
Teaching and Research Remits

Environmental Sciences Group

Part of the Wageningen University Chair Plan 2019-2022

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This is an annex to the Chair Plan of 2019-2022 of Wageningen University & Research with the teaching and research remits of all ninety-four regular chairs of Wageningen University standardized and collected between 2020 and 2021.

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1 Introduction

In the teaching and research remit the chair's specific domain is described within the framework of the mission and objectives of Wageningen University & Research (WUR). With this specific scientific domain the chair holder leads and directs the chair group. According to Article 18 of the WU Administrative and Management regulations for each regular chair teaching¹ and research remits should be formulated and centrally documented in the Chair Plan.²

This document is a collection of the standardized teaching and research remits of all ninety-four regular chairs and forms an annex to the Chair Plan of 2019-2022.

The teaching and research have been categorized by department and displayed in alphabetical order lead by their acronym. The teaching and research remits contain the name of the chair holder; the acronym, the English and when applicable the Dutch name of the chair; a summary of the remit; a description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair; and a description of the remit regarding teaching, research and value creation.

¹ Regular chairs are chairs with a chair holder. Personal, special and endowed chairs are embedded in a regular chair.

² WU Administrative and Management regulations Article 18

2 Environmental Sciences Group

2.1 Teaching and research remit Aquatic Ecology and Water Quality Management (AEW)

Chair holder: Prof. Bart Koelmans

1	<i>Name of the chair group (in English and Dutch)</i>	Aquatic Ecology and Water Quality Management (AEW) / Aquatiscche Ecologie en Waterkwaliteitsbeheer
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	AEW aims to generate novel insights that can help preserving and restoring marine and freshwater ecosystem services. Methodology of research is a systems approach linking physical, chemical and biological processes across scales.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The multidisciplinary research approach and the aim to develop state-of-the-art modelling and techniques solving the great challenges caused by e.g. globalisation and climate change, fit in the domain and strategy of WU.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The research focuses on the physical, chemical and biological processes occurring in aquatic ecosystems. The main goal is to develop new knowledge and better instruments for restoration and management of these ecosystems.</p> <p>The research is multidisciplinary (environmental engineering, environmental chemistry and aquatic ecology) and ranges from the laboratory scale (detailed process studies) to the scale of actual ecosystems (field studies). The multidisciplinary expertise of the team comes together in the development of integrated models for ecosystem and water quality management. The research approach thus is quantitative with a strong emphasis on state-of-the-art statistical and modelling techniques. Three main areas of research are identified:</p> <ul style="list-style-type: none"> • transport and fate of micropollutants and nutrients; • effects of pollution, exploitation and climate on the functioning of aquatic ecosystems; • resilience and critical transitions in aquatic and other complex non-linear systems.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.2 Teaching and research remit Environmental Systems Analysis (ESA)

Chair holder: Prof. Rik Leemans

1	<i>Name of the chair group (in English and Dutch)</i>	Environmental Systems Analysis (ESA) / Milieusysteemanalyse
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	Environmental systems analysis is a quantitative and multidisciplinary research field aimed at analysing, interpreting, simulating and communicating complex environmental problems from different perspectives.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Exploring, modelling and communicating environmental problems and their causes, mechanisms, effects and potential solutions, by combining multi- and transdisciplinary research and by integrating knowledge from natural, social and engineering sciences.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The research combines ecological, economic, technological and policy perspectives in order to develop new insights into the causes, effects and potential solutions to complex environmental issues. All research is related to environmental change and sustainability comprising three specific fields: climate change, pollution and nutrients, and ecosystem services and biodiversity.</p> <p>Research approaches and tools include:</p> <ul style="list-style-type: none"> • appraisal tools for ecosystem functions, services and their valuation; • models integrating different components, dimensions and scales; • decision support systems for integrated pollution and/or ecosystem management; • integrated environmental assessments with special emphasis on participatory methods; • methods for analysing and communicating uncertainty. <p>These tools are applied to further assess and develop policies and management options, and to provide input for national and international decision-making processes.</p>
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2.3 Teaching and research remit Forest Ecology and Forest Management (FEM)

