

## Soil Degradation (I001573)

**Wegens Covid19 kan mogelijk afgeweken worden van de onderwijs- en evaluatievormen. Dergelijke afwijkingen zullen via Ufora worden gecommuniceerd.**

**Cursusomvang** *(nominale waarden; effectieve waarden kunnen verschillen per opleiding)*

**Studiepunten** 5.0      **Studietijd** 135 u      **Contacturen**      60.0 u

**Aanbodsessies in academiejaar 2020-2021**

A (semester 2)      Engels      Gent

**Lesgevers in academiejaar 2020-2021**

Verdoodt, Ann      LA20      Verantwoordelijk lesgever

**Aangeboden in onderstaande opleidingen in 2020-2021**

	stptn	aanbodsessie
<a href="#">Master of Science in Physical Land Resources (afstudeerrichting Soil Science)</a>	5	A

### Onderwijstalen

Engels

### Trefwoorden

Soil structural degradation, soil compaction, soil erosion, salinization, decline in OM, aridity, drought, desertification, soil conservation

### Situering

This course aims to provide students specialized insights into different types, causes and processes of soil degradation and desertification. The students learn to apply this knowledge to assess soil degradation status and risk at different spatial scales, and to formulate soil protection and conservation strategies.

### Inhoud

#### Theory

A first chapter is devoted to describing the definition, importance, general causes and consequences of different types of land degradation. In the following chapters, each land degradation type (structural soil degradation, soil compaction, decline in soil organic matter, salinization and alkalisation, and soil erosion (briefly)) is discussed in detail, with attention paid to the specific soil degradation processes, underlying causes, options to avoid and correct soil degradation, and ways to assess and interpret the status and risk for that land degradation type. Attention is also paid to desertification and drought risk assessments. Furthermore, different (interdisciplinary) frameworks and tools to assess soil degradation (DPSIR, Livelihoods framework) are discussed and some major soil protection strategies are highlighted.

#### Practicals

The practicals comprise field work and laboratory skills related to the assessment of different types of soil degradation, coached exercises, an integral study of a soil degradation case, and a GIS task for the identification of soil degradation risk areas. The outcomes of the tasks need to be compiled and discussed in group reports, submitted at regular time steps. Micro-teaching or group reporting will be used to discuss the outcome of the soil degradation case study, as well as the results of the laboratory practicals.

### Begincompetenties

The student:

- has insight in the composition of soils, can explain the behaviour of soils on the basis of their physico-chemical properties, and understands classification of soils on a basic level. The student can thus read and interpret soil reports, tables with soil

analytical data and soil maps.

- has basic knowledge of meteorological processes.
- can perform spatial analyses using GIS software on digital maps representing vector and raster data structures

### **Eindcompetenties**

- 1 Correctly use the specific terminology related to soil quality, soil degradation and desertification
- 2 Have insights in the processes, potential causes, and impacts of the main threats by soil degradation
- 3 Identify relevant soil quality indicators and their related analytical procedures to assess soil degradation status
- 4 Correctly interpret analytical data (soil quality indicator values) with respect to soil degradation or soil conservation
- 5 Integrate knowledge on soil degradation and land information systems to delineate soil degradation risk zones
- 6 Identify relevant and sustainable soil protection and conservation measures
- 7 Report and communicate soil degradation research methods and results clearly, unambiguously, soundly
- 8 Display integrative thinking on soil degradation and land management
- 9 Collaborate with fellow students in a (interdisciplinary) team to solve soil degradation assignments

### **Creditcontractvoorwaarde**

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

### **Examencontractvoorwaarde**

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

### **Didactische werkvormen**

Demonstratie, hoorcollege, microteaching, practicum, veldwerk, werkcollege: geleide oefeningen, werkcollege: PC-klasoefeningen

### **Toelichtingen bij de didactische werkvormen**

The lectures focus on explaining different processes at stake for specific types of land degradation, and the consequences for their measurement, interpretation, causes and remediation measures.

Practical skills focus on measuring and evaluating soil degradation indicators using field and laboratory techniques, as well as delineating soil degradation risk zones using GIS.

### **Leermateriaal**

An English syllabus will be made available during the first lectures, downloadable from Minerva. There are no obligatory handbooks. During the course of the lectures, an electronic version of the slides will be deposited at the Minerva site.

An estimated cost of 20.0 EUR is foreseen to cover expenses related to the excursion/field work (guide, transport).

### **Referenties**

- FAO 2015. Status of the World's Soil Resources, FAO.
- GLASOD (Global Assessment of Soil Degradation) publications (ISRIC, Wageningen): <http://www.isric.org/projects/global-assessment-human-induced-soil-degradation-glasod>
- (G)LADA (Land Degradation Assessment in Drylands) publications, FAO & ISRIC: <http://www.isric.org/projects/land-degradation-assessment-drylands-glada>
- Liniger, H.P., R. Mekdaschi Studer, C. Hauert and M. Gurtner. 2011. Sustainable Land Management in Practice – Guidelines and Best Practices for Sub-Saharan Africa. TerrAfrica, World Overview of Conservation Approaches and Technologies (WOCAT) and Food and Agriculture Organization of the United Nations (FAO)
- Liniger, H.P. and W. Critchly. 2011. WOCAT 2007: where the land is greener. Case studies and analysis of soil and water conservation initiatives worldwide. CTA, FAO, UNEP, CDE.
- Louwagie, G., Gay, S.H., Burrell, A. 2009. Addressing land degradation in EU agriculture: relevant processes, practices and policies. Report on the project "Sustainable agriculture and Soil Conservation (SoCo). EUR 23767 EN. JRC, IPTS,

### **Vakinhoudelijke studiebegeleiding**

Personal coaching before and after the lectures. Consultancy and feedback about the corrected applications by assistant during the guided exercises.

### **Evaluatiemomenten**

periodegebonden evaluatie

### **Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode**

Schriftelijk examen met open vragen

### **Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode**

Schriftelijk examen met open vragen

### **Evaluatievormen bij niet-periodegebonden evaluatie**

Mondeling examen, participatie, verslag

### **Tweede examenkans in geval van niet-periodegebonden evaluatie**

Examen in de tweede examenperiode is enkel mogelijk in gewijzigde vorm

### **Toelichtingen bij de evaluatievormen**

The period-aligned written examination will assess the knowledge and insight of the student in different soil degradation processes, indicators and frameworks for their assessment, and their control.

With respect to the practical skills and interpretation, the students will be evaluated based on their participation throughout the semester, the group reports following the various practicals, as well as on the presentation and discussion of their case study. Deadlines for submission of the group reports need to be strictly respected. Each student is held responsible for the timely submission, reporting and presentation of a part of the practicals. Each group member is expected to contribute to all practicals and group reports. Each group member is responsible for the organisation, communication of results and presentation of a part of the case study.

All group members must combine and integrate their results in the final discussion of conclusions. At the end of the semester, during the last practical, the groups present their case study to the class.

The non-period aligned examination can not be retaken as such in the second session. Instead the student will be asked for feedback on the knowledge gained during the practicals by some additional questions on the written exam.

### **Eindscoreberekening**

- Theory: 60% (written exam)
- Skills and exercises: 40% (20% on group reports, 5% on group slide presentation, 15% on individual presentation, discussion and participation)

If there is an obvious difference in input and commitment between the different group members, the marks for the group reports might differ among the students belonging to the same group.

Unfoundedly eschewing the non-period aligned evaluation for this course unit leads to a total mark (theory+exercises) of maximum 9/20, regardless of the marks for the theoretical part. In case of foundedly eschewing the practicals or field work, (an) alternative task(s) will be provided.