

Appendix 1: Module Descriptions

Module Number	Module Name	Instructor in Charge
FOMT 1.1	Climate and Ecology of the Tropics	Prof. Dr. M. Roth
<p>Content and Learning Objectives</p>	<p><u>Content</u>: Climate-relevant abiotic factors as well as feedback loops between ecosystems, the atmosphere, and the hydrosphere. Climate systems, determining stocks, material flows, and land use with examples from the tropics. General circulation, micro- and macroclimate, forests and water, basic concepts of soil-vegetation-atmosphere transfer; key concepts of ecology at the levels of individual organisms, (meta-)Populations, species communities, and ecosystems as components of landscapes. Forms of biodiversity, taking into account species and functional diversity across various spatial and temporal scales, as well as drivers of change. Ecosystem functions and ecosystem services in the context of sustainability. <u>Learning objectives</u>: Students will understand the structure and functioning of ecosystems in the tropics. They are familiar with the causal relationships and effects of drivers of change in the dynamic equilibrium within populations, communities, and the entire biosphere, including the interfaces with the atmosphere and hydrosphere. They are able to analyze and evaluate the possibilities and limitations of managing, sustainably using, and regenerating tropical (forest) ecosystems. They are able to identify problems related to the protection, sustainable use, and regeneration of tropical forest ecosystems and landscapes through causal analysis and to align their actions accordingly. They are capable of planning actions and developing management competencies for ecosystems and conflict-ridden forest-related land uses.</p>	
<p>Teaching and Learning Methods</p>	<p>2.5 credit hours of lecture 2 hours per week seminar 1 credit hour of self-study</p>	
<p>Prerequisites for participation</p>	<p>Knowledge of biology, physics, chemistry, and mathematics at the high school level (basic course). Literature: Reece, J. B.; Campbell, N. A. (2011) Campbell Biology: Concepts & Connections with Mastering Biology. N.J. Pearson Education, Upper Saddle River. (selected chapters). Aber, J. D.; Melillo, J. M. (2001) Terrestrial Ecosystems. Academic Press. San Diego, London, Burlington. Beeby, A.; Brennan, A.-M. (2004) First Ecology. Oxford University Press, Oxford.</p>	

Availability	This module is a required module in the Tropical Forestry and Management specialization track of the Master's program in Tropical Forestry.
Requirements for Awarding Credits	Credits are awarded upon passing the module exam. The module exam consists of a written exam (90 minutes) and a presentation.
Credits and Grades	This module is worth 7 credit points. The module grade is calculated as the unweighted average of the grades from the two assessments.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 210 hours. Of these, approximately 82 hours are spent attending classes and approximately 128 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Course Literature	<p>Reece, J. B.; Campbell, N. A. (2011) Campbell Biology: Concepts & Connections with Mastering Biology. N.J. Pearson Education. Upper Saddle River. (selected chapters).</p> <p>Smith T.M.; Smith R. L. (2012) Elements of Ecology.^{8th}ed. Pearson Education. Benjamin Cummings. San Francisco.</p> <p>Oke, T. R. (1987) Boundary Layer Climatology. Methuen, London.</p> <p>Calver, M. (2009) Environmental Biology. Cambridge University Press, Cambridge.</p> <p>Wright, R. T. (2008) Environmental Science. Pearson Education International, London.</p> <p>Larcher, W. (2002) Physiological Plant Ecology: Ecophysiology and Stress Physiology of Functional Groups. Springer, New York.</p> <p>Schulze, E.-D.; Beck, E.; Müller-Hohenstein, K. (2005) Plant Ecology. Springer, Berlin.</p>

Module number	Module Name	Instructor
FOMT 1.2	Forest-related development policy and forest culture	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Content</u>: Development models as a framework for policy and process analyses regarding forests, land, and the environment in tropical countries. Policy instruments relevant to forests, nature conservation, and the livelihoods of the indigenous population. Processes of institutional change, participation of interest groups, and potential consequences; theoretical foundations of cultural ecology and ethnology, local moral and spiritual/religious concepts, and relationships between humans and forests. Traditional forest use in the tropics, colonial and post-colonial influences and changes, as well as the impact of globalization.</p> <p><u>Learning Objectives</u>: Students will be able to analyze and evaluate social systems in relation to their interconnections with ecosystems and within their historical context. This includes the application of social science analytical tools and explanatory models. They recognize political structures and how they function at various levels, as well as their interconnections with politics, socioeconomics, land use, forestry, and environmental and nature conservation. They are capable of utilizing political instruments and assessing their effects. They are able to analyze, understand, and model cultural relationships regarding the human-forest interaction.</p>	
Teaching and Learning Methods	3.5 hours per week of lectures 2 hours per week seminar 1.5 hours per week of exercises and self-study	
Prerequisites for participation	Knowledge of geography and history at the high school graduation level (basic course). Bibliography: Todaro, M. P.; Smith, S. C. (2006) Economic Development. Pearson Addison Wesley, Boston. Cabbage, F. W.; O'Laughlin, J.; Bullock, I. C. S. (1993) Forest Resource Policy. J. Wiley, New York. Ember C. R., Ember M. (2004) Cultural Anthropology. New Jersey, Englewood Cliffs.	
Applicability	This module is a required module in the Master's program in Tropical Forestry.	

Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (60 hours) and an oral exam (individual exam, 20 minutes).
Credits and Grades	A total of 9 credits can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Seminar paper including presentation 33%, oral exam 67%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 270 hours. Of these, approximately 105 hours are spent attending classes, and approximately 165 hours are devoted to self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>North, D. C. (1991) Institutions. <i>Journal of Economic Perspectives</i>, Vol. 5, No. 1, 97–112. American Economic Association, Nashville, Tennessee.</p> <p>Pretzsch, J. (2005) Forest-related rural livelihood strategies in national and global development. In: <i>Forests, Trees, and Livelihoods</i>, Vol. 15, 115–117.</p> <p>Hunt, D. (1989) <i>Economic theories of development: An analysis of competing paradigms</i>. Harvester Wheatsheaf, London.</p> <p>Thirlwall, A. P. (2006) <i>Growth and development</i>. Palgrave Macmillan, Hampshire and New York.</p> <p>FAO (2012) <i>State of the World's Forests</i>. FAO, Rome.</p> <p>Messner, D.; Nuscheler, F. (2002) World Politics: Structures and Trends. In: Kennedy, P.; Messner, D.; Nuscheler, F. (eds.), <i>Global Trends and Global Governance</i>, 125–155. Pluto, London.</p> <p>Ingold, T. (2000) <i>The Perception of the Environment. Essays on livelihood, dwelling, and skill</i>. Routledge, London.</p> <p>Roger S. G. (2004) <i>This Sacred Earth. Religion, Nature, Environment</i>. 2nd ed., Routledge, New York and London.</p> <p>Pretzsch, J. et al. (eds.) (2013) <i>Forests and Rural Development</i>. Springer, Heidelberg.</p>

Module number	Module Name	Instructor
FOMT 1.3	Urban Tree Management in the Tropics	Prof. Dr. A. Roloff
Content and Learning Objectives	<p><u>Content:</u> Planning, administration, and management of shrubs and trees in urban, peri-urban, and roadside habitats in tropical regions. Inventory procedures, planning methods, governance, budgeting, and implementation of urban and peri-urban tree management at all levels, from villages to megacities. Services and products such as environmental, cultural, social, and socio-hygienic effects; production and use of tree products; biological characteristics of tree species for their use as roadside trees; management of urban forests, parks, gardens, and individual trees, including tree care, tree assessment methods, disease diagnosis, climbing plants and epiphytes, methods and equipment for determining damage, wound responses, crown-root interactions, wood growth, individual life history and tree assessment, genetics, safety aspects, legal requirements, and tree pruning. Aspects of science communication, environmental education, and local networks.</p> <p><u>Learning Objectives:</u> Students will gain an understanding of the importance of trees and woody plants in urban and peri-urban landscapes, as well as the challenges associated with their integration at various levels. They will be able to plan, manage, and evaluate urban tree management in tropical and other regions during the implementation phase. This enables them to plan green spaces in tropical cities and oversee their sustainable management.</p>	
Teaching and learning methods	3 hours per week lecture 2 hours per week seminar 1.5 hours per week of exercises 1-day field trip Self-study	
Prerequisites for participation	Knowledge of ecology, tree biology, and management at the bachelor's level. References: Miller, R. W. (2015) Urban Forestry. Prentice-Hall, London.	
Availability	This module is a required module in the Tropical Forestry master's program.	
Requirements for awarding credits	Credit hours are awarded upon successful completion of the module exam. The module exam consists of a seminar paper, including a presentation (30 hours), and a written exam (120 minutes).	