Chair holder: Prof. Douglas Sheil

1	Name of the chair group (in English and Dutch)	Forest Ecology and Forest Management (FEM) / Bosecologie en Bosbeheer
2	Brief summary of the (teaching and research) remit in max 35 words	FEM aims to understand the structure and functioning of forest ecosystems and their responses to changing environmental, biotic and social conditions, and to apply this knowledge for the development of sustainable forest resource use systems.
3	Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words	FEM's mission is to understand the growth of trees and forests in relation to site and climate, and to apply this knowledge in support of sustainable forest management aimed at provision of ecosystem services.
4	Concise description of the remit regarding teaching, research and value creation, max 150-200 words.	<p>FEM research is conducted across a range of spatial and temporal scales and in both temperate and tropical forests, involving a wide range of organisational levels: from cell, individual tree, population, species, forest, landscape to global scales. This allows scaling up from detailed eco-physiological observations to large scale patterns, but also to scale down.</p> <p>The research approach is interdisciplinary, and increasingly transdisciplinary, where the group combines field observations with experiments (field and greenhouse), (wood) laboratory analyses, tree and forest models and scenario analyses. The group also works on socio-ecological systems and explicitly works with non-academic stakeholder groups.</p> <p>Expertise includes ecophysiology, wood anatomy, tree-ring research, tree and forest modelling, forest ecology, forest management, agroforestry, and social ecological systems, where forest biomes under investigation range from temperate to tropical, from natural to production, agroforestry systems, and forests in human modified landscapes.</p> <p>The research is both fundamental and applied and centred on three main themes:</p> <ul style="list-style-type: none"> • ecology of forests in a changing world; • understanding biodiversity and functional diversity in relation to resource gradients; • sustainable supply of forest resources and environmental services.
5	Date of adoption of this description (decision of the EB) (only for filing purposes)	8 November 2021

2.4 Teaching and research remit Forest and Nature Conservation Policy (FNP)

Chair holder: Prof. Georg Winkel

1	Name of the chair group (in English and Dutch)	Forest and Nature Conservation Policy (FNP) / Bos- en Natuurbeleid
2	Brief summary of the (teaching and research) remit in max 35 words	FNP focuses on the political, socio-economic and cultural dimensions of forests and nature. It covers themes such as deforestation, forest transitions, climate change, biodiversity conservation and landscape management in the global North and South.
3	Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words	Understanding and finding solutions for nature and forest policies to global challenges such as deforestation, forest transitions, climate change and biodiversity loss.
4	Concise description of the remit regarding teaching, research and value creation, max 150-200 words.	<p>The research focuses on the policy of forest and nature conservation from global to local scales, covering four interrelated themes:</p> <ul style="list-style-type: none"> • forest and nature conservation governance; • the role of power and knowledge in policymaking; • human-nature interactions, including people's experiences and values of nature; • management, forest value chains and markets with a focus on natural resource management and the role of business actors. <p>FNP has a diverse composition and orientation. Theoretically, the group engages amongst others with institutional, governance and political theory, international relations theory, environmental sociology, science and technology studies, and political ecology. Mainly, a practice-based approach is advanced that is committed to investigating how specific institutions, actors, and discourses, and other interventions produce effects. FNP employs a mix of social science approaches, with some emphasis on qualitative and interpretative methodologies.</p> <p>FNP's research is strongly rooted in the social sciences, but also benefits from interdisciplinary collaboration with natural and environmental sciences, to understand the various social and environmental dimensions and consequences of forest and nature conservation policies and practices. The focus of analysis is on actual forest and nature conservation practices, which enhances the relevance and impact of the research.</p>
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2.5 Teaching and research remit Cultural Geography (GEO)

