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MONTHLY REPORT

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Month Covered in this Report:	April 2017 (Period: 1ˢᵗ – 31 May 2017)
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Date:	08 June 2017
Title:	Impact evaluation of SLM options to achieve land degradation neutrality in Tunisia

A. OBJECTIVES COMPLETED FOR LAST MONTH - OVERVIEW

In the context of the project "Impact evaluation of SLM options to achieve land degradation neutrality in Tunisia", different tasks were performed for the period 1ˢᵗ - 31ˢᵗ May 2017, targeting specifically the following objectives:

(1) finalise the mapping of the SLM technologies across the land use cover types of the two pilot sites and surrounding areas, clean the geodatabase and produce the metadata files;

(2) write a technical report on the mapping of the SLM practices. Further details will be provided on the mapping method and the interpretation of the outputs;

(3) upload the mapped SLM technologies into the WebGIS OxC and check for the correct properties of the raster database domain of the WebGIS OxC.

These activities are conducted under the supervision of Dr. Quang Bao Le (Systems- and GIS-based Sustainable Land Management – SLM, at ICARDA Amman), Mr. Enrico Bonaiuti (Monitoring, Evaluation and Learning – MEL, ICARDA Amman) and Mr. Victor Kimathi (iMMAP, Jordan Office).

B. OVERVIEW OF PROGRESS IN GIS-BASED SLM OxC DATA DEVELOPMENT

Table 1 below provides an overview of the SLM being mapped in the two sites. The site of Zaghouan is covered by the SAEZ 2, 3, 4 and 5 whereas the Medenine site in the south covers SAEZ 8 and 9. For the Excel templates, the percentage of progress is provided relatively to reference data source as provided in WOCAT database and LADA report of Tunisia. These databases are the most well documented literature available on SLM technologies in Tunisia.

Table 1. Overview of the mapping SLM technologies

SLM ID	Technique	References	Socio-Agricultural Ecological Zone (SAEZ) (if the SLM is selected, then write the relevant code in ANNEX 1a)	Land Use System (LUS) (if the SLM is selected, then write the relevant code in ANNEX 1b)	Name of documented of the SLM OxC template (syntax: <technique>_<SAEZ code>_<ALUS code>_<short name of documenter>.xlsm)	Name of visual file of the SLM OxC (syntax: <technique>_<SAEZ code>_<ALUS code>_<short name of documenter>.zip; zip file includes: 5 files of GIS shape + a Google Earth image of an example site in jpg + 1-2 field photos in jpg + a technical sketch of the technique in jpg)
1. Techniques targeting specifically water and soil conservation						
1.1.	Jessours	Tunisian LADA Report 2010; WOCAT Database 2017	SAEZ8	ALUS2	Jessours_SAEZ8_ALUS2_BD.xlsm (1st version completed)	Jessours_SAEZ8_ALUS2_BD.zip (1st version completed)
			ZAEZ9	ALUS2	Jessours_SAEZ9_ALUS2_BD.xlsm (1st version completed)	Jessours_SAEZ9_ALUS2_BD.zip (1st version completed)
1.2.	Tabia	Tunisian LADA Report 2010; WOCAT Database 2017	SAEZ8	ALUS2	Tabias_SAEZ8_ALUS2_BD.xlsm (1st version completed)	Tabias_SAEZ8_ALUS2_BD.zip (1st version completed)
			SAEZ8	ALUS5	Tabias_SAEZ8_ALUS5_BD.xlsm (1st version completed)	Tabias_SAEZ8_ALUS5_BD.zip (1st version completed)
			SAEZ9	ALUS2	Tabias_SAEZ9_ALUS2_BD.xlsm (1st version completed)	Tabias_SAEZ9_ALUS2_BD.zip (1st version completed)