Credits and Grades	A total of 8 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: seminar paper including presentation 33%, written exam 67%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 240 hours. Of these, approximately 107 hours are spent attending classes and approximately 133 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Chin, W. Y. (2003) Tropical Trees and Shrubs – A Selection for Urban Plantings. Sun Tree Publ., Singapore.</p> <p>Cox, S. (2011) Urban Trees: A Practical Management Guide. Crowood Press, Marlborough.</p> <p>Draper, B. D.; Richards, P. A. (2009) Dictionary for managing trees in urban environments. CSIRO Publishing, Melbourne.</p> <p>Harris, R.W. et al. (2015) Arboriculture. Pearson Education, New Jersey.</p> <p>Konijnendijk, C. C. et al. (2005) Urban Forests and Trees. Springer, Berlin.</p> <p>Miller, R. W. (2015) Urban Forestry. Prentice-Hall, London.</p> <p>Roloff, A. (ed.) (2016) Urban Tree Management: For the Sustainable Development of Green Cities. Wiley-Blackwell, Chichester, UK.</p> <p>Roloff, A. (2004) Trees – Phenomena of adaptation and optimization. Ecomed, Landsberg.</p> <p>Trowbridge, P. J.; Bassuk, N. L. (2004) Trees in the Urban Landscape. Wiley, New Jersey.</p>

Module number	Module Name	Instructor
FOMT 1.4A	Forest Use and Product Chains	Prof. Dr. J. Eler
Course Content and Learning Objectives	<p><u>Content</u>: Processes of harvesting, transport, storage, and processing of wood as socio-economic and technical systems. Implementation and management of forestry operations. Identification of tropical timber based on its anatomical structure, physical and mechanical properties, as well as potential harvesting, utilization, and value chains for non-timber products using selected products from natural forests and forest plantations. Product development.</p> <p><u>Learning Objectives</u>: Students will acquire specialized knowledge of the principles and systematic approaches to the harvesting, storage, processing, and marketing of timber and non-timber products. They can identify tropical tree species and are familiar with important non-timber products of tropical forests, including their potential for sustainable forest management. They are capable of independently developing and managing technological processes related to forest utilization, management, and product refinement, particularly timber harvesting, transport, processing, and optimization of timber sorting.</p>	
Teaching and Learning Methods	3 SWS lecture 2 hours per week seminar 1 hour per week of self-study	
Requirements for participation	Bachelor's-level knowledge of forest management and forest use. References: Conway, S. (1976) Logging practices: Principles of timber harvesting systems. Miller Freeman Publications, San Francisco.	
Availability	This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.	
Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a written exam (90 minutes) and an oral exam (individual exam, 20 minutes).	
Credits and Grades	A total of 7 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades from the examination components, weighted as follows: Written exam 33%, oral exam 67%.	

Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 210 hours. Of these, approximately 90 hours are spent attending classes and approximately 120 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Conway, S. (1976) Logging Practices: Principles of Timber Harvesting Systems. Miller Freeman Publications, San Francisco.</p> <p>Hakkila, P. (1989) Utilization of Residual Forest Biomass. Springer, Berlin.</p> <p>Tsoumis, G. (1991) Science and technology of wood. Van Nordstrand Reinhold, New York.</p> <p>Balick, M. J.; Elisabetsky, E.; Laird, S. A. (eds.) (1996) Medicinal resources of the tropical forest. Biodiversity and its importance to human health. Columbia University Press, New York.</p> <p>FAO (2000–2010) Non-wood News. Information Bulletins. FAO, Rome.</p> <p>Shackleton S. et al. (eds.): Non-Timber Forest Products in the Global Context. Tropical Forestry, 7. Springer, Berlin et al.</p> <p>Kaplinsky, R., Morris, M. (2001) A Handbook for Value Chain Research. IDRC. www.prism.uct.ac.za/Papers/VchNov01.pdf.</p> <p>ACIAR (2012) Making value chains work better for the poor: a toolbox for practitioners of value chain analysis. Australian Centre for International Agricultural Research (ACIAR). Canberra. Available online at http://aciarc.gov.au/publication/cop019.</p>

Module number	Module Name	Instructor
FOMT 1.4B	Survey and Assessment of Forest Resources	Prof. Dr. H. Röhle
Content and Learning Objectives	<p><u>Content:</u> Instruments and methods for measuring individual trees and tree stands; establishment and analysis of experimental plots in forests and short-rotation plantations. Modeling and simulation of forest growth, timber yield, and biomass. Biometric methods using example datasets. Remote sensing methods and Geographic Information Systems (GIS). Data acquisition using aircraft- and satellite-based sensor systems, as well as analysis methods based on aerial image interpretation and digital satellite image classification, including their integration into geographic information systems.</p> <p><u>Learning Objectives:</u> Students will understand the principles, operation, and application of key tree-measuring instruments, as well as the methodologies for surveying and analyzing forest growth, yield, and forest biomass production, and will be familiar with the corresponding modeling techniques. They are able to operationally utilize analog and digital remote sensing data based on modern methods of aerial and satellite image analysis, as well as apply image data and multi-thematic geodata to the monitoring of land use and land-use change.</p>	
Teaching and Learning Formats	2.5 hours per week lecture 3 hours per week of lab work Self-study	
Prerequisites for participation	<p>Mathematical and statistical knowledge (bachelor's level). Literature: Loetsch, F.; Zöhrer, F.; Haller, K. E. (1973) Forest inventory. Vol. 2. BLV Verlagsgesellschaft, Munich. Bettinger, P.; Wing, M. G. (2003) Geographic Information Systems – Applications in Forestry and Natural Resources Management. McGraw-Hill, New York. Lillesand, T. M.; Kiefer, R. W.; Chipman, J. W. (2004) Remote sensing and image interpretation.^{5th}ed., Wiley, New York.</p>	
Usability	This module is one of two required electives in the Tropical Forestry master's program, and students must choose one of them.	
Requirements for Awarding Credit Points	Credits are awarded upon passing the module exam. The module exam consists of a report (30 hours) and a written exam (90 minutes).	