Chair holder: Prof. Edward Huijbens

1	<i>Name of the chair group (in English and Dutch)</i>	Cultural Geography (GEO) / Culturele Geografie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	GEO is committed to social theory in all its spatial articulations. The group advances creative, critical-constructive scholarship through exploring the ecological and social challenges facing all life on earth.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	GEO offers socio-spatial and socio-cultural perspectives on core themes of WUR: the environment, development and well-being, including landscape governance and identity; sustainable tourism, leisure and heritage practices and landscapes; mobility, migration and social integration.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>Interdisciplinarity is at GEO's core. Research and education build on an interdisciplinary approach and on diverse expertise backgrounds of staff, from human geography, sociology, anthropology, archaeology, social psychology, gender studies, and science and technology studies. GEO encompasses both theoretical and empirical work. Qualitative approaches are used as well as quantitative methods.</p> <p>GEO has consolidated its strong focus on landscape studies and tourism, leisure and mobility studies, but has also incorporated more recent work on the politics of life. The group's research may be broadly identified with the following three main themes, with a strong emphasis on the first two:</p> <ul style="list-style-type: none"> • space, place and landscape; • tourism, society and the environment; • politics of life.
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2.6 Teaching and research remit Remote Sensing (GRS)

Chair holder: Prof. Alexander Klippel

1	<i>Name of the chair group (in English and Dutch)</i>	Remote Sensing (GRS)
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	Remote sensing deals with quantitative, physical and statistical retrieval of land surface parameters relevant for multiple monitoring applications and earth system modelling.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	To find answers and solutions to global environmental challenges, research and improvement of spatial competences is essential.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The chair advances foundations for quantitative land remote sensing and improves in-situ data collection and analysis for development, calibration and validation of the next generation remote sensing data and products. Particular attention is paid to the use of innovative in-situ and laboratory-based measurements, unmanned airborne vehicles, radiative transfer models, vegetation indices, data assimilation methods, linking soil-vegetation-atmosphere transfer models, soil spectroscopy and calibration and validation procedures. Scientific research is underpinned by long-term expertise in using advanced earth observation techniques (i.e. imaging spectroscopy and LIDAR) in combination with ecological and dynamic vegetation models for applications. Some examples are biodiversity assessment at habitat and ecosystem level, assessing vegetation characteristics and carbon stocks and combining sensing techniques with crop growth models for precision farming.</p> <p>Dedicated research activities are ongoing in the real-time monitoring of global deforestation and forest degradation, precision agriculture, tracking of forest carbon, land use change and greenhouse gas emissions, remote sensing support for ecological modelling, and mapping and assessment of soil properties.</p>
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2.7 Teaching and research remit Geo-information Sciences (GRS)

Chair holder: vacant

1	<i>Name of the chair group (in English and Dutch)</i>	Geo-information Sciences (GRS) / Geo-informatiekunde
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The group researches and educates in geo-information science, big data analytics, and human-space interactions in thematic domains such as agro-environmental applications and/or smart cities.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The work contributes to improving spatial competences for a sustainable world, and to WUR's strategic themes such as resource use efficiency, resilience, metropolitan solutions, and big data technologies and methodologies.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The overall scope is to conduct fundamental research in the field of geo-information science related to, e.g.: <ul style="list-style-type: none"> • the uptake of evolving geo-information technologies and methods in innovative research; • improving spatio-temporal (big) geo-data analysis (incl. error estimation); taking advantage of multi-source data; • developing novel approaches for assessing land (use) dynamics on different scales, and work towards their integration in interdisciplinary research, models and applications; • foster understanding, exploration, and prediction of human behaviour in our environment; • increasing the role of geo-information in management of land resources, and enhance the adaptability of agro-environmental communities.
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2.8 Teaching and research remit Hydrology and Quantitative Water Management (HWM)