				SAEZ9	ALUS5	Tabias_SAEZ9_ALUS5_BD.xlsm (1st version completed)	Tabias_SAEZ9_ALUS5_BD.zip (1st version completed)
1.3.	Mechanical bench terraces	Roose E. (2002) Roose E. (2005)		SAEZ2	ALUS1	Mechanised_terraces_SAEZ2_ALUS1_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ2_ALUS1_BD.zip (75% completed)
				SAEZ2	ALUS2	Mechanised_terraces_SAEZ2_ALUS2_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ2_ALUS2_BD.zip (75% completed)
				SAEZ2	ALUS3	Mechanised_terraces_SAEZ2_ALUS3_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ2_ALUS3_BD.zip (75% completed)
				SAEZ3	ALUS1	Mechanised_terraces_SAEZ3_ALUS1_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ3_ALUS1_BD.zip (75% completed)
				SAEZ3	ALUS3	Mechanised_terraces_SAEZ3_ALUS2_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ3_ALUS2_BD.zip (75% completed)
				SAEZ3	ALUS3	Mechanised_terraces_SAEZ3_ALUS3_BD.xlsm (25% completed)	Mechanised_terraces_SAEZ3_ALUS3_BD.zip (75% completed)
1.4.	Manual bench terraces	Tunisian LADA Report 2010		SAEZ2	ALUS2	Manual_terraces_SAEZ2_ALUS2_BD.xlsm (25% completed)	Manual_terraces_SAEZ2_ALUS2_BD.zip (100% completed)
1.5.	Stone bund terraces	Tunisian LADA Report 2010		SAEZ2	ALUS2	Stone_bunds_SAEZ2_ALUS2_BD.xlsm (25% completed)	Stone_bunds_SAEZ2_ALUS2_BD.zip (100% completed)
				SAEZ9	ALUS7	Stone_bunds_SAEZ9_ALUS7_BD.xlsm	Stone_bunds_SAEZ9_ALUS7_BD.zip

					(25% completed)	(100 % completed)
1.6.	Gabion check dams	Tunisian LADA Report 2010 WOCAT Database 2017	SAEZ8	ALUS1	Gabions_SAEZ8_ALUS1_BD.xlsm (1st version completed)	Gabions_SAEZ8_ALUS1_BD.zip (1st version completed)
			SAEZ9	ALUS1	Gabions_SAEZ9_ALUS1_BD.xlsm (1st version completed)	Gabions_SAEZ9_ALUS1_BD.zip (1st version completed)
			SAEZ2	ALUS1	Gabions_SAEZ2_ALUS1_BD.xlsm (1st version completed)	Gabions_SAEZ2_ALUS1_BD.zip
			SAEZ2	ALUS2	Gabions_SAEZ2_ALUS2_BD.xlsm (1st version completed)	Gabions_SAEZ2_ALUS2_BD.zip (1st version completed)
			SAEZ3	ALUS1	Gabions_SAEZ3_ALUS1_BD.xlsm (1st version completed)	Gabions_SAEZ3_ALUS1_BD.zip (1st version completed)
			SAEZ3	ALUS2	Gabions_SAEZ3_ALUS2_BD.xlsm (1st version completed)	Gabions_SAEZ3_ALUS2_BD.zip (1st version completed)
1.7.	Individual micro-catchment		SAEZ2	ALUS2	Micro-catchment_SAEZ2_ALUS2_BD.xlsm (25% completed)	micro-catchment_SAEZ2xALUS2_BD.zip (1st version completed)
2. Techniques for controlling sand dune mobility						
2.1.	Usage of palm leaves for sand dune stabilisation	Tunisian LADA Report 2010; WOCAT Database 2017	SAEZ8 SAEZ8	ALUS1 ALUS3	Palm_fences_SAEZ8_ALUS1_BD.xlsm (75 % 1st version completed) Palm_fences_SAEZ8_ALUS3_BD.xlsm (75 % 1st version completed)	Palm_fences_SAEZ8_ALUS1_BD.zip (1st version completed) Palm_fences_SAEZ8_ALUS3_BD.zip (1st version completed)

