

Module Name	Module Code
Plant Nutrition in the Tropics and Subtropics	agrarAEF873-01a
Module Coordinator	
Prof. Dr. Karl-Hermann Mühling	
Organizer	
Institute of Plant Nutrition and Soil Science - Plant Nutrition	
Faculty	
Faculty of Agricultural and Nutritional Sciences	
Examination Office	
Faculty of Agricultural and Nutritional Sciences - Examination Office	

ECTS Credits	6
Evaluation	Graded
Duration	1 Semester
Frequency	Only takes place during summer semesters
Workload per ECTS Credit	30 hours
Total Workload	180 hours
Contact Time	60 hours
Independent Study	120 hours
Teaching Language	English

Module Courses			
Course Type	Course Name	Compulsory/Optional	SWS
Lecture	Plant Nutrition in the Tropics and Subtropics	Compulsory	2
Seminar	Nutrient dynamics and nutritional plant physiology in the sub-tropics and tropics	Compulsory	1
Field exercise	Ecophysiological aspects of tropical plant nutrition	Compulsory	1

Examination(s)				
Examination Name	Type of Examination	Evaluation	Compulsory / Optional	Weighting
Oral Examination: Plant Nutrition in the Tropics and Subtropics	Oral Examination	Graded	Compulsory	100
Further Information on the Examination(s)				
1.+2. period in summersemester 1. period in wintersemester examiner: Prof. Dr. Mühling, Prof. Dr. Sulieman QIS 70400 with number of Examination 70410				

Course Content
<p>This module provides an extensive overview and analyses the most important nutritional aspects of plants grown under tropical and subtropical conditions. The lectures give the students insight into the basic principles of soil fertility, nutrient availability and dynamics in numerous soils dominated under tropical and subtropical regions. This knowledge is demonstrated using examples of soil such as calcareous/alkaline, acidic, saline/sodic, highly weathered, submerged paddy soils. Students get acquainted with crop responses to different environmental constraints (e.g., drought, waterlogging, salinity, alkalinity, heat, acidification, nutrient deficiency) in the (sub) tropics. The module also discusses the different respective acclimation/adaptation strategies adopted by plants from a nutritional point of view. The topics are provided within the context of current and future expected global climatic changes. A special focus is given on the plant nutritional disorders (e.g., nutrient deficiency and toxicity) and their relationship to environmental conditions. The lectures cover in-depth the performance of crop plants in association with mutualistic root symbioses such as, rhizobial-induced nodulation and mycorrhizae that are used to improve the sustainable productivity in tropical cropping systems. Organic and mineral fertilization for sustainable land use is also given credence in this module. Finally, a particular view on nutrient cycling in diverse existing production systems in tropical regions (e.g., agroforestry, intercropping, alley cropping, shifting cultivation, lowland rice, submerged paddy rice) is presented and discussed. In the accompanying seminars, the content of the lectures is expanded by presenting and discussing some recent documented reports</p>
Learning Outcome
<p>After successfully completing the module and with the aid of lectures and reading of scientific materials the students are able to understand the basic principles of nutrient dynamics and nutritional physiology and get a concise and up-to-date knowledge on the state-of-the-art overview on plant production in the subtropics and tropics. They can interpret complex situations with respect to the metabolic consequences of plants. The seminar presented will enable the participants to promote their scientific articulateness and the skills of oral communication. Finally, the participants acquire the know-how and are able to find solutions for specific research problems connecting to crop plant nutrition in different environments of the (sub)tropics.</p>
Reading List
<p>To be announced at the beginning of the lecture</p>

Use	Compulsory / Optional	Semester
Master, 1-Subject, Agricultural Sciences, Specialisation Agricultural Economics, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Agribusiness, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Crop Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Animal Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Agricultural Sciences, Specialisation Environmental Sciences, (Version 2017)	Optional	-
Master, 1-Subject, Dairy Science, (Version 2017)	Optional	-
Master, 1-Subject, Nutritional and Food Science, (Version 2013)	Optional	-
Master, 1-Subject, Nutritional and Consumer Economics, (Version 2017)	Optional	-