Credits and Grades	A total of 7 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for the examination components, weighted as follows: Report 67%, written exam 33%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 210 hours. Of these, approximately 82 hours are spent attending classes and approximately 128 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Cochran, W. G. (1977) Sampling Techniques.^{3rd}ed. John Wiley, New York.</p> <p>Vanclay, J. (1999) Modelling forest growth and yield. CABI Publishing, New York.</p> <p>West, P. W. (2004) Tree and forest measurement. Springer, Berlin, Heidelberg, New York.</p> <p>Wulder, M. A.; Franklin, S. E. (eds.) (2003) Remote sensing for forest environments – concepts and case studies. Kluwer, Dordrecht, Boston, London.</p> <p>Zar, J. H. (1996) Biostatistical analysis.^{3rd}ed. Prentice Hall, New Jersey.</p>

Module number	Module Name	Instructor
FOMT 1.5	Economics and Management of Forest Resources	Prof. Dr. P. Deegen
Content and Learning Objectives	<p><u>Content:</u> Economic principles of human behavior as illustrated by the forest rotation problem and other issues related to the management of even-aged stands and decision-making problems in uneven-aged forest stands. Examination of human interactions using environmental and ecosystem services in forestry; management of forest enterprises, including strategic planning, forest planning, and the planning and monitoring of forest management measures. Development of a forest inventory design and the establishment of a management information system based on Geographic Information Systems using case studies from tropical regions.</p> <p><u>Learning Objectives:</u> Students understand forestry-economic principles and procedures and can independently apply them in the analysis of forestry activities and in the management of forest enterprises. They can apply the concepts of intertemporal efficiency to both timber production and the provision of environmental ecosystem services. They are able to apply economic tools to plan management decisions and steer operational development in the tropics.</p>	
Teaching and Learning Methods	<p>2 hours per week lecture 1.5 hours per week seminar 2 hours per week of exercises Self-study</p>	
Prerequisites for participation	<p>High school-level mathematics (basic course). Literature: Davis, L. S.; Johnson, K. N. (1986) Forest Management. McGraw-Hill, New York.</p>	
Availability	<p>This module is a required course in the Tropical Forestry track of the Master's program in Tropical Forestry and Management, and one of two required elective courses in the Sustainable Tropical Forestry track, from which students must select one.</p>	
Requirements for Awarding Credit Points	<p>Credits are awarded upon passing the module exam. The module exam consists of a written exam (120 minutes).</p>	
Credits and Grades	<p>A total of 7 credit points can be earned through the module. The module grade corresponds to the grade on the written exam.</p>	

Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 210 hours. Of these, approximately 82 hours are spent attending classes and approximately 128 hours on self-study, including exam preparation and taking the exam.
Duration of the module	The module spans one semester.
Recommended reading	<p>Klemperer, D. (1996) Forest Resource Economics and Finance. McGraw-Hill, New York.</p> <p>Neher, P. A. (1993) Natural Resource Economics: Conservation and Exploitation. Cambridge University Press, Cambridge.</p> <p>Buongiorno, J.; Gilles, J. K. (2003) Decision methods for forest resource management. Academic Press, Amsterdam.</p> <p>Chang, S. J. (1983) Rotation age, management density, and the economic factors of timber production: do changes in stumpage price, interest rate, regeneration cost, and forest taxation matter? Forest Science, vol. 29, no. 2, pp. 267–277.</p> <p>Chang, S. J.; Deegen, P. (2011) Pressler's indicator rate formula as a guide for forest management. Journal of Forest Economics, vol. 17, issue 3, 258–266.</p> <p>Buchanan, J. M. (1999) The demand and supply of public goods. Liberty Fund, Indianapolis.</p> <p>Leuschner, W. A. (1990) Forest regulation, harvest scheduling, and planning techniques. Wiley, New York.</p> <p>Loetsch, F.; Haller, K. E. (1964) Forest inventory. Vol. I. BLV-Verlag. Munich.</p> <p>Loetsch, F.; Zöhrer, F.; Haller, K. E. (1973) Forest inventory. Vol. II. BLV-Verlag, Munich.</p>

Module number	Module Name	Instructor in charge
FOMT 1.6	Organization and Operating Systems	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Contents</u>: Operational analyses, ranging from subsistence-oriented farm households to private forestry and agroforestry enterprises and large-scale industrial operations in the tropics. Cooperatives, community forests, and partnership models for forest management, such as outgrower, concession, joint forestry, and leasehold models. Internal and external factors and processes determining operations, as well as their qualitative and quantitative recording and evaluation. Assessment of operations in the context of their sociocultural, economic, and natural conditions.</p> <p><u>Learning Objectives</u>: Students will be able to apply methods for the socioeconomic analysis of forestry enterprises and organizations. This includes methods for interpreting results and conducting comparative analysis. They will be able to identify enterprise profiles and differentiate them based on technological, economic, and social criteria, as well as conduct enterprise analyses independently. Students have become familiar with methodological tools for the socioeconomic development of enterprises and organizations through case studies.</p>	
Teaching and Learning Formats	2 hours per week of lecture 2-hour-per-week seminar 0.5 credit hours of lab 1.5-day field trip and self-study	
Prerequisites for participation	Basic knowledge of forestry, management, economics, and business organization (bachelor's level). References: Auch, E.; Pretzsch, J.; Uibrig, H. (2013) Organizational changes in forest management. In: Pretzsch, J. et al. (eds.) Forests and rural development. Springer, Heidelberg.	
Availability	This module is a required module in the Tropical Forestry master's program.	
Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (30 hours) and an oral exam (individual exam, 20 minutes).	

Credits and Grades	A total of 8 credits can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Seminar paper including presentation 33%, oral exam 67%.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 240 hours. Of these, approximately 82 hours are spent attending classes and approximately 158 hours are devoted to self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Klemperer, D. (1996) Forest Resource Economics and Finance. McGraw-Hill, New York.</p> <p>Beets, W.C. (1990) Raising and sustaining productivity of small-holder farming systems in the tropics. AgBe Publishing, Alkmaar.</p> <p>Neher, P.A. (1993) Natural Resource Economics: Conservation and Exploitation. Cambridge University Press, Cambridge.</p> <p>Dillon, J.L.; Hardacker, J.B. (1993) Farm management research for small farmer development. Farm Systems Management Series 6. FAO, Rome.</p> <p>McConnell, D.J.; Dillon, J.L. (1997) Farm management for Asia: a systems approach. Farm Systems Management Series 13. FAO, Rome.</p>

Module number	Module Name	Instructor
FOMT 1.7	Management of Vegetation and Soil in Watersheds	Prof. Dr. K.H. Feger
Content and Learning Objectives	<p><u>Content:</u> The role of forests in watersheds and water cycles, as well as their ecosystem services, in relation to soil properties. Current and future challenges in watershed management. Relationships between water supply and food security, climate change, integrated land-use planning, and management. Trade-offs and synergies between forestry and water management, particularly in regions with low and/or uneven precipitation and high evaporation. Concepts for site-appropriate and adapted land uses.</p> <p><u>Learning Objectives:</u> Students will be able to understand and analyze fundamental factors and processes in plant-soil systems within the context of watersheds. Furthermore, they will be able to analyze land-use conflicts related to soil and water resources. They are able to apply methods for simulating and evaluating scenarios (climate, spatial distribution of land use) that serve as the basis for interdisciplinary concepts for the sustainable management of watersheds. In addition to teamwork skills, they possess qualifications in communication, presentation, argumentation, facilitation, and documentation of results.</p>	
Teaching and Learning Methods	2 hours per week lecture 2 hours per week seminar 1.5 hours per week project work (condensed into 3 days) 0.5 days field trip Self-study	
Prerequisites for participation	Knowledge in the fields of forestry, primarily soil science, biogeochemistry, hydrology, and climatology (bachelor's level). References: Brady NC, Weil RR (2017) The Nature and Properties of Soils, 15 th ed. Prentice Hall, Upper Saddle River. Calder IR (2005) Blue Revolution: Integrated Land and Water Resource Management. Earthscan, London.	
Applicability	This module is a required module in the Tropical Forestry track of the Master's program in Tropical Forestry and Management, and one of two required elective modules in the Sustainable Tropical Forestry track, of which one must be selected.	

