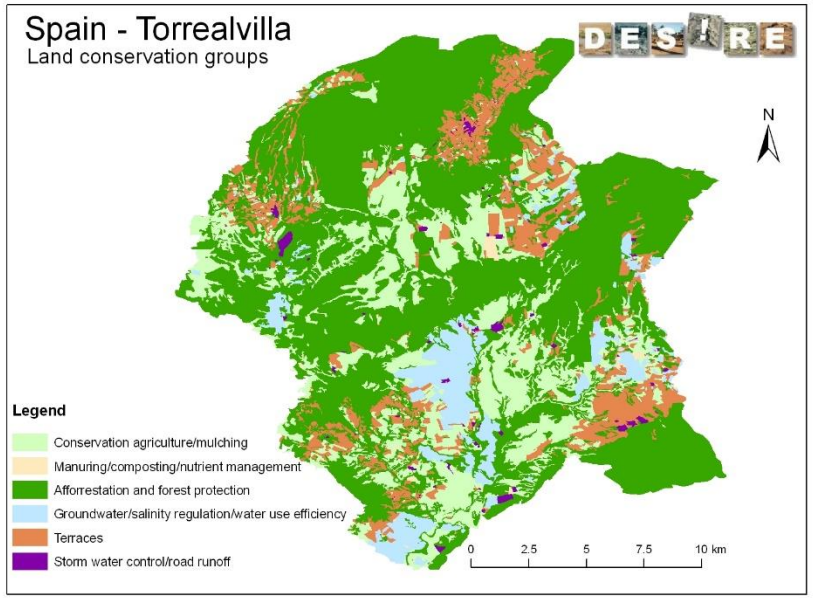
Conservation (Step 4)														
a) Name	b) Group	c) Measure			d) Pur-pose	e) % of area	f)Degradation ad-dressed			g)Effec-tiveness	h) Eff.. trend	i) Impact on ESS	j)Period	k)Ref to QT	l) Remarks
Controlled grazing + reseeding	*VS*	*V2*	*M 2*		*M*	*20%*	*Wt*	*Pc*	*Pk*	*3*	*0*	*P1+3, E3+3 E2+2, E7+1*	*1985*		*Major efforts were made in the late 80'ies and have been mein-tained*
Dams (with Agrofor-estry)	*WH*	*S6*	*M 1*		*M*	*15%*	*Wt*	*Cn*	*Ha*	*2*	*1*	*P1+2, S2+1 E1+2*	*1980*	*RSA05*	*Great potential for up-scaling*

- Define the **impact on ecosystem services** (WOCAT 2008) including level of impact

QM – Sustainable Land Management assessment

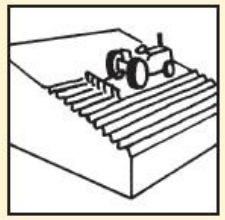
- Name the **most widespread SLM technologies** for each mapping unit

CA:	Conservation agriculture / mulching
NM:	Manuring / composting / nutrient management
RO:	Rotational system / shifting cultivation / fallow /slash and burn
VS:	Vegetative strips / cover
AF:	Agroforestry
AP:	Afforestation and forest protection
RH:	Gully control / rehabilitation
TR:	Terraces
GR:	Grazing land management
WH:	Water harvesting
SA:	Groundwater / salinity regulation / water use efficiency
WQ:	Water quality improvements
SD:	Sand dune stabilization
CB:	Coastal bank protection
PR:	Protection against natural hazards
SC:	Storm water control, road runoff
OT:	Other: (specify)

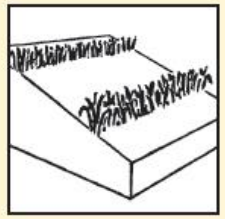


QM – Sustainable Land Management assessment

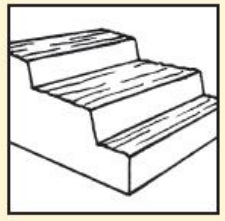
- Related **SLM measures** (WOCAT categories)

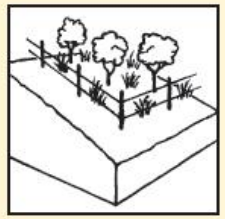
Agronomic measures: measures that improve soil cover (e.g. green cover, mulch); measures that enhance organic matter / soil fertility (e.g. manuring); soil surface treatment (e.g. conservation tillage); subsurface treatment (e.g. deep ripping).

Vegetative measures: plantation / reseeding of tree and shrub species (e.g. live fences; tree crows), grasses and perennial herbaceous plants (e.g. grass strips).