2.2.	Biological stabilisation of sand dunes	Tunisian LADA Report 2010; WOCAT Database 2017	SAEZ9	ALUS6	Biological_fixation_dunes_SAEZ9_ALUS6_BD.xlsm (1st version completed)	Biological_fixation_dunes_SAEZ9_ALUS6_BD.zip (1st version completed)
3. Techniques for rangelands management and improvement						
3.1.	Rangeland fallow cropping (rangeland resting)	Tunisian LADA Report 2010; WOCAT Database 2017	SAEZ9	ALUS6	Rangeland resting_SAEZ9_ALUS6_BD.xlsm (1st version completed)	Rangeland resting_SAEZ9_ALUS6_BD.zip (Not yet)
3.2.	Conservation of degraded rangelands	Tunisian LADA Report 2010;	SAEZ9	ALUS6	Not mapped because an approach for rangeland resting and area enclosure techniques	
3.3.	Area enclosure		SAEZ8	ALUS6	Area enclosure_BD.xlsm (75 % 1st version completed)	Area enclosure_BD.zip (75% completed)
4. Agronomic techniques and practices						
4.1.	Deficit irrigation with salted water in arid areas	Tunisian LADA Report 2010			Deficit_irrigation.xlsm (pending)	Deficit_irrigation.zip (pending)
5. Techniques targeting specifically water harvesting						
5.1.	Hill reservoirs (lakes and dams)	Technical reports (DGACTA, 2005)	SAEZ2	ALUS1	Hill_dam_SAEZ2_ALUS1_BD.xlsm (50 % 1st version completed)	Hill_dam_SAEZ2_ALUS1_BD.zip (1st version completed)
			SEAZ3	ALUS1	Hill_dam_SAEZ3_ALUS1_BD.xlsm (50 % 1st version completed)	Hill_dam_SAEZ3_ALUS1_BD.zip (1st version completed)
			SAEZ2	ALUS1	Hill_lake_SAEZ2_ALUS1_BD.xlsm (50 % 1st version completed)	Hill_lake_SAEZ2_ALUS1_BD.zip (1st version completed)
			SAEZ3	ALUS1	Hill_lake_SAEZ3_ALUS1_BD.xlsm (50 % 1st version completed)	Hill_lake_SAEZ3_ALUS1_BD.zip (1st version completed)
			SAEZ5	ALUS1	Hill_lake_SAEZ5_ALUS1	Hill_lake_SAEZ5_ALUS1_BD.zip

					BD.xlsm (50 % 1st version completed)	(1st version completed)
5.2.	Citerns	Tunisian LADA Report 2010	SAEZ8	ALUS3	Citerns_SAEZ8_ALUS3_BD.xlsm (75 % 1st version completed)	Citerns_SAEZ8_ALUS3_BD.zip (1st version completed)
			SAEZ9	ALUS3	Citerns_SAEZ9_ALUS3_BD.xlsm (75 % 1st version completed)	Citerns_SAEZ9_ALUS3_BD.zip (1st version completed)
5.3.	Wells in desert	Tunisian LADA Report 2010	SAEZ8	ALUS5	Wells in desert_SAEZ8_ALUS5_BD.xlsm (20 % completed)	Wells in desert_SAEZ8xALUS5.zip (1st version completed)
5.4.	Oasis in desert	Tunisian LADA Report 2010	SAEZ8	ALUS3	Oasis_SAEZ8_ALUS3_BD.xlsm (20 % completed)	Oasis_SAEZ8_ALUS3_BD.zip (1st version completed)
			SAEZ9	ALUS3	Oasis_SAEZ9_ALUS3_BD.xlsm (20 % completed)	Oasis_SAEZ9_ALUS3_BD.zip (1st version completed)
5.5.	Artesian well		SAEZ8	ALUS4	Artesian_well_SAEZ8_ALUS4_BD.xlsm (20 % completed)	Artesian_well_SAEZ8_ALUS4_BD.zip (1st version completed)
5.6.	Recharge wells	WOCAT database	SAEZ9	ALUS1	Recharge well_SAEZ9xALUS1_BD.xlsm (75 % completed)	Recharge well_SAEZ9xALUS1_BD.zip (1st version completed)
6. Tree-based techniques						
6.1.	Reforestation/tree plantation	Tunisian LADA Report 2010	SAEZ3	ALUS4	Tree_plantation_SAEZ8_ALUS4_BD.xlsm (75 % 1st version completed)	Tree_plantation_SAEZ8_ALUS4_BD.zip (1st version completed)

C. FURTHER DETAILS IN ASSOCIATED OUTCOMES OF COMPLETED OBJECTIVES

C1. (Objective 1). mapping of the SLM technologies and clean the geodatabase and produce the metadata files