Chair holder: Albert van Dijk

1	<i>Name of the chair group (in English and Dutch)</i>	Hydrology and Quantitative Water Management (HWM) / Hydrologie en Kwantitatief Waterbeheer
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	HWM aims to contribute to the improved understanding of catchment-scale hydrological processes through advanced measurement, modelling and assimilation techniques.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Climate change, land-use change and other human influences have a substantial effect on the water balance of catchments, and therefore need to be understood to cope with changes and enable sustainable use.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	The research focuses on catchment-scale hydrological processes and river basin water management. With respect to hydrology, special emphasis is put on the development of physically-based and conceptual models of surface and subsurface flow processes to examine the hydrological system and its component processes and to study the effects of climate change, land-use change and other human influences on the water balance of catchments. Spatial information technology, such as remote sensing and geographic information systems, are essential tools in this field. To improve model calibration and validation procedures and to improve on-line and off-line simulation performance advanced (geo-)statistical data mining techniques are being studied and applied. Central in this research are mathematical tools, such as neural networks, non-linear optimization procedures, disaggregation techniques and data assimilation. HWM uses these models and techniques to study floods and droughts in river basins. Another main theme of research is river hydraulics and morphology as an element of hydrological modeling and to support sustainable river and land management planning. Theoretical developments are tested in a fully-equipped laboratory.
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2.9 Teaching and research remit Landscape Architecture (LAR)

Chair holder: Prof. Sanda Lenzholzer

1	Name of the chair group (in English and Dutch)	Landscape Architecture (LAR) / Landschapsarchitectuur
2	Brief summary of the (teaching and research) remit in max 35 words	LAR studies how the landscape has originated, its present condition, and functional and sustainable future perspectives. Special attention is paid to sustainability, metropolitan areas, intertwining of urban and rural areas, and planning.
3	Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words	In Wageningen / At WUR landscape architecture is characterized by a thorough tradition of connecting physical landscape genesis with anthropogenic land use, paying special attention to the countryside and the role of landscape in urbanization processes.
4	Concise description of the remit regarding teaching, research and value creation, max 150-200 words.	<p>The scientific scope of the LAR chair is to formulate theories and development of landscape architecture by designing methods aimed at sustainability on a regional scale, in metropolitan areas and the large-scale public space.</p> <p>This is done along three methodological approaches in interdisciplinary, multidisciplinary and transdisciplinary collaboration:</p> <ul style="list-style-type: none"> • research <i>on</i> design covering the study of finished products, critical project analysis and other reflections on design products; • research <i>for</i> design encompassing the research that informs the making of design decisions; • research <i>through</i> design providing knowledge, embodied in the form of new artefacts. <p>The chair focuses on the following societally relevant topics:</p> <p>energy transition, sustainable water management, rural transformations, urban climate, built environment and public space, the new Dutch Environment and Planning Act.</p> <p>Special attention is paid to the balance between results of research in a traditional scientific sense and results that have weight in the evaluation systems of designing disciplines.</p>
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2.10 Teaching and research remit Land Use Planning (LUP)

Chair holder: Prof. Martha Bakker

1	<i>Name of the chair group (in English and Dutch)</i>	Land Use Planning (LUP) / Ruimtelijke planning
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	LUP develops knowledge and expertise, and teaches on spatial planning and accompanying legislative and financial instruments that contribute to deliberate modifications of landscapes.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The societal challenges explored include climate adaptation, transitions in the countryside, and urban developments. Many of these challenges are manifested within landscapes that require comprehensive planning and design solutions.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The research topics of LUP include climate adaptation of metropolitan deltas, rural revitalization, the energy transition, landscape quality, and rural-urban migration. Addressing these topics has to consider a clear spatial dimension, as problems typically arise from a particular spatial distribution of water, nutrients, people, capital, power, etc. LUP analyses planning practices and processes that can contribute to more favourable spatial distributions, and critically reflects on them in terms of effectiveness (in terms of landscape quality), efficiency, legitimacy, justice, and practicability. Spatial planning - as a scientific discipline - is considered as the study of both processes of planning and objects of planning. LUP has a fairly strong focus on the latter, i.e. the landscape. Moreover, it has a specific focus on landscapes that are a mix of agricultural and semi-natural and urbanized areas.</p> <p>Typical for the Wageningen approach to planning is the strong integration between the following three research dimensions:</p> <ul style="list-style-type: none"> • the landscapes, including the processes by which they are shaped and the services they provide; • the study of (government) decision making, e.g. top-down or bottom-up, technocratic or participatory; • the instruments available for making the actual modifications, ranging from land policy instruments to physical modifications.
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2.11 Teaching and research remit Air Quality and Atmospheric Chemistry (MAQ)