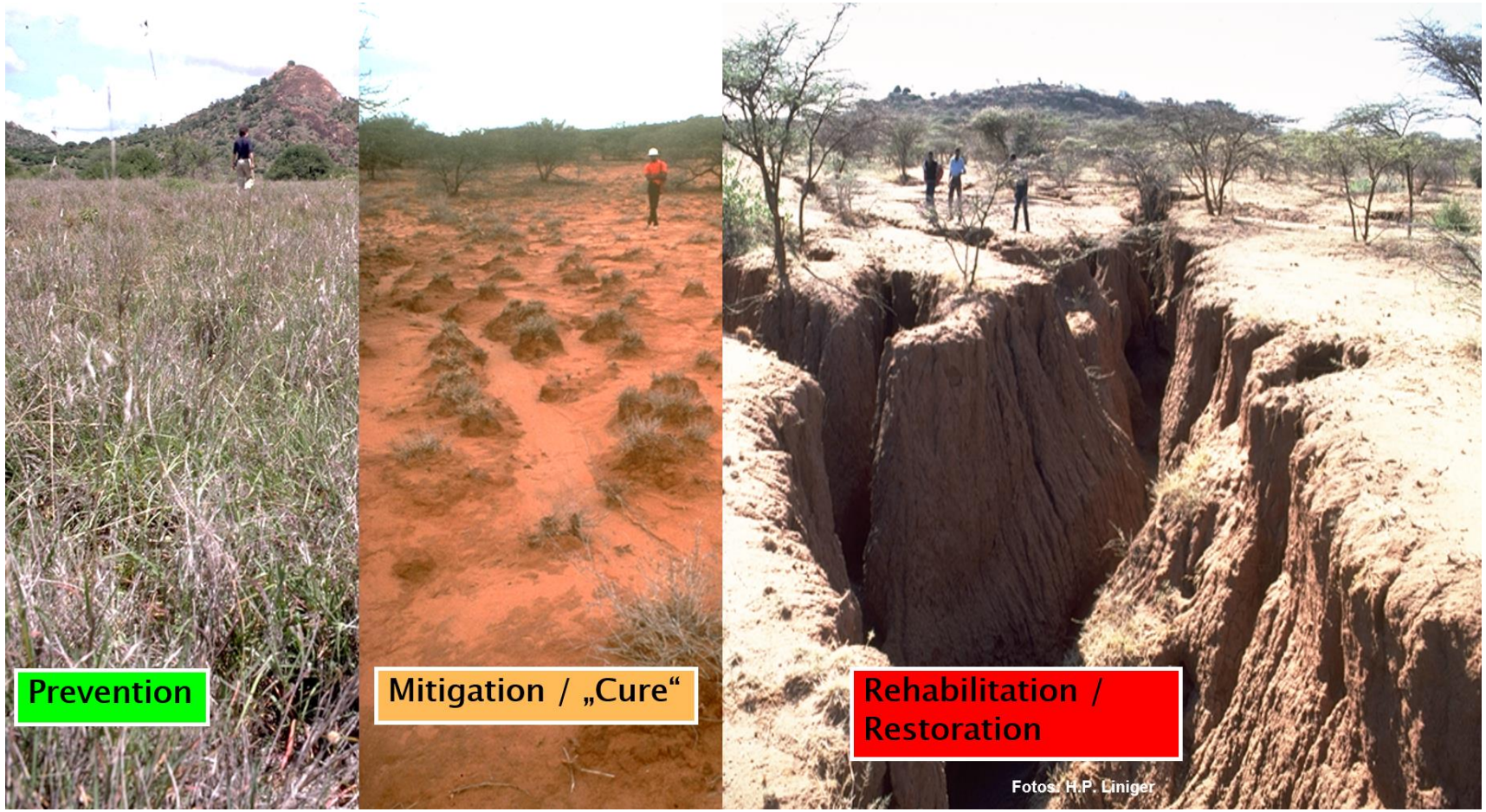
Structural measures: terraces (bench, forward / backward sloping); bunds banks / level, graded); dams, pans; ditches (level, graded); walls, barriers, palisades.

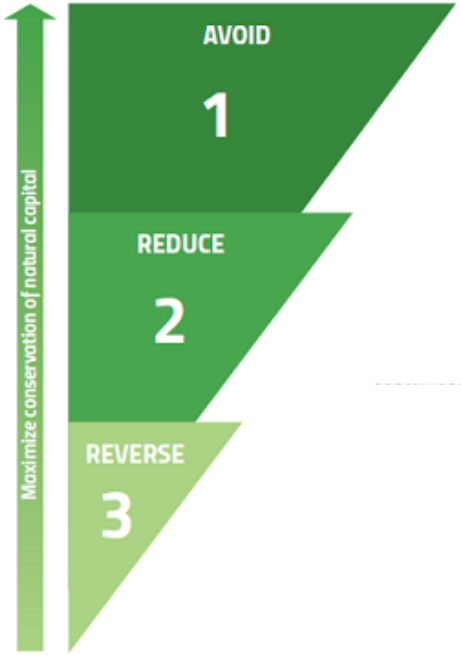



Management measures: change of land use type (e.g. area enclosure); change of management / intensity level (e.g. from grazing to cut-andcarry); major change in timing of activities; control / change of species composition.

QM – Sustainable Land Management assessment

- **Purpose** of the SLM technology





QM – Sustainable Land Management

- Determine the **effectiveness of implemented SLM technologies** (how much the technology reduces the degree of degradation or how well it is preventing degradation)

- Determine the **effectiveness trend** (does the technology have a growing positive or negative impact on reducing degradation)

- Determine the **impact on Ecosystem Services**

STEP 5) QM – Expert recommendation

- For each mapping unit, provide an **expert recommendation concerning interventions** on how to address degradation (maximum 2).

Decide on the best intervention using the following:

A Adaptation to the problem: the degradation is either too serious to deal with and is accepted as a fact of life, or it is not worthwhile the effort to invest in.

P Prevention implies the use of conservation measures that maintain natural resources and their environmental and productive function on land that may be prone to further degradation

M Mitigation: is intervention intended to reduce ongoing degradation.

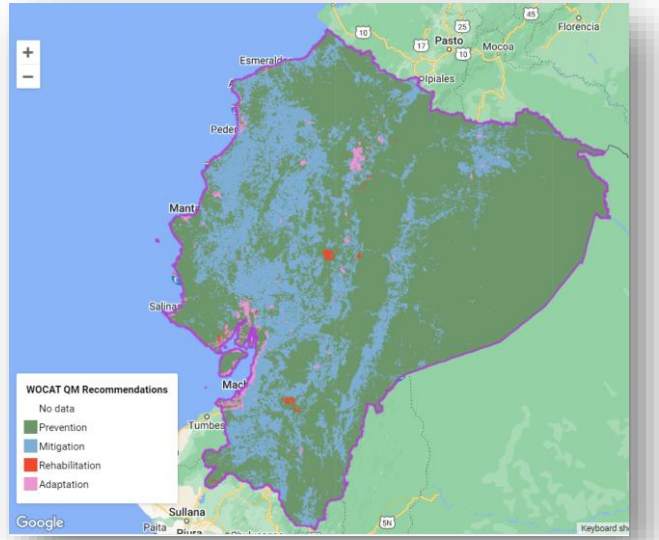
R Rehabilitation: is intervention when the land is already degraded to such an extent that the original use is only possible with extreme efforts as land has become practically unproductive.

Data entry table:

Table 4: Expert recommendation (Example)

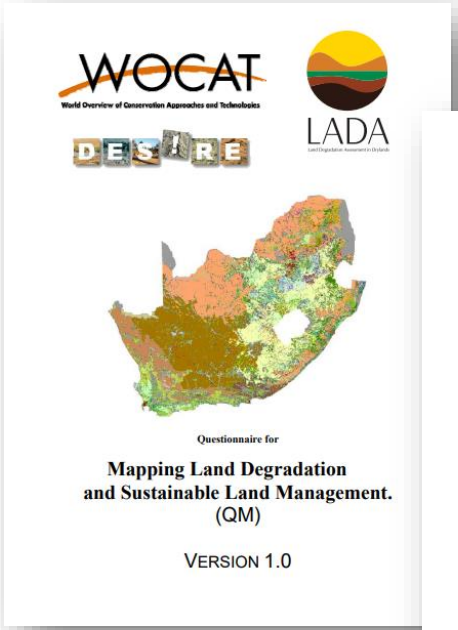
Name: *X Y* **Country:** *South Africa*
Mapping Unit Id (LUS + admin. unit): **113** *(Savanna + Ratlou municipality)*