Requirements for Awarding Credits	Credits are awarded upon passing the module exam. The module exam consists of a project (1 week) and a seminar paper (30 hours).
Credits and Grades	A total of 7 credit points can be earned through the module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Project assignment 33%, seminar paper 67%.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload amounts to 210 hours. Of these, approximately 87 hours are spent attending classes and approximately 123 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Course Literature	<p>Brady NC, Weil RR (2017) The Nature and Properties of Soils,^{15th}ed. Prentice Hall, Upper Saddle River.</p> <p>Brauman, K. A.; et al. (2007) The nature and value of ecosystem services: An overview highlighting hydrologic services. Annual Review of Environmental Resources 32, pp 67–98.</p> <p>Calder IR (2005) Blue Revolution: Integrated Land and Water Resource Management. Earthscan, London.</p> <p>Falkenmark, M.; Rockström, J. (2004) Balancing Water for Humans and Nature: The New Approach in Ecohydrology. Routledge, London.</p> <p>Feger, K.H.; Hawtree, D. (2013) Soil carbon and water security. In: Lal, R. et al. (eds.) Ecosystem services and carbon sequestration in the biosphere. Springer, Dordrecht.</p> <p>Julich, S., Mwangi, H.M., Feger, K.H. (2016) Forest Hydrology in the Tropics. In: Pancel, L., Köhl, M. (eds.) Tropical Forestry Handbook,^{2nd}ed., Springer, Berlin, Heidelberg. pp. 1917–1939.</p> <p>Lal, R. (2009) Ten tenets of sustainable soil management. Journal of Soil and Water Conservation 64, 20A–21A. Soil and Water Conservation Society, Ankeny.</p> <p>Mwangi, H.M., Julich, S., Feger, K.H. (2015) Introduction to Watershed Management. In: Pancel, L., Köhl, M. (eds.): Tropical Forestry Handbook,^{2nd}ed., Springer, Berlin, Heidelberg. pp. 1869–1896.</p> <p>Mwangi, H.M., Julich, S., Feger, K.H. (2015): Watershed Management Practices in the Tropics. In: Pancel, L., Köhl, M. (eds.): Tropical Forestry Handbook,^{2nd}ed., Springer, Berlin, Heidelberg. pp. 1897–1915.</p> <p>Nair, P. K. et al. (2009) Agroforestry as a strategy for carbon sequestration. Journal of Plant Nutrition and Soil Science 172, 10–23. Wiley-VCH, Weinheim.</p>

	UNEP (2009) Water Security and Ecosystem Services: The Critical Connection. A Contribution to the United Nations World Water Assessment Programme. UNEP, Nairobi.
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Module number	Module Name	Instructor
FOMT 1.8A	Silviculture and Biodiversity Conservation in Tropical Natural Forests	Prof. Dr. S. Wagner
Content and Learning Objectives	<p><u>Content</u>: The ecosystem concept as a tool for silviculture and the conservation of biological diversity. Natural distribution and classification of forest and plant formations as well as fauna in the tropics, and methods for their assessment. Major silvicultural systems with their methods and procedures in moist and dry forests. Population ecology with its natural regulatory mechanisms, relationships between plants, herbivores, and between herbivores and their predators in the context of biodiversity and conservation. Significance, indicators, threats, and utilization potentials of biodiversity, as well as instruments and mechanisms for its conservation.</p> <p><u>Learning Objectives</u>: Students will be able to classify, analyze, and evaluate tropical forest ecosystems and their biodiversity, as well as develop appropriate silvicultural systems tailored to local conditions. They can analyze the plant–herbivore–antagonist relationship and thereby assess biotic risks and regulatory options for the management of natural forests and the protection of biodiversity, as well as integrate these into management strategies. Students are able to design strategies for sustainable production and the protection of natural forest ecosystems.</p>	
Teaching and Learning Methods	3 hours per week lecture 2 hours per week seminar 1.5 hours per week of exercises and self-study	
Prerequisites for participation	Basic knowledge of ecology (bachelor’s level). Literature: Kimmins, J. P. (1997) Forest Ecology: A Foundation for Sustainable Management. ^{2nd} ed., Prentice Hall, New Jersey. Lamprecht, H. (1989) Silviculture in the Tropics. German Society for Technical Cooperation, Eschborn. Matthews, J. D. (1996) Silvicultural Systems. Clarendon Press, Oxford. Huffaker C. B.; Gutierrez A. P. (1999) Ecological Entomology. ^{2nd} ed. Wiley, New York.	
Usability	This module is one of two required elective modules in the Tropical Forestry master’s program, and students must choose one of them.	

Requirements for Awarding Credits	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (30 hours) and an oral exam (individual exam, 20 minutes).
Credits and Grades	A total of 7 credit points can be earned through the module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Seminar paper including presentation 33%, oral exam 67%.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 210 hours. Of these, approximately 97 hours are spent attending classes and approximately 113 hours on self-study, including exam preparation and the completion of the assessment components.
Duration of the module	The module spans one semester.
Recommended reading	<p>Dawkins, H. C.; Philip, M. S. (1998) Tropical Moist Forest Silviculture and Management: A History of Success and Failure. CABI, Wallingford.</p> <p>Ffolliott, P. F. et al. (1995) Dryland forestry. Planning and management. Wiley, New York.</p> <p>Johnson, E. A.; Miyanishi, K. (2001) Forest fires. Behavior and ecological effects. Academic Press, San Diego.</p> <p>Richards, P. W. (1996) The tropical rainforest—an ecological study.^{2nd}ed. Cambridge University Press, Cambridge.</p> <p>Smith, D. M. et al. (1997) The practice of silviculture. Applied forest ecology.^{9th}ed. Wiley, New York.</p> <p>Ananthakrishnan, T. N. (1998) Technology in biological control. Science Publishers, New York.</p> <p>Denholm, I. et al. (1998) Insecticide Resistance: From Mechanisms to Management. CABI, Wallingford.</p> <p>Pearce, M.J. (1997) Termites. Biology and pest management. CABI, Wallingford.</p> <p>Speight, M. R.; Wylie, F. R. (2001) Insect pests in tropical forestry. CABI, Wallingford.</p>

Module number	Module Name	Instructor
FOMT 1.8B	Silviculture in Forest Plantations and Agroforestry in the Tropics	Prof. Dr. G. Kapp
Content and Learning Objectives	<p><u>Contents:</u> Silviculture and production stages for forest plantations, including pure and mixed stands, as well as tree plantings as an integral part of agroforestry in the tropics and subtropics. Case studies on representative genera and tree species with regional characteristics. Forest protection strategies and innovations in forest plantations. Artificially established forest ecosystems and agroforestry systems, classified by function, including fast-growing plantations. Attributes and methods for their assessment and certification.</p> <p><u>Learning Objectives:</u> Students will be able to classify, analyze, and evaluate forest plantations and agroforestry systems by component, as well as design integrated forest protection strategies and further develop innovative technologies. They possess the skills to conduct preliminary surveys and to design forest plantations and woody components of agroforestry systems in the tropics.</p>	
Teaching and learning methods	3 hours per week lecture 2 hours per week seminar 1.5 hours per week of exercises and self-study	
Prerequisites for participation	Knowledge of ecological fundamentals (bachelor's level). Literature: Burkhart, H. E.; Tomé, M. (2012) Modeling Forest Trees and Stands. Springer, Dordrecht. Evans, J.; Turnbull, J. W. (2004) Plantation forestry in the tropics. 3 rd edition. Oxford University Press, Oxford. Huxley, P. (1999) Tropical agroforestry. Blackwell Science, Oxford. Nair, K. S. S. (2007) Tropical forest insect pests. Ecology, impact, and management. Cambridge University Press, Cambridge. Nair, P. K. R. (1993) An introduction to agroforestry. Kluwer Academic Publishers, Dordrecht. Wylie, F. R.; Speight, M. R. (2012) Insect pests in tropical forestry. 2 nd ed. CABI, Wallingford.	
Applicability	This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.	

Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (30 hours) and an oral exam (individual exam, 20 minutes).
Credits and Grades	A total of 7 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for both assessment components: seminar paper including presentation (33%) and oral exam (67%).
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 210 hours. Of these, approximately 97 hours are spent attending classes and approximately 113 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Alavalapati, R. R.; Mercer, D. E. (2004) Valuing agroforestry systems – methods and applications. Kluwer Academic Publishers, Dordrecht.</p> <p>Atangana, A. et al. (2014): Tropical Agroforestry. Springer, Dordrecht.</p> <p>Ashton, M. S.; Montagnini, M. F. F. (1999) The silvicultural basis for agroforestry systems. CRC Press, Washington.</p> <p>Boyle, J. R.; Winjum, J. K.; Kavanagh, K.; Jensen, E. C. (1999) Planted Forests: Contribution to the Quest for Sustainable Societies. Forestry Sciences 56, Kluwer, Dordrecht.</p> <p>Günter, S. et al. (2011) Silviculture in the tropics. Springer, Berlin Heidelberg.</p> <p>Matthews, J. D. (1996) Silvicultural systems. Clarendon Press Oxford, Oxford.</p> <p>Nair, P. K. R. et al. (2004) New vistas in agroforestry – a compendium for the 1stWorld Congress of Agroforestry 2004. Kluwer Academic Publishers, Dordrecht.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and Insects. Chapman & Hall, London.</p> <p>Young, A. (1997) Agroforestry for soil management. 2nded. ICRAF. CABI. Wallingford.</p>

Module number	Module Name	Instructor
FOMT 2.1	Research Design and Planning	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Contents:</u> Foundations of scientific theory and hermeneutics, and analytical methods in the natural, technical, and social sciences. Quantitative-statistical and qualitative data collection, analysis, and evaluation methods. Standards for scientific publications and strategies for their preparation. Research proposal on a topic from the fields of ecology, technology, or socioeconomics and culture in the tropics, including a work plan.</p> <p><u>Learning Outcomes:</u> Students are able to identify and apply scientific methods for data collection, data analysis, and evaluation of results in the complex environment of a tropical country. Students have further developed their ability to write and evaluate scientific papers and can independently develop research projects. They are prepared to draft a research plan for their master's thesis.</p>	
Teaching and Learning Methods	4 hours per week lecture 3 hours per week seminar 1 hour per week tutorial and self-study	
Prerequisites for participation	Knowledge in the fields of forestry (bachelor's level). Literature: Creswell, J. W. (2003) Research Design: Qualitative and Quantitative Methods and Approaches. ^{2nd} ed. Sage, Thousand Oaks, California. Yin, R. K. (1994) Case Study Research: Design and Methods. SAGE Publications, Newbury Park, London, New Delhi.	
Applicability	This module is a required module in the Tropical Forestry track of the Tropical Forestry and Management specialization within the Master's program in Tropical Forestry.	
Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a report (30 hours) and a research plan (135 hours).	
Credits and Grades	A total of 10 credits can be earned through this module. The module grade is calculated as the weighted average of the grades for the examination components, weighted as follows: Report 33%, Research Plan 67%.	

Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 300 hours. Of these, approximately 120 hours are spent attending classes and approximately 180 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module lasts one semester.
Recommended reading	<p>Angelsen, A. et al. (eds.) (2011) Measuring Livelihoods and Environmental Dependence: Methods for Research and Fieldwork. Earthscan. London, Washington.</p> <p>Bernard, H. R. (2011) Research Methods in Anthropology: Qualitative and Quantitative Approaches.^{5th}ed. Altamira Press, Lanham, USA.</p> <p>Creswell, J. W. (2003) Research design. Qualitative and quantitative methods, approaches.^{2nd}ed. Sage, Thousand Oaks, California.</p> <p>Czaja, R.; Blair, J. (1996) Designing Surveys. A Guide to Decisions and Procedures. Sage, Thousand Oaks.</p> <p>Freese, F. (1984) Statistics for Land Managers. Paeony Press, Jedburgh.</p> <p>Neuman, W. L. (1994) Social research methods – qualitative and quantitative approaches. Allyn and Bacon, Massachusetts.</p> <p>Rohrmoser, K. (1985) Handbook for Field Trials in Technical Cooperation. GTZ, Eschborn.</p> <p>Silverman, D. (2001) Interpreting Qualitative Data: Methods for Analyzing Talk, Text, and Interaction.^{2nd}ed. SAGE, Thousand Oaks.</p> <p>Stern, R. D.; Coe, R.; Allan, E. F.; Dale, I. C. (2004) Good statistical practice for natural resources research. CABI, Cambridge.</p> <p>Yin, R. K. (1994) Case study research - design and methods. SAGE Publications, Newbury Park, London, New Delhi.</p>

Module number	Module Name	Instructor
FOMT 2.2	Planning at the Project and Landscape Level	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Contents:</u> Methods for analyzing problems and identifying objectives in a given situation; methods and tools for planning, implementing, monitoring, and managing projects and programs, as well as for conducting impact analyses in developing and emerging economies. The importance of the project context, stakeholders, project economics, efficiency, learning, innovation, and knowledge transfer for projects aimed at driving change. Concepts and methods of forestry consulting. Methodological principles of integrated land-use planning and management at the landscape level, taking into account specific sectors and stakeholder groups. Practical procedures for the preparation of planning documents.</p> <p><u>Learning Objectives:</u> Students will be able to independently identify and assess options for interventions, plan them as projects, manage their implementation, and evaluate their results. They will understand the factors influencing human behavior and learning and will be able to design counseling strategies and facilitate processes within an intercultural context. They are familiar with methods of multisectoral land-use planning as well as with disciplinary and interdisciplinary concepts for sustainable land-use management. They possess skills in teamwork, communication, presentation, and facilitation, and can understand and analyze interactions across sectors in terms of synergies and competition.</p>	
Teaching and Learning Methods	3 hours per week lecture 2 hours per week seminar 1.5 hours per week project work and self-study	
Prerequisites for participation	Knowledge of forestry and development policy, business administration, and business organization (bachelor's level).	
Applicability	This module is a required module in the Tropical Forestry track of the Tropical Forestry and Management specialization within the Master's program.	
Requirements for the award of credit points	Credit points are awarded upon passing the module exam. The module exam consists of a project (2 weeks) and a written exam (90 minutes).	

Credits and Grades	A total of 8 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades from both assessment components, weighted as follows: Project assignment 67%, written exam 33%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 240 hours. Of these, approximately 97 hours are spent attending classes and approximately 143 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Dalal-Clayton, B.; Dent, D.; Dubois, O. (2003) Rural planning in developing countries – supporting natural resource management and sustainable livelihoods. Earthscan, London.</p> <p>Dusseldorp, D. B. W. M. v. (1990) Planned development via projects. Its necessity, limitations, and possible improvements. In: Sociologia Ruralis Vol. XXX, No. 3–4, 337–352.</p> <p>FAO (1995): Planning for sustainable use of land resources: Toward a new approach. FAO Land and Water Bulletin 2, Rome.</p> <p>Gittinger, J. P. (1982) Economic analysis of agricultural projects. The Johns Hopkins University Press. Baltimore & London.</p> <p>McGhee, P.; McAliney, P. (2007) Painless Project Management: A Step-by-Step Guide for Planning, Executing, and Managing Projects. Wiley, Hoboken.</p> <p>Darr, D. et al. (2013) Extension services for rural development. In: Pretzsch, J. et al. (eds.) Forests and rural development. Springer, Heidelberg.</p> <p>Hoffmann, V. et al. (eds.) (2009) Handbook of rural extension 1: Basic issues and concepts. 3rded. Margraf, Weikersheim.</p> <p>Rogers, E. M. (2003) Diffusion of Innovations. 5thedition, Free Press, New York.</p> <p>Weiss, G. et al. (eds.) (2010) Innovation in Forestry: Territorial and Value Chain Relationships. CAB International, Oxfordshire.</p>