Chair holder: Prof. Maarten Krol

1	<i>Name of the chair group (in English and Dutch)</i>	Air Quality and Atmospheric Chemistry (MAQ) / Luchtkwaliteit en Atmosferische Chemie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	Research and teaching comprises: <ul style="list-style-type: none">• chemistry of the atmospheric boundary layer;• earth surface exchange processes of trace gases and air pollutants (atmosphere-biosphere interactions).
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Knowledge and understanding of the atmosphere and its relevance for weather, climate and air, are part of the fundamentals to improve the quality of life.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	Many social questions about climate change, greenhouse gases, acidification and eutrophication of ecosystems, particulate emissions, and human health all have a common ground with air quality. In many densely populated regions, as in the Dutch delta, urban air quality is regularly brought under discussion. The chair MAQ provides basic disciplinary knowledge of air quality on local, regional, continental and global scales (processes, measurements and models); the implications of atmospheric chemistry for atmospheric radiation; and basic and policy-relevant knowledge of the relationship between air quality and health. This knowledge is important for: <ul style="list-style-type: none">• understanding air pollution;• the interaction between meteorology and air pollution;• model-based conversion of emission to concentration;• interpretation of satellite data. <p>Emissions are converted to atmospheric concentrations, and further to exposure of individuals to air pollution, and finally to health effects and the effect of mitigating measures. In addition, technological developments in sensors and satellites are currently enabling the mapping of air quality with more detail, including the scale on which people live. Finally, there is an increasing demand for applied and interdisciplinary research in the field of air quality, interconnecting with themes such as sustainable urban development.</p>
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2.12 Teaching and research remit Meteorology (MAQ)

Chair holder: Prof. Jordi Vilà-Guerau de Arellano

1	<i>Name of the chair group (in English and Dutch)</i>	Meteorology (MAQ) / Meteorologie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	The chair focuses on atmospheric/tropospheric research to providing answers to current and future societal demands such as how atmosphere-land processes influence extreme weather events, and their potential for enhancement due to climate change and natural/urban landscape modifications.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Meteorology chair's mission is to advance knowledge and educate students on the fundamental principles and applications of weather and climate sciences, and to relate them to the WUR core themes (food production, artificial intelligence).
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The core of the chair's research is boundary-layer meteorology and land-atmosphere interactions under a wide range of weather and climate conditions. Research on the understanding of the surface energy balance and atmospheric processes such as turbulence, radiation, and clouds must address challenges driven by global warming and by the rise in greenhouse gas concentrations. This fundamental knowledge is transferred to improve weather and climate model representations (parameterization). This know-how enables the chair to play an active role in meteorological topics that influence air quality, urban/rural environments, and agrometeorological research.</p> <p>The chair uses an extensive set of methodologies that combine theoretical studies, modelling and observations. It develops and maintains a comprehensive hierarchy of numerical atmospheric models, ranging from numerical simulation techniques that explicitly solve turbulence, to urban and regional scales. Conceptual models are also developed with a view to building bridges between theoretical and numerical findings, and experimental field campaigns related to land-atmosphere interactions. The chair maintains a weather station, where new instrumental techniques are developed and tested. The instruments and experimental strategy are extended to urban areas by deploying a dense network of weather stations completed by mobile platforms.</p>
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2.13 Teaching and research remit Plant Ecology and Nature Conservation (PEN)

Chair holder: Prof. David Kleijn

1	<i>Name of the chair group (in English and Dutch)</i>	Plant Ecology and Nature Conservation (PEN) / Plantenecologie en Natuurbeheer
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	PEN studies and teaches the processes and underlying mechanisms that link biodiversity, ecosystem functioning and service delivery and aims to implement these insights in the design of effective biodiversity conservation strategies.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The work of PEN is in the heart of the WUR domain Natural Resources & Living Environment and is key to the research theme Nature-inclusive and Landscape.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	PEN examines the impact of land-use change and climate change on biodiversity and the links between biodiversity, ecosystem functioning and the delivery of ecosystem services and public goods. These insights are used to design more effective conservation strategies and to inform policy makers and the general public. Research is carried out on a range of spatiotemporal scales using a variety of study systems but firmly rooted in plant ecology. PEN explores whether the mechanisms underlying biodiversity-ecosystem functioning relations, as identified in experimental plant communities at the plot level, can explain the relations between biodiversity and delivery of ecosystem services and public goods on the landscape scale in natural ecosystems (including tundra, peat bogs and savannah) as well as in agricultural landscapes.
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2.14 Teaching and research remit Soil Biology (SBL)