Expert recommendation (Step 5)	
Expert recommendation	**Remarks and additional information**
P	*Maintain good soil cover conditions through agroforestry systems*
M	*Reduce loss of water through runoff and evaporation by the soil surface through mulching and minimum tillage.*



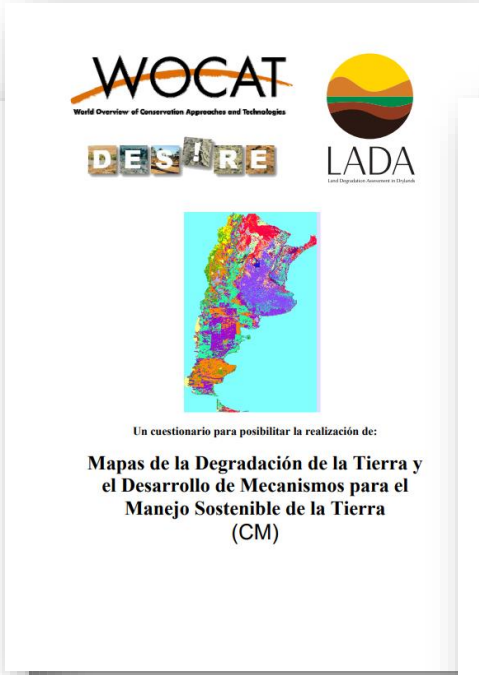
QM – Available in 5 different languages

English

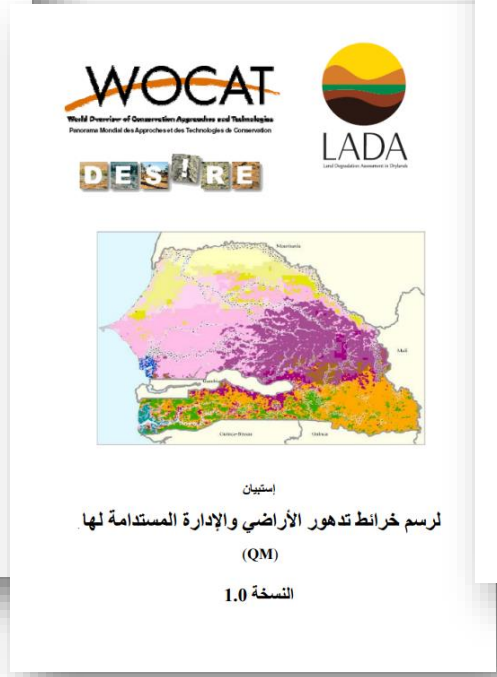


French

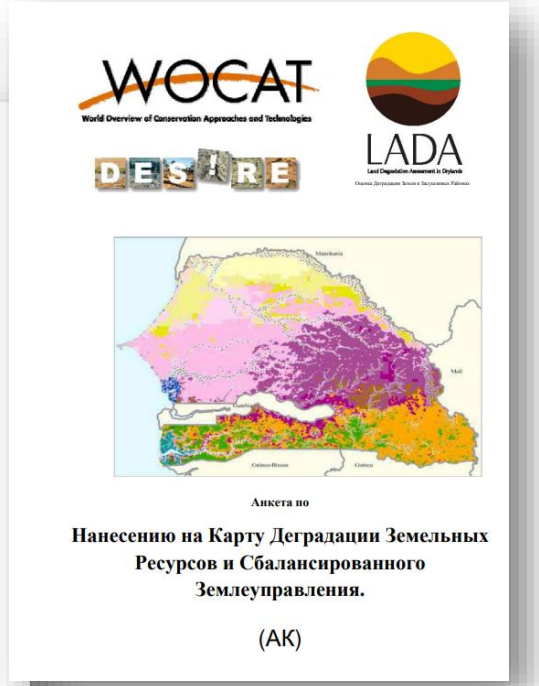
Spanish



Arabic



Russian



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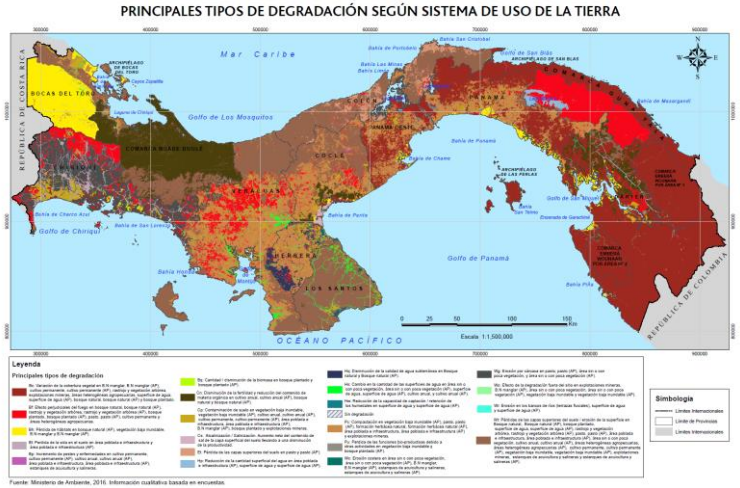
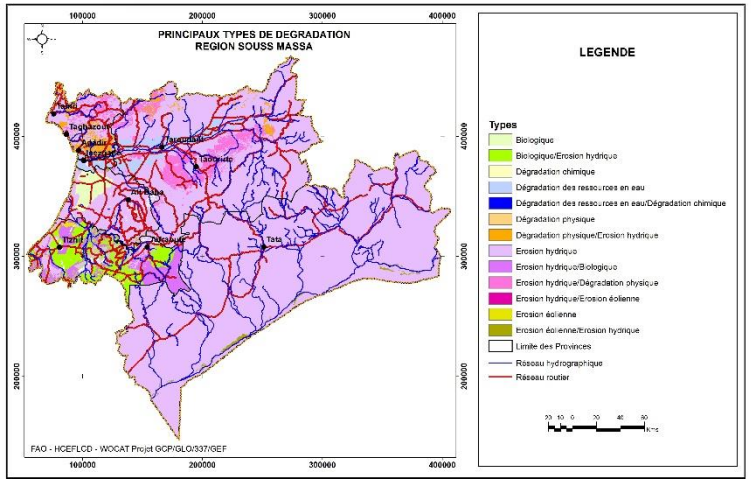
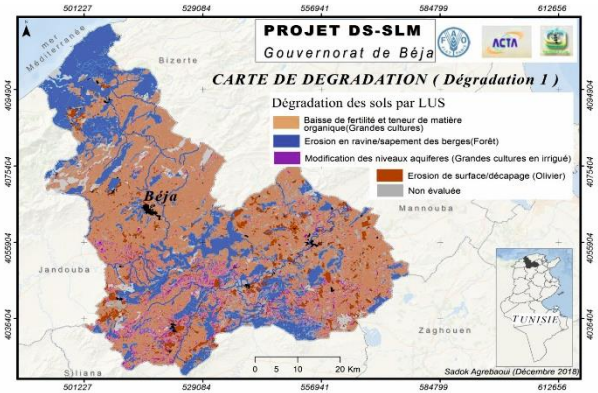
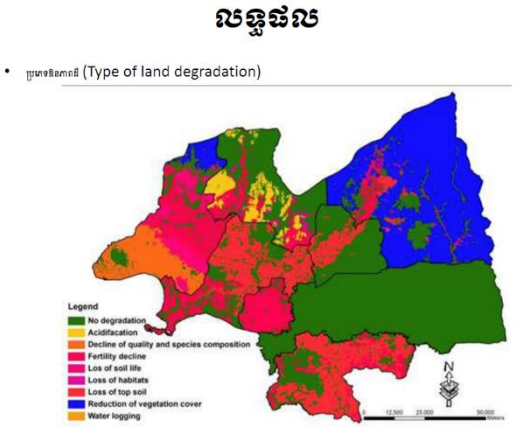
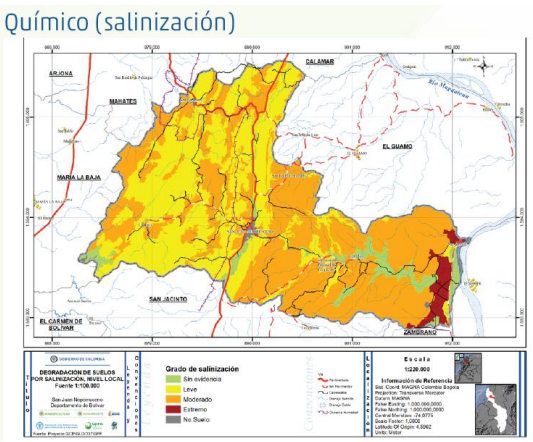
Results depends on the local adaptations to QM