Module number	Module Name	Instructor
FOMT 2.3A	Modeling	Prof. Dr. U. Berger
Content and Learning Objectives	<p><u>Content</u>: Overview of individual-based and agent-based modeling (IBM/ABM), model development, implementation, parameterization, and sensitivity analysis. Handling uncertainties regarding data, planning simulation experiments, and statistical analysis of results. Integration of spatial data into models using Geographic Information Systems (GIS). Geodata processing and integration, visualization, and elementary analysis.</p> <p><u>Learning Objectives</u>: Students will be able to design and program models, as well as conduct and analyze simulation experiments using IBM/ABM. They will be able to generate, handle, and analyze geodata and use it as input in IBM/ABM models.</p>	
Teaching and Learning Methods	<p>1 hour per week lecture 1.5 hours per week of lab 1 hour per week e-learning exercise (self-study)</p>	
Prerequisites for participation	<p>Active participation and willingness to conduct simulation experiments and analyze model results; an overview of the purpose and requirements of modeling in ecology and the social sciences; basic mathematical and statistical knowledge at the bachelor's level.</p> <p>References: Grimm, V.; Railsback, S. F. (2005) Individual-based Modeling and Ecology. Princeton University Press, Princeton. Gilbert, N.; Troitzsch, K. G. (2005) Simulation for the Social Scientists. Open University Press, Maidenhead. Gotelli, N. J.; Ellison, A. M. (2013) A Primer of Ecological Statistics.^{2nd} revised edition. Sinauer Associates, Sunderland.</p>	
Applicability	<p>This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.</p>	
Requirements for Awarding Credits	<p>Credits are awarded upon passing the module exam. The module exam consists of a report (15 hours) and a presentation.</p>	
Credits and Grades	<p>A total of 5 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Report 25%, Presentation 75%.</p>	
Frequency of the module	<p>The module is offered every winter semester.</p>	

Workload	The total workload amounts to 150 hours. Of these, approximately 52 hours are spent attending classes and approximately 98 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Course Literature	<p>Railsback, S. F.; Grimm, V. (2011) Agent-Based and Individual-Based Modeling: A Practical Introduction. Princeton University Press, Princeton.</p> <p>de Smith, M.; Goodchild, M.; Longley, D. (2008) Geospatial Analysis. Available at www.spatialanalysisonline.com.</p> <p>Worboys, M. F.; Duckham, M. (2004) GIS: A Computing Perspective (2nded.) CRC Press, Boca Raton.</p>

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Module number	Module Name	Instructor
FOMT 2.3B	Communication and Conflict Management	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Contents</u>: Theories and concepts of verbal and nonverbal communication. Communication as social behavior, conflicts as part of social systems, conflict resolution, psychological dispositions, and human perception. Rhetorical rules and psychological patterns for goal-oriented actions and reactions in disputes over natural resources. Methods and tools for proactive, situation-specific interventions during ongoing communication, negotiation, discourse, and conflicts. Strategies for mediation, Meta-Plan facilitation, and participation in the context of rural development. Communication in participatory data collection and in field laboratories.</p> <p><u>Learning Outcomes</u>: Students are able to assess conflicts, select methods and tools for addressing them, and apply them in practice. They are capable of applying ethical standards when dealing with problems and conducting communication processes in a democratic and participatory manner. Students will be able to manage communication processes among stakeholder groups and conduct participatory surveys.</p>	
Teaching and Learning Methods	<p>2 hours per week lecture 1 hour per week seminar 1 credit hour of project work (self-study)</p>	
Prerequisites for participation	<p>Knowledge of natural forest and plantation management as well as nature conservation (bachelor's level). References: Moore, C. W. (2003) The mediation process. Updated and revised^{3rd}ed., Jossey-Bass, San Francisco. Klebert, K. et al. (2000) Winning Group Results. Techniques for Guiding Group Thought and Decision-Making Processes with the Moderation Method.^{2nd}ed. Windmühle, Hamburg.</p>	
Applicability	<p>This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.</p>	
Requirements for Awarding Credits	<p>Credits are awarded upon passing the module exam. The module exam consists of a project (1.5 weeks) and a written exam (90 minutes).</p>	

Credits and Grades	A total of 5 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Project assignment 67%, written exam 33%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 150 hours. Of these, approximately 60 hours are spent attending classes and approximately 90 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Course-related literature	Miall, H., et al. (2011) Contemporary Conflict Resolution: The Prevention, Management, and Transformation of Deadly Conflicts, ^{3rd} ed. Polity Press. Cambridge. Wilkenfeld, J. et al. (2005) Mediating International Crisis. Routledge, New York. Bercovitch, J. (ed.) (2002) Studies in International Mediation: Essays in Honor of Jeffrey Z. Rubin. Macmillan, New York. Kalyvas, S. (2006) The Logic of Violence in Civil Wars. Cambridge University Press, Cambridge.

Module number	Module Name	Instructor
FOMT 2.4A	Management Systems and Renaturation in Tropical Natural Forests	Prof. Dr. S. Wagner
Content and Learning Objectives	<p><u>Contents:</u> Management systems for natural forest management in the tropics. Elements for data collection, planning, implementation, monitoring, and control. Management strategies using decision-theoretical models. Management of different forest formations, management units, and operations. Production strategies and value chains for timber, non-timber products, and forest environmental services. Biodiversity management, integrated forest protection, and firefighting in tropical and subtropical natural forests based on case studies.</p> <p><u>Learning Objectives:</u> Students will acquire specific knowledge of key management systems for tropical forests. They will be able to apply methods of planning, implementation, monitoring, and control for natural forest management and will be capable of implementing multifunctional strategies for the management of tropical natural forests.</p>	
Teaching and Learning Methods	3 hours per week lecture 2 hours per week seminar 0.5 hours per week of exercises 1-day field trip Self-study	
Prerequisites for participation	Knowledge of forestry disciplines (bachelor's level). References: Lamprecht, H. (1989) <i>Silviculture in the Tropics</i> . German Society for Technical Cooperation (GTZ), Eschborn. Matthews, J. D. (1996) <i>Silvicultural Systems</i> . Clarendon Press, Oxford. Johnson, E. A.; Miyanishi, K. (2001) <i>Forest fires. Behavior and ecological effects</i> . Academic Press, San Diego. Speight, M. R.; Wylie, F. R. (2001) <i>Insect pests in tropical forestry</i> , CABI, Wallingford.	
Applicability	This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.	
Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (30 hours) and a written exam (90 minutes).	

Credits and Grades	This module is worth 7 credit points. The module grade is calculated as the weighted average of the grades for the following assessments: Seminar paper including presentation 33%, written exam 67%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 210 hours. Of these, approximately 92 hours are spent attending classes and approximately 118 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Clemen, R. (1996) Making Hard Decisions. Duxbury Press, Pacific Grove.</p> <p>Ffolliott, P. F.; Brooks, K. N.; Gregersen, H. N.; Lundgren, A. L. (1995) Dryland forestry. Planning and management. Wiley, New York.</p> <p>Buongiorno, J.; Gilles, K. (2003) Decision Methods for Forest Resource Management. Academic Press, Amsterdam, Boston</p> <p>Goldammer, J. G. (1993) Fire Management. In: Pancel, L. (ed.) (1993) Tropical Forestry Handbook. Springer, Berlin Heidelberg New York, pp. 1221–1268.</p> <p>Heikkilä, T. V.; Grönqvist, R.; Jurvelius, M. (1993) Handbook on Forest Fire Control. Forestry Training Programme: Publication 21. Helsinki.</p> <p>Speight, M. R.; Wainhouse, D. (1989) Ecology and management of forest insects. Oxford University Press, Oxford.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and Insects. Chapman & Hall, London.</p> <p>Heyde, W. F. (1980) Timber supply, land allocation, and economic efficiency. Johns Hopkins University Press, Baltimore.</p> <p>Neher, P. A. (1993) Natural Resource Economics: Conservation and Exploitation. Cambridge University Press, Cambridge.</p>