Chair holder: Prof. Rachel Creamer

1	<i>Name of the chair group (in English and Dutch)</i>	Soil Biology (SBL) / Bodembioogie
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	SBL regards soil life as key to sustainable (agro)ecosystems. Soil biologists study the role of soil organisms in element (carbon, nutrient) transformations in soils. Research themes are: fertile soils; soil functional biodiversity; soils and climate change.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	SBL's research aims at sustainable soil use and increased biodiversity. Thereby it contributes to the WUR domains Natural Resources & Living Environment and Food, Feed & Bio-based Production.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	SBL studies the role of the soil biota in ecosystem processes on a range of scales: from the life in a soil ped ???to the role of soil biota in climate change on a global scale. The mission is to use soil processes driven by soil biota to develop and maintain sustainable agro-ecosystems. Soil biota being studied are earthworms, enchytraeids (potworms), microarthropods, nematodes, fungi, bacteria and archaea. Research is classified in four main lines that are interconnected: <ul style="list-style-type: none"> • the role of soil biota in nutrient cycling to enhance plant soil interactions and associated ecosystem services; • the richness and community composition of soil biota coupled with soil functions (nutrient provision, carbon management, pest and disease resilience and resistance, water regulation and purification) in (agro)ecosystems; • how soil and land management can enhance soil health and the beneficial soil functions provided by soil biota; • the effects of climate change on soil life, and the controls that soil life exerts on greenhouse gas emissions from the soil.
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2.15 Teaching and research remit Soil Geography and Landscape (SGL)

Chair holder: Prof. Jakob Wallinga

1	<i>Name of the chair group (in English and Dutch)</i>	Soil Geography and Landscape (SGL) / Bodemgeografie en Landschap
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	SGL improves and shares understanding of soil patterns and landscape dynamics. The chair takes an integrative approach that combines biophysical and human elements to gain insight into past, present and future system dynamics, and to support sustainable land management.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Through the understanding of soil patterns and landscape dynamics which includes biophysical and human elements, SGL aims to support sustainable land management.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>The research and projects of SGL are focused on issues that have a well-defined place within a research chain, reaching from problem identification - in close interaction with stakeholders and specialists from other disciplines - to generation of answers. It ranges from fieldwork, to scenarios and modelling. The following elements may be distinguished in the chain:</p> <ul style="list-style-type: none"> • developing quantitative methods for obtaining soil patterns on different scales, using expert knowledge, remote sensing, GIS, and geostatistics; • interpretation in space and time of soil patterns and corresponding soil properties on different scales; • interpretations in the context of land evaluation, focusing on soil and water quality and the sustainability of land utilization types. <p>Research is grouped in the themes:</p> <ul style="list-style-type: none"> • crop growth and vegetation development; • genetic resources and diversity; • sustainable production and conservation systems; • methodological links; <p>The mission is to contribute to the development of alternative land use types which preserve soil quality and are sustainable. Basic research in this context is focused on the question as to which soil data are needed in the interdisciplinary analysis of sustainability, and how existing soil data can be used to derive unavailable but required data by pedo-transfer functions.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.16 Teaching and research remit Soil Physics and Land Management (SLM)