Example of Full QM analysis in Argentina

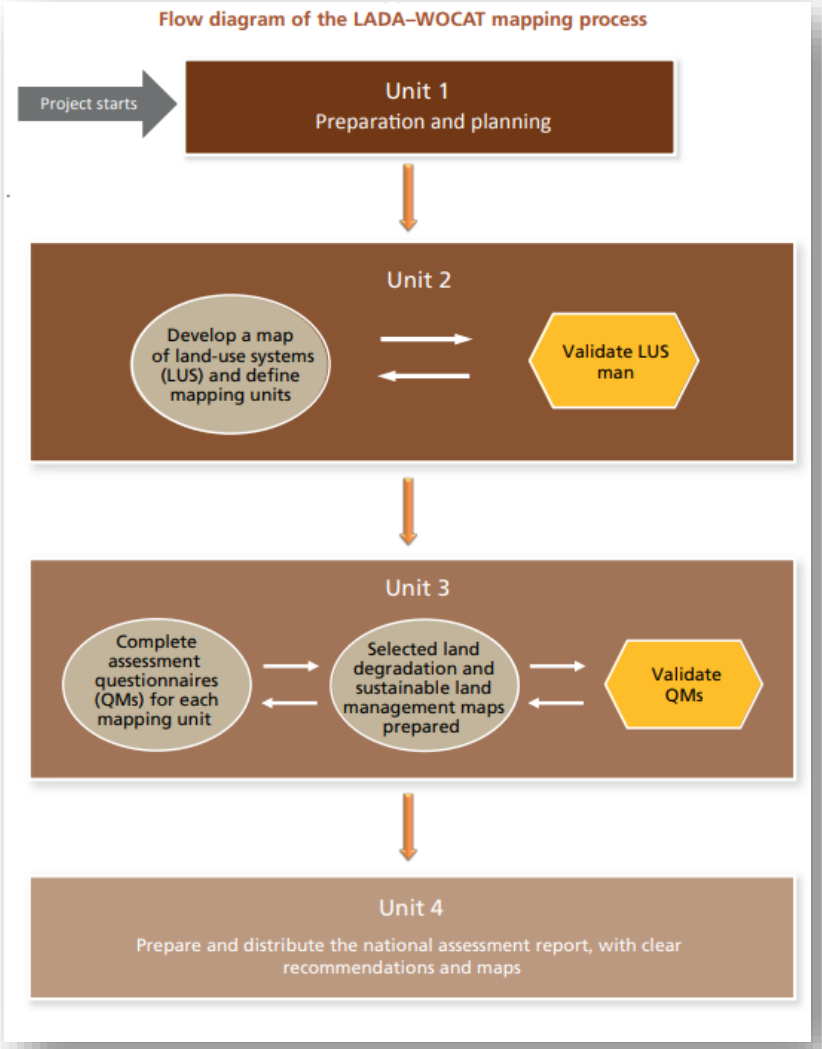
Provincia:	Jujuy	Departamento:	San Antonio
País:	Argentina	LUS:	10
Identificación de la Unidad de Mapeo: Oasis de Riego - Valles Calchaquíes			
Sistema/Clasificación del Uso de la Tierra (Paso 2)			
a) Tendencia del Área	b) Intensidad de la Tendencia	c) Obervaciones (por ej. razones de la tendencia)	
1	1	Aparición de grandes pooles vitivinícolas (grandes empresas)	