Module number	Module Name	Instructor
FOMT 2.4B	Management Systems for Forest Plantations and Landscape Rehabilitation in the Tropics	Prof. Dr. Kapp
Content and Learning Objectives	<p><u>Content:</u> Management of production and protection systems in forest plantations. Timber production, agroforestry, value chains, as well as erosion control, fire protection, and land rehabilitation. Surveying of forest plantations and protective plantings, their physical and monetary modeling and evaluation. Establishment of forest plantations as well as planning, organization, and management of operations, the involvement of stakeholders, and the identification of research needs. Connections to landscape rehabilitation and integrated land-use management.</p> <p><u>Learning Objectives:</u> Students will be able to assess and model tropical forest plantations in terms of their yield potential and vulnerability, and comprehensively evaluate them based on ecological, economic, and social criteria. They are able to plan, establish, and manage forest plantations in accordance with the objectives and to involve relevant stakeholders. They can integrate forest plantations into land-use concepts and identify research needs.</p>	
Teaching and Learning Methods	<p>3 hours per week lecture 2 hours per week seminar 0.5 hours per week of exercises 1-day field trip Self-study</p>	
Prerequisites for participation	<p>Knowledge of forestry disciplines (bachelor's level). Literature: Burkhart, H. E., Tomé, M. (2012) Modelling forest trees and stands. Springer, Dordrecht. Evans, J.; Turnbull, J.W. (2004) Plantation Forestry in the Tropics. Third edition. Oxford University Press, Oxford. Johnson, E.A.; Miyanishi, K. (2001) Forest Fires: Behavior and Ecological Effects. Academic Press, San Diego. Wylie, F.R.; Speight, M.R. (2012) Insect pests in tropical forestry. 2nd ed., CABI, Wallingford.</p>	
Applicability	<p>This module is one of two required elective modules in the Tropical Forestry master's program, one of which must be selected.</p>	

Requirements for Awarding Credits	Credits are awarded upon passing the module exam. The module exam consists of a seminar paper including a presentation (30 hours) and a written exam (90 minutes).
Credits and Grades	A total of 7 credit points can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Seminar paper including presentation 33%, written exam 67%.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 210 hours. Of these, approximately 92 hours are spent attending classes and approximately 118 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.
Recommended reading	<p>Smart, J. C. R.; Burgess, J. C. (2000) An Environmental Economic Analysis of Willow SRC Production. In: J. of Forest Economics, vol. 6, no. 3, pp. 193–225. Umea.</p> <p>Goldammer, J. G. (1993) Fire management. In: Pancel, L. (ed.) (1993) Tropical Forestry Handbook. Springer-Verlag Berlin Heidelberg New York, 1221–1268.</p> <p>Goldammer, J. G.; Jenkins, M. J. (eds.) (1990) Fire in ecosystem dynamics. SPB Academic Publishing, The Hague.</p> <p>Speight, M. R.; Wainhouse, D. (1989) Ecology and management of forest insects. Oxford University Press. Oxford.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and Insects. Chapman & Hall, London.</p> <p>Wright, J. W. (1976) Introduction to Forest Genetics. Academic Press, New York.</p>

Module number	Module Name	Instructor
FOMS 1.1	Preparation for Fieldwork in the Tropics	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Content</u>: Assessing the situation in a research area. Research, evaluation, and critical discussion of site-specific literature. Identification of research questions, hypotheses, theories, methods, and instruments for field research. Development of a research plan.</p> <p><u>Learning Objectives</u>: Students will have a thorough understanding of the importance and process of preparing for scientific fieldwork. They are able to research and access information on a research topic or field and possess conceptual skills with a focus on (1) the collection, analysis, and evaluation of appropriate qualitative and quantitative data, as well as (2) their combination with corresponding research instruments. Students are able to prepare for scientific fieldwork, including in teams and using online communication tools.</p>	
Teaching and Learning Methods	6 SWS e-learning exercise (blocked into 8 weeks) Self-study	
Prerequisites for Participation	<p>Knowledge of tropical forestry from various disciplines, regions, and cultures (bachelor's level).</p> <p>References: Angelsen, A. et al. (eds.) (2011) Measuring Livelihoods and Environmental Dependence: Methods for Research and Fieldwork. Earthscan. London, Washington.</p>	
Availability	This module is a required module in the Master's program in Tropical Forestry within the Sustainable Tropical Forestry specialization.	
Requirements for Awarding Credits	Credits are awarded upon passing the module exam. The module exam consists of a project (3 weeks) and a report (30 hours).	
Credits and Grades	A total of 8 credits can be earned through this module. The module grade is calculated as the unweighted average of the grades for the project and the report.	
Frequency of the module	The module is offered every winter semester.	

Workload	The total workload is 240 hours. Of these, approximately 90 hours are spent attending classes and approximately 150 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module lasts one semester.

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Module number	Module name	Instructor
FOMS 1.2	Summer School	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Content</u>: Comprehensive assessment of natural resources as well as environmental, societal, and social influences in a field study on forestry in a tropical country. Topics include production, nature conservation, participation and organization of forest users, and sustainability. Implementation of a research project related to sustainable forestry.</p> <p><u>Learning Objectives</u>: Students will gain an understanding of current key issues in tropical forestry, as well as the social and political influences exerted by interest groups on natural resource management within a specific context. They will be able to adapt theories and concepts to local conditions and specific knowledge systems, as well as collect data in the field—even under challenging conditions—and analyze it using appropriate methods. In addition, they possess the ability to identify field sites with diverse forest structures, land uses, and different management practices. They can orient themselves in an unfamiliar sociocultural environment, interact with local people, and understand stakeholders within the context of local culture as well as their dependencies on forest resources. They are able to organize themselves within the framework of a project, actively participate in group discussions, develop a critical and analytical attitude toward the natural and managed environment, express themselves precisely and appropriately in writing, and assess the suitability of methods and the credibility of collected data.</p>	
Teaching and Learning Methods	<p>10 days of project work 2-day field trip and self-study The project work and field trip are conducted as a block (2 weeks).</p>	
Prerequisites for participation		
Applicability	<p>This module is a required module in the Sustainable Tropical Forestry specialization track of the Tropical Forestry master’s program.</p>	
Requirements for earning credits	<p>Credits are awarded upon passing the module exam. The module exam consists of a report including a presentation (30 hours) and a project (2 weeks).</p>	

Credits and Grades	A total of 7 credits can be earned through this module. The module grade is calculated as the unweighted average of the grades for the project and the report.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 210 hours. Of these, approximately 95 hours are spent attending classes and approximately 115 hours on self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.

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Module number	Module name	Instructor
FOMS 1.3	Climate Change and Tropical Forestry	Prof. Dr. J. Pretzsch
Course Content and Learning Objectives	<p><u>Content</u>: Biophysical and economic impacts of climate change on forests in tropical and subtropical countries. Changes in forest area, composition, structure, and growth for the production of timber and non-timber products, and associated economic impacts. Forest-related impacts on the livelihoods of rural populations, particularly with regard to subsistence agriculture and smallholder farmers, as well as their options for adaptation. Trade-offs, issues in food production, income generation, and ecosystem functions—including carbon sequestration—across different farming systems.</p> <p><u>Learning Objectives</u>: Students will acquire knowledge regarding the relationships between climate change, forests, and livelihoods. They will be able to critically evaluate and discuss current situations and strategies, as well as analyze related policy debates from a scientific perspective. They will be able to actively participate in relevant professional forums.</p>	
Teaching and learning methods	5 SWS e-learning, exercises, self-study	
Prerequisites for participation	<p>Knowledge of tropical forestry from various disciplines, regions, and cultures (bachelor's level).</p> <p>References: IPCC (2014) Fifth Assessment Report. Intergovernmental Panel on Climate Change (IPCC). Available online at www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.</p>	
Availability	This module is a required course in the Sustainable Tropical Forestry specialization track of the Tropical Forestry master's program.	
Requirements for earning credits	Credits are awarded upon passing the module exam. The exam consists of an e-learning assignment (180 minutes).	
Credits and Grades	A total of 7 credits can be earned through this module. The module grade corresponds to the grade of the e-learning assignment.	
Frequency of the module	The module is offered every summer semester.	