Chair holder: Prof. Coen Ritsema

1	<i>Name of the chair group (in English and Dutch)</i>	Soil Physics and Land Management (SLM) / Bodemfysica en Landgebruik
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	SLM's research addresses soil physical and hydrological processes on different temporal and spatial scales, and their central role in sustainable land and water management, with specific attention to flow and transport processes.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	SLM advances understanding the impacts of land use and management on soil physical processes and related ecosystem functions essential for addressing global societal challenges of water and food security, sustainable land management, and climate adaptation.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>SLM develops and advances both fundamental and applied knowledge of soil physics and land management and the research skills of future scientists, through focussing its research on the interactions between land use and management and soil physical processes using innovative approaches that link different disciplines and engage stakeholders. The objective is to study transport processes of water, sediment and solutes over and through soils, particularly in relation to land use and management practices and how these affect soils, groundwater, crops, vegetation and related ecosystem services and stakeholders.</p> <p>Research comprises three areas:</p> <ul style="list-style-type: none"> • <i>soil physics</i>: flow of water and transport of heat, sediment and solutes; • <i>ecohydrology</i>: soil-water-plant interactions; • <i>land use and management</i>: factors affecting soil degradation, conservation and restoration. <p>Research activities vary from field and laboratory experiments, to detailed process and modelling studies, to scenario and impact assessment studies at watershed level. This knowledge is used to explore, design, test and evaluate promising innovative practices and strategies for sustainable land management, often in close collaboration with (local) stakeholders and with the aim to prevent and remediate soil degradation problems worldwide. Upscaling and downscaling of these processes and innovative practices in time and space are important elements.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.17 Teaching and research remit

Soil Chemistry and Chemical Soil Quality (SOC)

Chair holder: Prof. Rob Comans

1	<i>Name of the chair group (in English and Dutch)</i>	Soil Chemistry and Chemical Soil Quality (SOC) / Bodemscheikunde en Chemische Bodemkwaliteit
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	SOC studies the characterization of soil particles (DOM, Fe-oxides) and speciation of compounds in the soil by fundamental research and by more practically motivated studies.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	Knowledge of soil chemistry and the chemical soil quality is essential for e.g. food production, soil biodiversity, and groundwater quality.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	Chemical substances as nutrients and contaminants interact with reactive soil particles, e.g. with organic matter, clay, iron oxide and aluminium and iron hydroxide. This will affect their bioavailability and mobility in the soil. Soil particles also interact with each other, for example, organic matter adsorbs onto iron hydroxide. This affects soil structure (formation of soil aggregates) and ion binding (competition effects). SOC's research includes the following topics: <ul style="list-style-type: none"> • multi-surface adsorption modelling of cations and anions on organic matter, clay and iron oxides; • dose-response relationships: heavy metals, such as copper, show a strong soil type and pH dependency; • adsorption of ions (heavy metals, phosphate, arsenate, etc.) on iron oxides; • binding of cations (heavy metals, calcium) on organic matter; • binding of cations on clays; • binding of organic matter molecules such as fulvic or humic acid, onto iron oxides; • new method for measuring free ion concentrations.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.18 Teaching and research remit Wildlife Ecology and Conservation (WEC)

Chair holder: Prof. Frank van Langevelde

1	<i>Name of the chair group (in English and Dutch)</i>	Wildlife Ecology and Conservation (WEC) / Wildlife-ecologie en -beheer
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	WEC offers insights into the densities and distributions of animals, and the interactions between animals and the biotic and abiotic components of their environments.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	With its focus on wildlife ecology and conservation in both natural and human-dominated areas, the chair contributes to sustainable use of our planet's resources.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>WEC studies how changing environments affect wildlife densities, distributions, and interactions. The group focuses on changes in food availability, predators, pathogens, land use, and climate, and the effects are examined in the context of evolutionary fitness and ecological resilience. WEC embraces observational, comparative, experimental, and theoretical studies, which typically have a large field component. Investigations focus on a range of study systems, spanning from the individual level to the ecosystem level. The group primarily addresses fundamental scientific challenges, but also contributes to the application of this knowledge to advance evidence-based wildlife conservation and other applied fields including agriculture, forestry, spatial land use planning, and public health.</p> <p>WEC's topics include the densities and distributions of large herbivores, interactions between large herbivores and the plants they eat, the spread of infectious diseases by wildlife hosts, and the influence of global change on population and ecosystem resilience. These form the core of WEC's interdisciplinary projects within an international context. Furthermore, the group integrates advancements in sensor technology and big data analytics to track animals, measure physiological parameters, quantify population dynamics, and monitor ecological resilience. These and other novel approaches will help to advance fields beyond wildlife ecology, including conservation science.</p>
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.19 Teaching and research remit Water Resources Management (WRM)