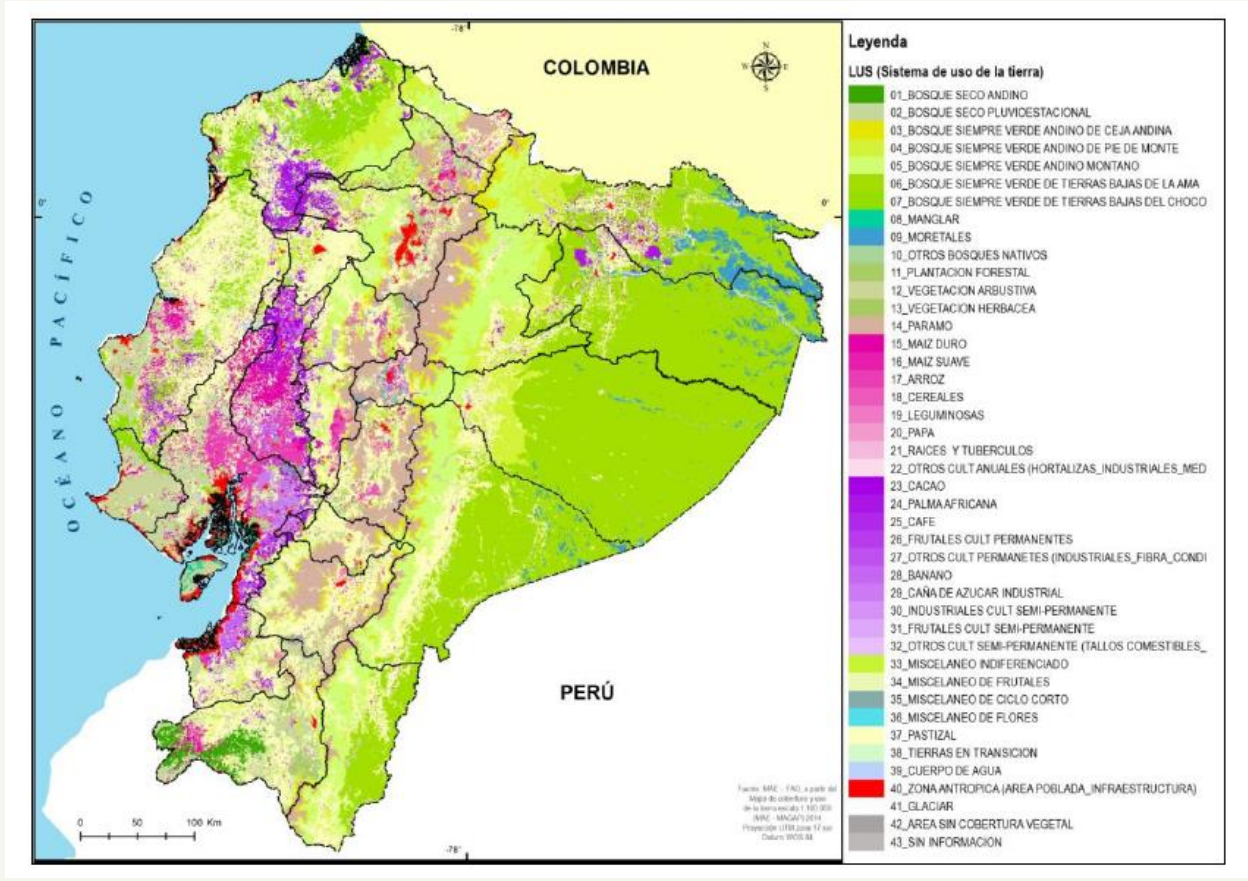
Degradación de la Tierra (Paso 3)									
a) Tipo			b)	c)	d)	e)	f)	g)	h)
i	ii	iii	Extensión	Grado	Tasa	Causas directas	Causas indirectas	Impacto sobre los SE	Observaciones
Wg			10	2	2	S2; C5; C6; N3	C, T, E	P1 (-1); E2 (-3); P2 (-3); S4 (-1); E5 (-2)	
	Wt		20	2	1	C5; W1	C, T, E	P1 (-1); E2 (-3); P2 (-3); S4 (-1); E5 (-2)	
		Ed	30	2	1	C1; S1	C, T, E	P1 (-1); E2 (-3); P2 (-3); S4 (-1)	
		Hg	30	3	3	C5; C6	C, T, E	P1 (-1); E2 (-3); P2 (-3); S4 (-1)	

Conservación (Paso 4)													
a) Nombre	b) Grupo	c) Medida			d) Propósito	e) % del área	f) Abordaje de la Degradación			g) Eficacia	h)Tendencia de la Eficacia	i) Impacto sobre los SE	j) Período	k) Referencia al QT	l) Observaciones
Abonos orgánicos	AM	A2			P,M,R	30	Wt			3	1	P1; E5; P3; E2 (2)	Continuo		
Control de cárcavas	RH	S3			P,R	5	Wg			3, 4	0	P2 (3); S1 (2);)3 (1); S6 (1); E1 (3)	Década del 80		Es necesario el mantenimiento de la estructura.

Recomendaciones de Expertos (Paso 5)	
Recomendaciones de Expertos	Observaciones e Información adicional
P, M, R	Expandir el uso de medidas del control del agua. Manejar la eficiencia del agua de riego. Incrementar el uso de abonos orgánicos.

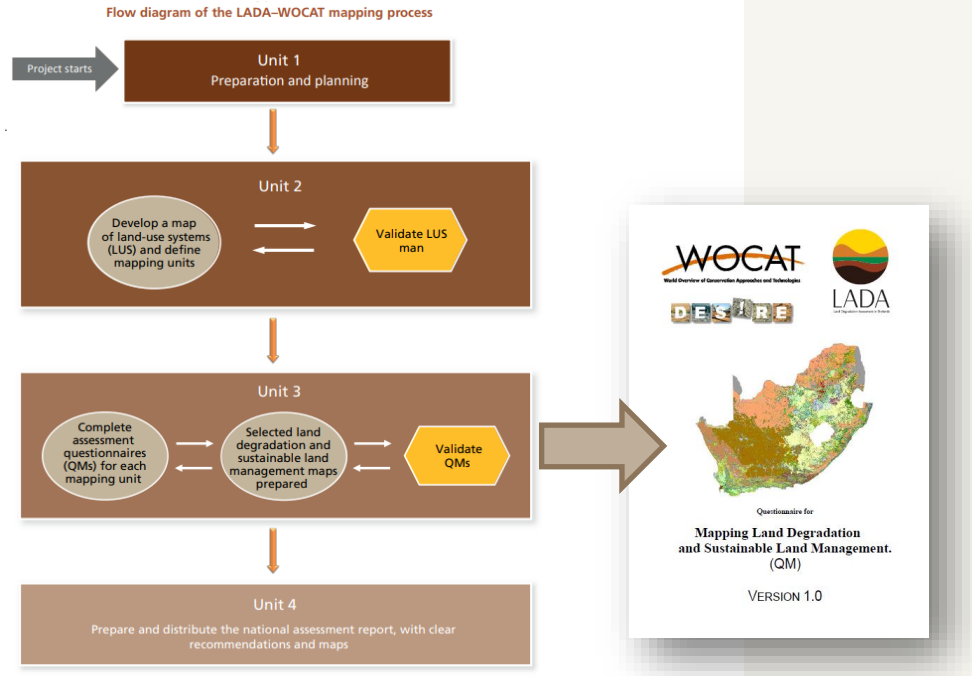
National Evaluation of Land Degradation LADA-WOCAT in Ecuador