Workload	The total workload is 210 hours. Of these, approximately 75 hours are spent attending classes and approximately 135 hours on self-study, including exam preparation and taking the exam.
Duration of the module	The module spans one semester.

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Module number	Module Name	Instructor
FOMS 2.1	Research Planning	Prof. Dr. J. Pretzsch
Content and Learning Objectives	<p><u>Content</u>: Structure and requirements of a research proposal in the field of natural resource management, including a literature review with a critical assessment of the reviewed material, hypotheses or research questions, a conceptual framework, and the methods to be applied. Relevant risks and ethical considerations, as well as the scientific merit of the literature and research proposals.</p> <p><u>Learning Outcomes</u>: Students can assess the quality of research proposals and engage in critical thinking and sound argumentation within an academic discipline. They can apply principles for the appropriate design of sound research projects, including the critical discussion of literature, problem identification, formulation of hypotheses and research questions, data requirements, and selection of methods. They demonstrate the ability to learn independently as a foundation for lifelong learning and are able to creatively solve scientific problems through systematic research. In doing so, they demonstrate the competencies and key qualifications necessary for a scientific career, as well as the ability to work independently and in a team.</p>	
Teaching and Learning Methods	4 SWS seminar 4 hours per week e-learning exercise and self-study	
Requirements for participation	<p>Knowledge of tropical forestry and development policy (bachelor's level).</p> <p>References: Angelsen, A. et al. (eds.) (2011) Measuring Livelihoods and Environmental Dependence: Methods for Research and Fieldwork. Earthscan, London, Washington.</p>	
Availability	This module is a required module in the Sustainable Tropical Forestry specialization track of the Tropical Forestry master's program.	
Requirements for awarding credit points	Credits are awarded upon passing the module exam. The module exam consists of a field report (20 hours), a written report (20 hours), and a research plan (125 hours).	
Credits and Grades	A total of 10 credits can be earned through this module. The module grade is calculated as the weighted average of the grades for the assessment components, weighted as follows: Protocol 20%, Report 20%, Research Plan 60%.	

Frequency of the module	The module is offered every winter semester.
Workload	The total workload amounts to 300 hours. Of these, approximately 120 hours are spent attending classes, and approximately 180 hours are devoted to self-study, including exam preparation and taking the exams.
Duration of the module	The module spans one semester.

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Appendix 2

Study Plan for Students Selecting the Tropical Forestry and Management Specialization

with the type and scope of courses in SWS as well as required components, the nature, scope, and structure of which can be found in the module descriptions

Module No.	Module Name	1st Semester	2nd Semester	3rd semester	4th semester	Credit Hours
		L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	
FOMT 1.1	Climate and Ecology of the Tropics	2.5/2/1/0/0/0 2xPL				7
FOMT 1.2	Forest-Related Development Policy and Forest Culture	3.5/2/1.5/0/0/0 2xPL				9
FOMT 1.3	Urban Tree Management in the Tropics	3/2/1.5/0/0/0 1-day ex- , 2xPL				8
FOMT 1.4A	Forest Use and Product Chains	3/2/1/0/0/0 2xPL				7
FOMT 1.4B*	Inventory and Assessment of Forest Resources	2.5/0/3/0/0/0 2xPL				
FOMT 1.5	Economics and Management of Forest Resources		2/1.5/2/0/0/0 1xPL			7
FOMT 1.6	Organization and Operating Systems		2/2/0.5/0/0/0 1.5 days Ex 2xPL			8
FOMT 1.7	Vegetation and Soil Management in Watersheds		2/2/0/1.5/0/0 0.5 days Ex 2xPL			7
FOMT 1.8A	Silviculture and Biodiversity Conservation in Tropical Natural Forests		3/2/1.5/0/0/0 2xPL			7
FOMT 1.8B*	Silviculture in Forest Plantations and Agroforestry in the Tropics		3/2/1.5/0/0/0 2xPL			
FOMT 2.1	Research Design and Planning			4/3/0/0/1/0 2xPL		10
FOMT 2.2	Planning at the project and landscape levels			3/2/0/1.5/0/0 2xPL		8
FOMT 2.3A	Modeling			1/0/1.5/0/0/1 2xPL		5
FOMT 2.3B*	Communication and Conflict Management			2/1/0/1/0/0 2xPL		

Module No.	Module Name	1st Semester	2nd semester	3rd semester	4th semester	Credit Hours
		L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	
FOMT 2.4A	Management Systems and Restoration in Tropical Natural Forests			3/2/0.5/0/0/0 1 day Ex 2xPL		7
FOMT 2.4B*	Management Systems for Forest Plantations and Landscape Rehabilitation landscape in the tropics			3/2/0.5/0/0/0 1 day Ex 2xPL		
					Master's thesis and colloquium	30
credits		31	29	30	30	120

* alternatively, depending on the selected elective module (1 of 2)

V Lecture
 S Seminar
 P Practicum
 P Project work
 T Tutorial

eL e-Learning Exercise
 PL Exam(s) Ex Field trip
 LP Credits

Study Plan for the Sustainable Tropical Forestry Specialization

including the type and scope of courses in lectures and seminars, as well as the required coursework, the type, scope, and structure of which can be found in the module descriptions

Module No.	Module Name	1st Semester	2nd Semester	3rd semester	4th semester	Credit Hours
		L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	
FOMT 1.2	Forest-related development policy and forest culture	3.5/2/1.5/0/0/0 2xPL				9
FOMS 1.1	Preparation for Fieldwork in the Tropics	0/0/0/0/0/6 2xPL				8
FOMS 1.2	Summer School	10 days P 2 days Ex 2xPL				7
FOMT 1.4A	Forest Use and Product Chains	3/2/1/0/0/0 2xPL				7
FOMT 1.4B*	Inventory and Assessment of Forest Resources	2.5/0/3/0/0/0 2xPL				
FOMS 1.3	Climate Change and Tropical Forestry		0/0/0/0/0/5 1xPL			7
FOMT 1.6	Organization and Operating Systems		2/2/0.5/0/0/0 1.5 days Ex 2xPL			8
FOMT 1.5	Economics and Management of Forest Resources		2/1.5/2/0/0/0 1xPL			7
FOMT 1.7*	Management of Vegetation and Soil in Watersheds		2/2/0/1.5/0/0 0.5 days Ex 2xPL			
FOMT 1.8A	Silviculture and Biodiversity Conservation in natural tropical forests		3/2/1.5/0/0/0 2xPL			7
FOMT 1.8B*	Silviculture in forest plantations and ag-Agri-forestry in the tropics		3/2/1.5/0/0/0 2xPL			
FOMS 2.1	Research Planning			0/4/0/0/0/4 3xPL		10
FOMT 1.3	Urban Tree Management in the Tropics			3/2/1.5/0/0/0 1 day Ex 2xPL		8

FOMT 2.3A	Modeling			1/0/1.5/0/0/1 2xPL		5
FOMT 2.3B*	Communication and Conflict Management			2/1/0/1/0/0 2xPL		
Module No.	Module Name	1st Semester	2nd semester	3rd semester	4th semester	Credit Hours
		L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	L/S/P/T/eL	
FOMT 2.4A	Management Systems and Restoration in Tropical Natural Forests			3/2/0.5/0/0/0 1 day Ex 2xPL		7
FOMT 2.4B*	Management Systems for Forest Plantations and Landscape Rehabilitation in the Tropics			3/2/0.5/0/0/0 1 day Ex 2xPL		
					Master's thesis and colloquium	30
credits		31	29	30	30	120

* alternatively, depending on the selected elective module (1 of 2)

V Lecture
 S Seminar
 P Practicum
 P Project work
 T Tutorial

eL e-Learning Exercise
 PL Exam(s) Ex Field trip
 LP Credit points