Regarding this objective, the mapping of SLM technologies was pursued in terms of the spatial occurrence in the two study sites. The database was reorganized per socio-agro-ecological zones (SAEZ) (Annex 1a) and aggregated land use systems (ALUS) (Annex 1b) as given in the overview table above. The full database of the SLM technologies contains the following:

- GIS shapefile data (ESRI format) for each SLM technology
- Google Earth image (.jpg format) for showing the patterns of each SLM technology. The images are described by a short title, the location, the scale
- 1 to 2 field photos (.jpg format) of the SLM technologies. Each field photo is described by providing a short caption, the source and the date taken.
- Filled in standardised SLM OxC form (.xlsm format) for each SLM technology;
- Technical sketch (.jpg format) for some SLM technologies (based on the availability). The source and some technical specifications (if available) of the sketch are mentionned.

Though twenty-one (21) SLM were the mapping focus for both sites, currently the database is prepared for 19 SLM techniques. The underlying reason of the reduction of the SLM number is the confusion between SLM technologies and SLM approaches. Consequently, some of the previously listed SLMs techniques (which are approaches) cannot be mapped as an approach refers to "*the ways and means used to implement an SLM Technology, including the stakeholders involved and their roles*" (WOCAT definition). Referring to the same source, an SLM technology is "*a land management practice that controls land degradation and enhances productivity and/ or other ecosystem services*". So, only concrete implementation of an SLM approach on the ground (i.e. SLM the technology) can be mapped in the context of this research. In addition, some SLM technologies cannot be located since they were not visited during field works. In addition, even though the SLM OxC templates are filled in for the SLM techniques "Mgouds", "Meskats", and "Salt water deficit irrigation", they could not be mapped as their exact location cannot be detected.

The database cleaning is not yet fully undertaken as it may require some revisions from the supervisors to tailor the database according to the need and expectation of the project. In this regard, the metadata files production is pending and will be finalized once the database is cleaned. Follow-up work will be reported in June report.

C2. (Objective 2): writing a technical report on the mapping of the SLM practices.

Planned for the month of May, the further details on the mapping and description of the SLM technologies in the two sites of Tunisia were not provided as expected. The reorganisation of the database took much more time than planned. In addition, other activities mentioned in Sub-section C4 affected the work flow planned for the month. Currently, a draft skeleton of the technical report is built.

C3. (Objective 3). Upload the mapped SLM technologies into the WebGIS OxC and checking for the correct properties of the raster database domain of the WebGIS OxC.

-   Uploading SLM online for testing

The SLM GIS database generated during April were uploaded on the WebGIS for testing and improving if needed. The information stored in the SLM templates were used to generate the ESRI shapefile attributes. The uploaded test data and their visualisation in the WebGIS are being improved in collaboration with the WebGIS developer.

-   Checking RASTER dataset in the WebGIS

All the raster data in the WebGIS domain were checked to ensure consistency of their properties with the original datasets. The revised list of raster and their correct properties is provided in an Excel file.

C4. (Other activities). These tasks refer to the unplanned package performed during the month.

-   Overview of SLM database in WOCAT online and Liniger (2011)

An overview of the SLM technologies available in WOCAT online and in the WOCAT book (Liniger et al, 2011) were retrieved to produce a database (Excel format) at national, regional levels. In addition, the WOCAT online data were used to generate database on the spatial distribution of the SLM technologies in Africa and MENA regions. The Liniger et al (2011) book was used to generate the distribution of SLM in SubSaharan Africa. All the database is stored as ESRI GIS shapefile.

-   Mapping the global food security index for feeding the WebGIS tool

A map of the global food security index (GFSI) was generated based on downloaded primary data specific to 113 countries. These data in Excel model (.xlsm format) were used to generate a GIS database (ESRI shape files, raster map and other associated files) on GFSI. This raster is generated for feeding the WebGIS data domain.

- SLM form revisions Excel template and online form:

The different sections of the SLM online form were reviewed in collaboration with other project team members to ensure easy data inputs, checking variables and options in line with the Excel OxC template. The latter was reorganised according to the different sections (Version 3 in English). In coordination with other project team members, assistance is being provided to the web developer to improve the SLM online form.