43 LUS + ADMINISTRATIVE UNITS= 647 Mapping Units

National Evaluation of Land Degradation LADA-WOCAT in Ecuador



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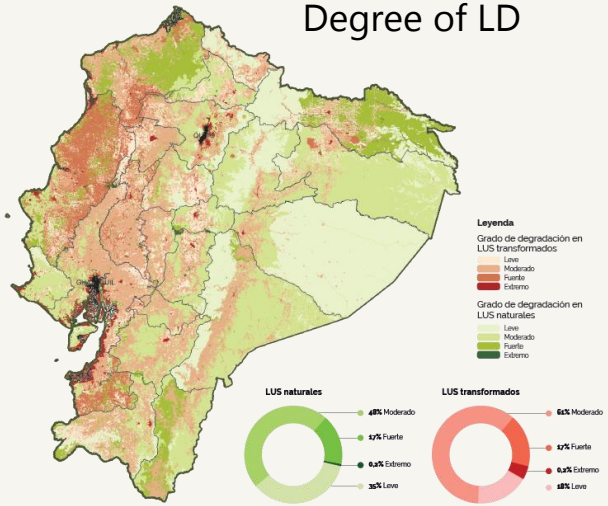
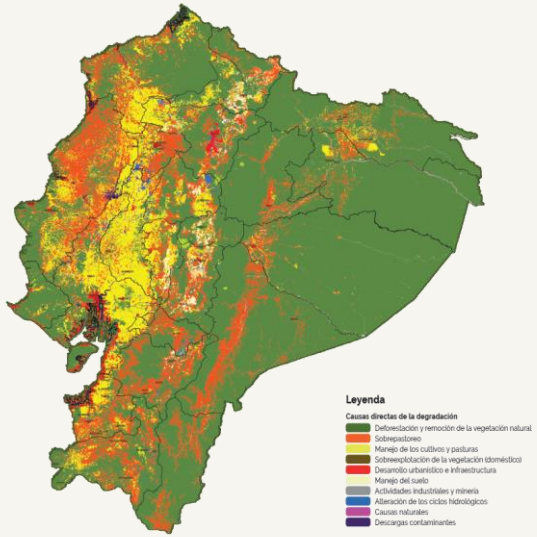
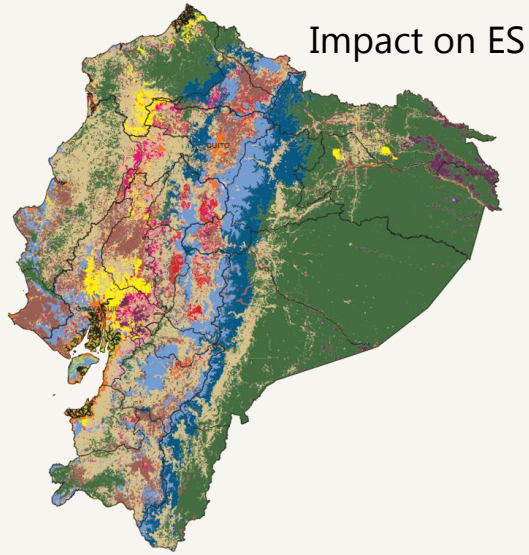
Degree of LD



Causes of LD



Impact on ES



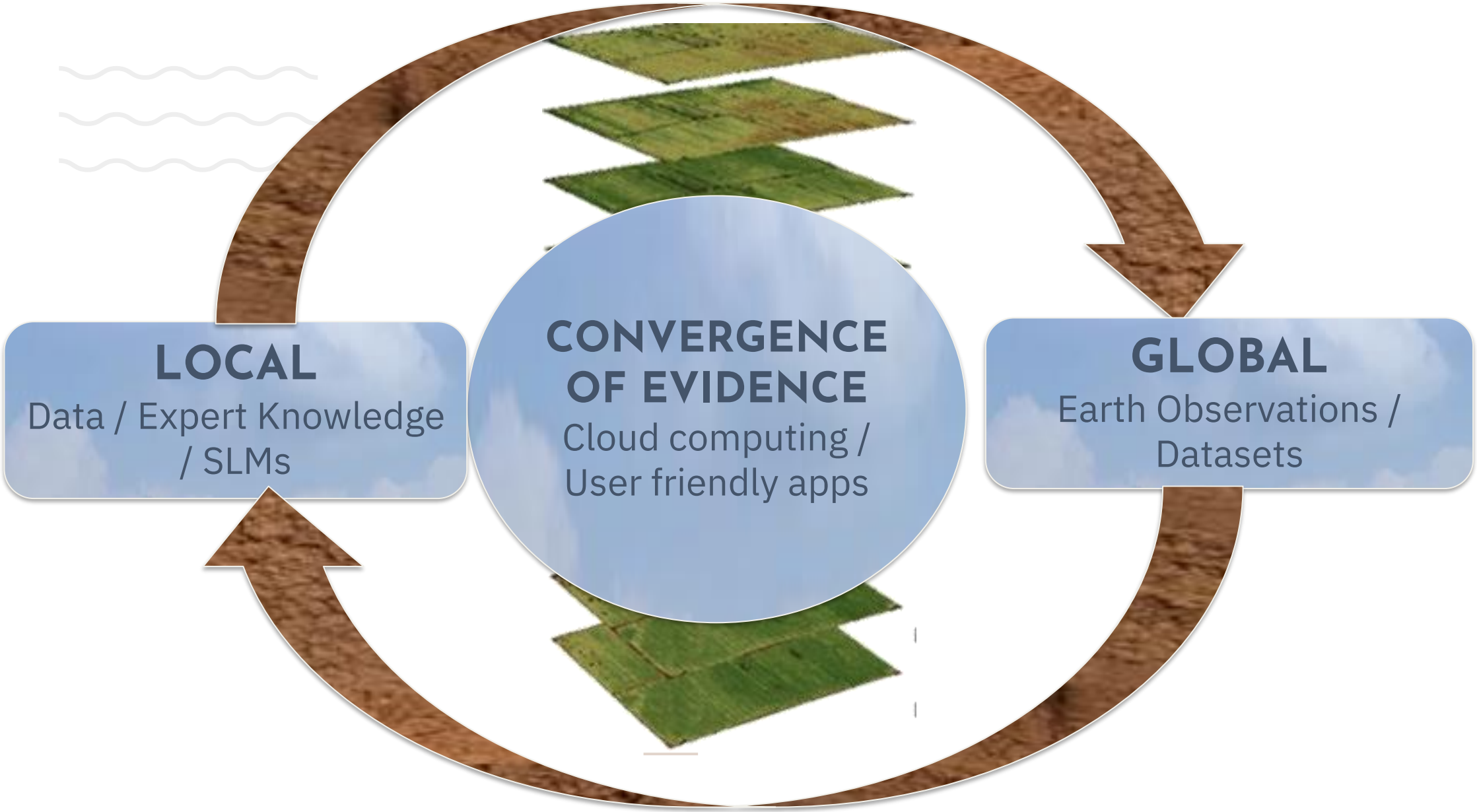
Other layers:

- Type of LD
- Conservation Measures
- Recommendations

Which is the best approach?