Chair holder: Prof. Petra Hellegers

1	<i>Name of the chair group (in English and Dutch)</i>	Water Resources Management (WRM)
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	WRM is engaged in interdisciplinary research and education at the intersection of water, technology and society. The field of study is integrated water resource management and governance questions in the developing world, and increasingly in the developed world.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	The overall mission is to improve water and food securities, by paying particular attention to water-based forms of social vulnerability, which is an important part of the WUR domain.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>Central questions are how patterns of allocation and use of water can be explained as the combined outcome of technological choices, socio-ecological dynamics and cultural-political processes. WRM's research questions always reflect a combination of the following principles:</p> <ul style="list-style-type: none"> • commitment to contributing to equity, democracy and sustainability of water management; • socio-technical approach to study how water management practices, policies and discourses are shaped by the interplay of multiple perspectives: socio-political, technological and physical processes; • spatial, temporal and organizational scales of analysis to study how water issues are shaped and linked across multiple scales in order to better understand tensions that occur. <p>The research is grouped in three themes:</p> <ul style="list-style-type: none"> • <i>water and technology</i>: effects of technologies on water users, water use efficiencies and productivities for various spatiotemporal scales of analysis; • <i>water in global food trade</i>: local water implications and conflicts of global food and biofuels trade, foreign direct investments and corporate farming; • <i>the politics of water expert knowledge</i>: class, ethnic and gender inequalities embedded in and reproduced by water governance forms, water policies, water development and allocative interventions and water knowledge production.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

2.20 Teaching and research remit Water Systems and Global Change (WSG)

Chair holder: Prof. Carolien Kroeze

1	<i>Name of the chair group (in English and Dutch)</i>	Water Systems and Global Change (WSG)
2	<i>Brief summary of the (teaching and research) remit in max 35 words</i>	WSG aims to improve the understanding of anthropogenically driven changes in water cycles in relation to interactions between climate, water, energy and agricultural systems.
3	<i>Brief description of the way the domain of the chair fits in the domain and mission of Wageningen University and the societal importance of the chair in max 35 words</i>	WSG wants to create new knowledge to contribute to sustainable water systems in a changing global environment, aimed at providing sufficient, clean and climate-proof water for society and nature.
4	<i>Concise description of the remit regarding teaching, research and value creation, max 150-200 words.</i>	<p>WSG performs integrated assessments of water systems, in which knowledge on water systems and global change is integrated. To this end, a variety of models and observations is used. WSG combines modelling analyses with participatory approaches. The water assessments focus on the effect of changing global drivers on water systems; adaptation and mitigation strategies, comprising novel approaches such as adaptive water management and ecosystem-based adaptation; and climate-water services. WSG thus takes an integrated approach across the water, food and energy systems, at multiple spatial and temporal scales.</p> <p>Research is grouped in four main lines:</p> <ul style="list-style-type: none"> • land-water-climate interaction; • water pollution assessment; • adaptive planning and design; • water-food-energy nexus. <p>Besides, there are two cross-cutting themes:</p> <ul style="list-style-type: none"> • climate-water information services, to develop science-based climate and water services, tailored to the needs and in interaction with users such as farmers, power companies and water managers; • future water stress, to develop novel tools to identify and evaluate solutions for future water stress. These tools account for the demand for water by society and nature, the availability of water, and the quality of water. This is studied this on the basin, regional, continental and global scales, in spatially explicit models.
5	<i>Date of adoption of this description (decision of the EB) (only for filing purposes)</i>	8 November 2021

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The mission of Wageningen University & Research is "To explore the potential of nature to improve the quality of life". Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 6,500 employees (5,500 fte) and 12,500 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.