- Learning the WebGIS platform

Some learning steps in how to monitor and handle GIS Raster in the WebGIS domain were undertaken using the WebGIS installation guide. Further learning is on-going for mastering the steps for uploading, changing or removing raster files in the WebGIS domain.

D. ASSOCIATED CHALLENGES OF COMPLETED MONTHLY OBJECTIVES

Challenges during this month are threefold:

- Challenge is related to the on-screen identification through Google Earth engine of some non-visited SLM technologies. The case of "deficient salt water irrigation" for instance. This also reduces the number of final elected SLM technologies to be mapped in the context of this project.
- The second challenge associated to the same objective is the filling of the full SLM form. There is no sufficient information available to fully fill in all the standardised SLM OxC templates.
- A third challenge is mostly related to the learning of the WebGIS platform whcih requires some knowledge in programing/coding. So basically, there is a need to undertake basic understanding of the programing languages (Java, Python and Linux Ubuntu).

E. NARRATIVE & LESSONS LEARNED

Many different tasks to be performed during this month of May. In connection with my supervisors, the SLM database will continuously be improved and shaped (as a data is always subjected to revisions if needed) to fit the needs of the project. Based on the performed tasks, it is always surprising to realize that the extent and soundness of the planned activities are far beyond the time frame, especially when the work focus is not only related to the scheduled activities.
Even though the tasks were hectic and time-consuming, there was a simulating environment for exploring new knowledge and tools domains. Although self-paced and

self-learning demarche, I found interesting the exploration of these new domains. Given the priority of certain tasks (mostly related to generating the SLM database and improving the SLM online form), less focus was given to the learning processes. Hopefully that improvement will be made during the next months.

F. OBJECTIVES PROJECTED FOR NEXT MONTH

Given that the objective on mapping SLM is uncompleted during the reported month, the main tasks for June 2017 will be:
- Clean the SLM database and finalise the online uploading
- Finalise the technical report on the SLM mapping
- Raster uploading, removal and change processes in the WebGIS
- Checking the validity of the retrievable raster data to the appropriate cells in the SLM online form.

LIST OF ANNEXES

Annex 1a. List of Socio-agricultural ecological zones (SAEZ)

Name of SAEZ	CODE of SAEZ	Key characterization	Reference
Mogods and Kroumerie	SAEZ1	**Area**: 319 518 ha **Subdivisions**: none **Climate**: humid; **Vegetation/Tree density**: Forests/high **Land use**: important siylvo-pastoral potential **Relief**: Hills and mountains **Governorates**: Beja; Jendouba	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Nord Est Cap Bon	SAEZ2	**Area**: 802 395 ha **Subdivisions**: none **Climate**: Humid, sub-humid, semi-arid **Vegetation/Tree density**: Forest/medium **Land use**: Tree and cereal crops **Relief**: plains, hills (^200 m), large valleys, domes (^637 m) **Governorates**: Bizerte, Ariana, Beja, Ben Arous, Nabeul, Zaghouan	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Dorsale et Tell	SAEZ3	**Area**: 2 365 584 ha **Climate**: Sub-humid to semi-arid (Pmm = 500 – 900 mm/yr) **Vegetation/Tree density**: Forests/ Low (on top hills) **Land use**: Tree and cereal crops **Relief**: hills (>200 m) and mountains (up to 1300 m), vast plains **Governorates**: Jendouba, Beja, Kef, Bizerte, Kairouan, Siliana, Sousse, Kasserine	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Basse steppe	SAEZ4	**Area**: 1 866 494 ha **Sub-divisions**: Sidi Mhaddeb; Sousse sahel, Sfax sahel, Basse steppe **Climate**: Humid to subhumid **Vegetation/Tree density**:	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable

		Land use: tree crops, cereal crops, rangelands **Relief** : Plateaus, plains, domes **Governorates**: Sfax, Gabes, Mhadia, Sousse, Sidi BouZid, Kairouan, Monastir	des RN/Avril2007
Haute steppe	**SAEZ5**	**Area**: 1 243 012 ha **Subdivisions :** Hautes steppes agricoles ; Hautes steppes alfatières **Climate**: Semi-arid **Vegetation/Tree density**: Shrubs & herbaceous/Low **Land use**: tree crops, cereal crops **Relief**: plains, Plateaus (700 m), Mountains **Governorates**: Kasserine, Siliana, Kairouan, Sidi BouZid, Sfax, Gafsa	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Chainons atlassiques	**SAEZ6**	**Area**: 698 554 ha **Subdivisions:** none **Climate**: Arid **Vegetation/Tree density**: Sparse shrubs/ Low **Land use**: agriculture **Relief**: Mountains (400 – 600 m) **Governorates**: Gafsa, Sidi Bouzid, Kebili, Sfax, Gabes	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Chotts	**SAEZ7**	**Area**: 1 964 074 ha **Sub-divisions:** none **Climate**: arid **Vegetation/Tree density**: sparse steppe, psammophile **Land use**: tree and cereal crops in oasis, Rangelands **Relief**: Plains **Governorates**: Kebili, Tozeur, Gafsa, Gabes	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Dahar et Matmata	**SAEZ8**	**Area**: 1 879 603 ha **Sub-divisions:** none **Climate**: arid **Vegetation/Tree density**: Mountain alfa and forest patches, sparse to dense low vegetation **Land use**: rare crops, rare rangelands	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007

		Relief: hills, mountains **Governorates**: Gabes, Kebeli, Medenine, Tatouine	
Jeffara- El Ouara	**SAEZ9**	**Area**: 1 591 197 ha **Sub-divisions: El Ouara, Jeffara** **Climate**: arid (Saharan Mediterranean) **Vegetation/Tree density**: halophile steppe **Land use**: Rangelands, tree crops, cereal crops **Relief**: plains **Governorates**: Medenine, Tatouine, Gabes	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007
Grand Erg	**SAEZ10**	**Area**: 2 761 748 ha **Subdivisions:** None **Climate**: arid **Vegetation/Tree density**: sparse vegetation **Land use**: rare rangelands, parks and reserves **Relief**: sand dunes **Governorates**: Kebili, Gabes, Tataouine	CNEA/Elaboration d'une étude sur l'état de désertification pour une gestion durable des RN/Avril2007

Annex 1b. List of Aggregated Land Use Systems (ALUS). Sources: DGACTA- Tunisia (2008)

Aggregated LUS (ALUS)	CODE for ALUS	Primary LUS in Tunisian LADA classification (multiple categories be separated by semicolon)	Code for primary LUS
Irrigated Crops	**ALUS1**	Citrus trees	Cr_irrig_citrus
		Tree crops	Cr_irrig_tree
		Garden market crops	Cr_irrig_gard
		Palm trees	Cr_irrig_palm
		Great crops	Cr_irrig_great
Rainfed crops	**ALUS2**	Citrus trees	Cr_rain_citrus
		Garden market crops	Cr_rain_gard
		Great crops	Cr_rain_great
		Olive trees	Cr_rain_oliv
		Palm trees	Cr_rain_palm
		Orchards	Cr_rain_orch
		Vineyard	Cr_rain_vine
Non-irrigated agro-pastoralism	**ALUS3**	Intensive breeding	No_irrig_agro_past_int
		Semi-intensive breeding	No_irrig_agro_past_semi
		Extensive breeding	No_irrig_agro_past_ext
Irrigated agro-pastoralism	**ALUS4**	Intensive breeding	Irrig_agro_past_int
		Semi-intensive breeding	Irrig_agro_past_semi
		Extensive breeding	Irrig_agro_past_ext
Pastoralism on bare soils	**ALUS5**	Extensive	Past_bare_ext
		Semi-intensive	Past_bare_semi
		Intensive	Past_bare_int
Pastoralism on shrub lands	**ALUS6**	Extensive	Past_sh_ext
		Semi-intensive	Past_sh_semi
		Intensive	Past_sh_int
Natural zones	**ALUS7**	Bare soils	Bare_ar
		Water	Water

		Forests	Forest
		Shrubs- Mosaic of sparse shrubs herbaceous	Sh_h_ar
Urban areas	**ALUS8**	Excluded	Urb
Parks and natural reserves	**ALUS9**	Excluded	Protect_1
Ramsar sites	**ALUS10**	Excluded	Protect_2