Remote Sensing

Expert Knowledge



The most likely explanation (hypothesis, inference, explanation, conclusion or best guess) about the status of LD at a given location that can be updated / improved with additional local information

CONVERGENCE OF EVIDENCE

Accumulated evidence that
certain core issues related to land degradation
currently co-exist at
a given location




remote sensing

MDPI

https://doi.org/10.3390/rs11242918

Article

Combining Earth Observations, Cloud Computing, and Expert Knowledge to Inform National Level Degradation Assessments in Support of the 2030 Development Agenda

Contents lists available at ScienceDirect

Environmental Science and Policy

journal homepage: www.elsevier.com/locate/envsci

ELSEVIER

https://doi.org/10.1016/j.envsci.2018.10.018

Land degradation assessment in the Argentinean Puna: Comparing expert knowledge with satellite-derived information

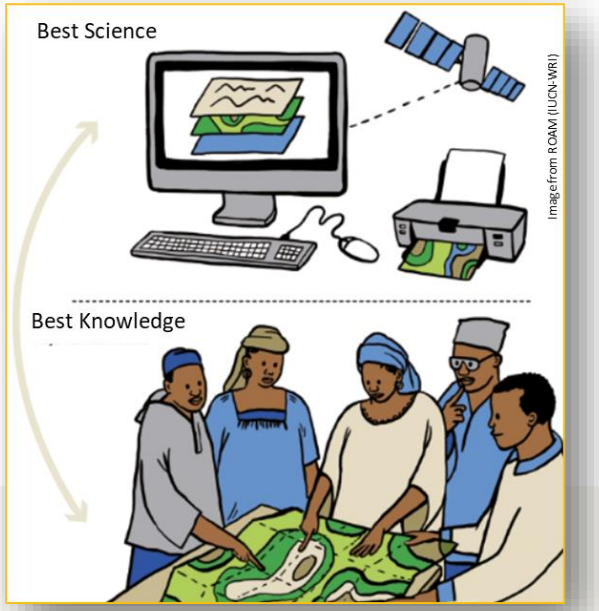
HOW CAN WE INTEGRATE KNOWLEDGE USING THE PRINCIPLE OF CONVERGENCE OF EVIDENCE ?

Co-development and integration of context-relevant tools and datasets

Validation of data by local experts / field verification

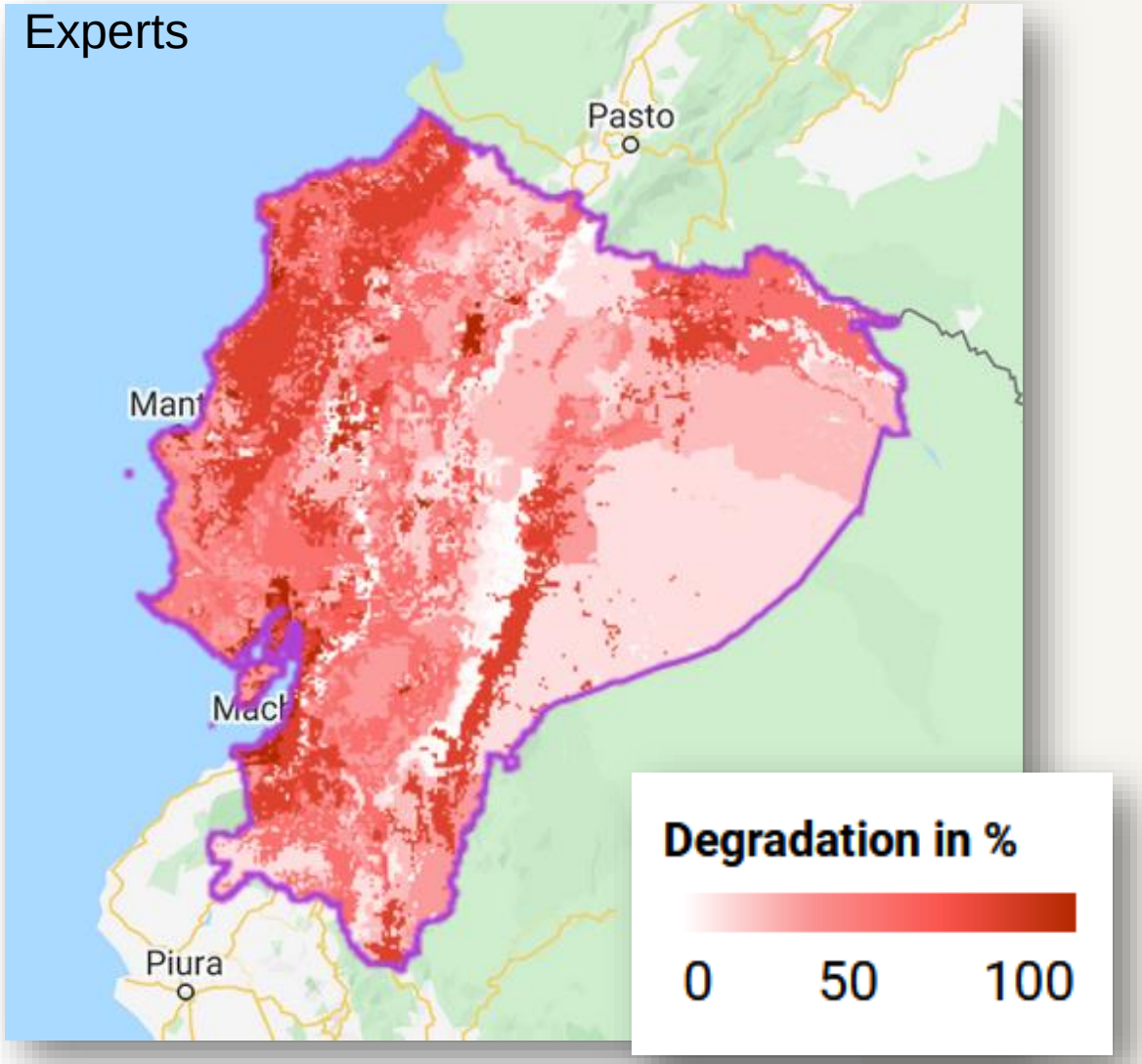
Participatory process involving all-level stakeholders

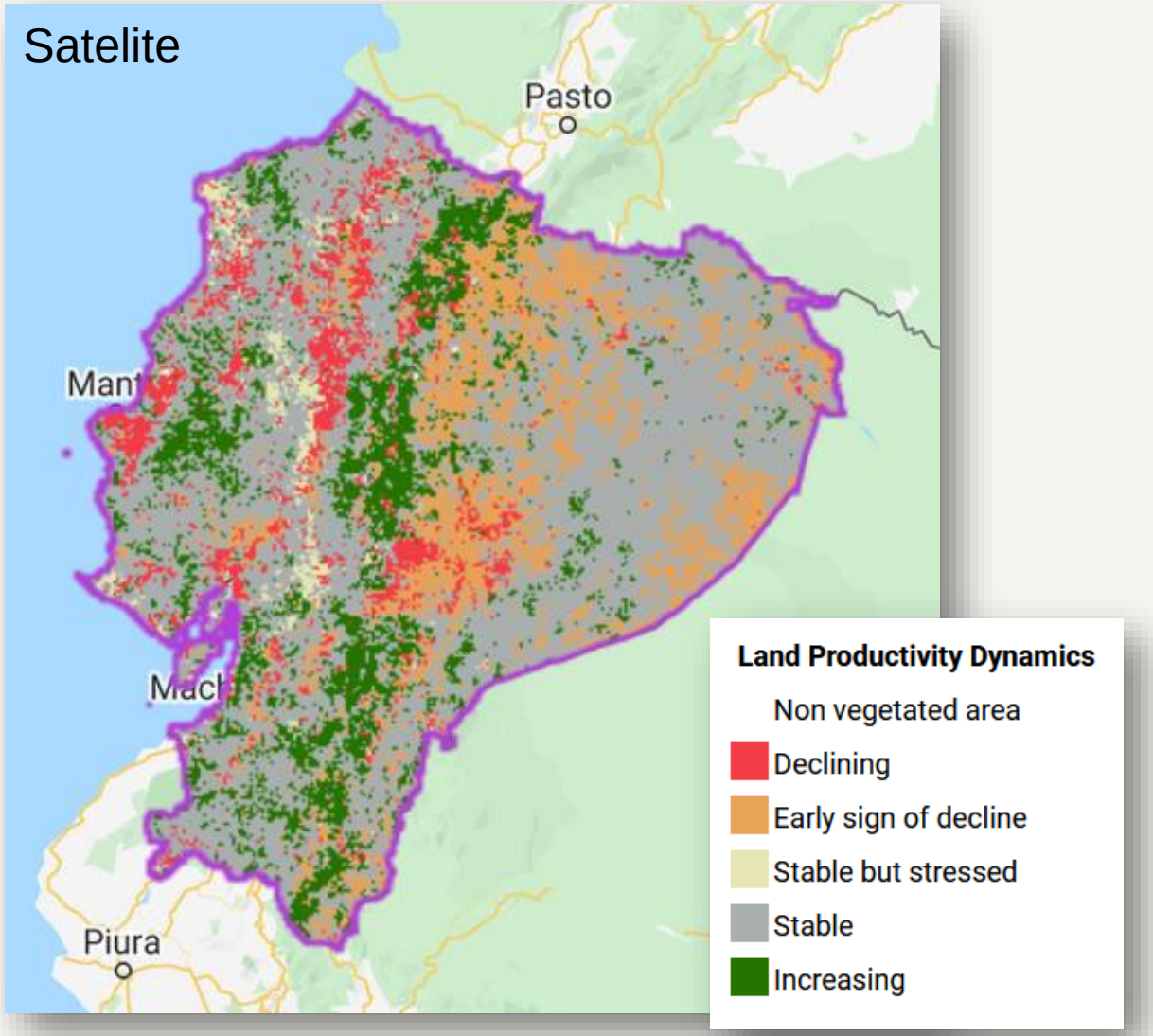
Develop user friendly, dynamic and flexible Decision Support Systems (DSS) that do not provide all the answers (take advantage of cloud computing!)



Comparing results

Publication: https://doi.org/10.1002/ldr.4645





Co-development of tools to support the implementation of many GEF Founded projects, LD monitoring and Decision Support

Google Earth Engine Apps

Integration of context-relevant tools and datasets into user friendly, dynamic and flexible systems.

MAIN FUNCTIONALITIES

- **Visualization and comparison of maps**
- **Nationally validated indicators and curated maps from multiple sources.**
- **Statistics, charts and tables at different spatial scales**
- **Advance Multicriteria Analysis**
- **Land cover Transition Analysis with national data**
- **Support to Participatory Mapping process**
- **Support Informed Decision Making Support**

- Define which issues they consider important to map
- Decide which data sets and methodologies are most appropriate
- Use their knowledge and experience and context to make sense out of the information
- Analyze the data using different functionalities

Co-development of tools to support the implementation of many GEF Founded projects, LD monitoring and Decision Support

Google Earth Engine Apps

Based on Google Earth Engine Apps that can be used freely for non-commercial applications

Does not require having a server and maintaining infrastructure

Open source and free code to use, copy and modify

https://doi.org/10.1002/ldr.4645

https://doi.org/10.4060/cb7986en

Between WOCAT and FAO: More than 65 Apps co-developed for different projects, countries, programs, regions and global level. Apps with different aims, layers and functionalities according to requirement.

https://projectgeffao.users.earthengine.app/view/reu-ldn-assessment

How does a DSS tool looks like?

https://www.wocat.net/en/ldn/wocatapps/

https://projectgeffao.users.earthengine.app/ https://wocatapps.users.earthengine.app

- Visualization and comparison of maps
- Support to Participatory Mapping process
- Statistics, charts and tables at different spatial scales
- Land cover Transition Analysis with national data
- Advance Multicriteria Analysis

Objective: to support projects design, investment allocation, decision making for Land Use Planning and restoration priorities, SLM implementation strategies and monitoring towards SDG.

Publication: https://doi.org/10.1002/ldr.4645

WOCAT
World Overview of Conservation Approaches and Technologies

FAO
FIAT PANIS

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Asian knowledge hub on sustainable soil and land management
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