



Africa: sustainable soil, crop and land management from farm to regional scales



AGRO-ECOLOGICAL INTENSIFICATION OF AGRICULTURAL SYSTEMS IN THE AFRICAN HIGHLANDS



At the IITA, research is conducted to improve interactions between soil management and crop production, for instance in diagnosing feasible crops, soil and crop management, and fertilization. One of the central aims is to improve the opportunities for more efficient production systems. This requires that sufficient yields are produced with minimal use of resources such as water, nutrients, and pesticides, yet optimal economic gains. Sustainability also implies that agriculture is optimally combined with nature conservation and maintenance of biodiversity. In this context, MSc theses are feasible of which the precise topic or investigation is a matter of negotiation with IITA (Wageningen alumnus Piet van Asten). Recently, land use changes in relation with carbon stocks, and links from plant to plot to farm to region have been under investigation. Good command of English is important, student housing can be arranged, and the involved IITA team is young and dynamic. For an MSc thesis, close supervision from the SLM side is mandatory.

Host institute: International Institute for Tropical Agriculture (IITA), Kampala, Uganda

Country: Uganda

Host Contact: Dr. Piet van Asten

Starting date: any time

SLM contact person: Sjoerd van der Zee (482103, Sjoerd.vanderZee@wur.nl)



Aruba: The impact of goats on vegetation, landscape and ecosystem services in National Park Arikok



National Park Arikok has been suffering from wide abundance of domesticated goats grazing illegally in the park. This has resulted in low perennial and annual vegetation species richness and soil degradation. Goat keeping is seen as part of the Aruban culture and society. Due to overgrazing, plant cover and diversity is low and monotonous at many places, often leading to a predominant occurrence of Acacia (Hubada) only.

The proposed study consists of an extensive literature study to review and analyse grazing intensity and grazing capacity data of other comparable Caribbean environments. Thereafter, a thorough field investigation is foreseen across Arikok National Park to assess grazing intensity and grazing patterns. For this purpose, assistance of park rangers will be provided. Final goal is to provide targeted recommendations on a realistic and preferably sustainable goat management strategy in Arikok National Park. Additionally, the student(s) are asked to pay some attention to the possible re-introduction of the small endemic white-tailed deer (from Curacao) to Aruba, and to the increasing population of Aruban rabbits, with regard to expected impacts on vegetation cover and diversity.

Host institute: ARIKOK National Park, Emil ter Horst (emil.ter.horst@arubanationalpark.org)

Country: Aruba

Starting date: any time

SLM contact person: Coen Ritsema (coen.ritsema@wur.nl)



Aruba: Spatial inventory and management zoning of the National Park Arikok and outer nature areas



Since years, Arikok National Park attracts an increasing amount of visitors, resulting in subsequent pressure on different fragile parts of the park. An urgent need exists to characterise the National Park in a consistent and far more spatial detail than available at present with regard to landscape, soil, water, flora, and fauna characteristics.

Main aim of this study is to derive an improved map with high spatial resolution indicating the unique features of the park. Also current infrastructure within the park (roads, pathways, etc) should be considered with this respect, and alternative lay-outs suggested, if contributing to improving overall ecosystem state and preservation. Furthermore, within the mapping exercise, specific attention should be paid to identifying degraded areas in the National Park, including providing potentials ways for restoration.

Data derived and analysed should lead to a new zonation of the National Park providing the park rangers a basis for targeted site-specific management contributing to preserving ecosystem services, sustaining natural capital, and adding value to the park as a whole, including restoration of the cultural landscape of the past centuries.

Host institute: ARIKOK National Park, Emil ter Horst (emil.ter.horst@arubanationalpark.org)

Country: Aruba

Starting date: any time

SLM contact person: Coen Ritsema (coen.ritsema@wur.nl)



Bolivia: Ex-post evaluation of a SWC project and its impact on local livelihoods



In the Department of Chuquisaca, in farmer communities around the capital Sucre at an altitude of about 3000 meters above sea level, the project JALDA was executed from 1999-2003. After this project another project was carried out and closed last year. Most important of the approach of both projects was the focus on soil and water conservation, and the intensive work done with farmer conservation leaders. Both projects pretended to achieve sustainable impact, with long-lasting changes in the communities, and the scaling-up of soil conservation practices.

This MSc thesis will carry out an ex-post evaluation in the same communities where the project JALDA worked till 2003. The focus will be on physical impact (existence of SWC practices, their quality, reforestation areas, etc.) and on farmers' behaviour and attitude towards natural resource management. The baseline of the research is a PhD research executed in 2004-2005 in the same area, and a comparison will be made with the situation 10 years ago. What has changed, what has remained, how do farmers behave and perceive their future? The research requires good knowledge of Spanish, classes can be taken in Sucre if needed.

Host institute: Arnulfo Borges, University of San Xavier de Chuquisaca

Country: Bolivia, Sucre

Starting date: any time

SLM contact person: Aad Kessler (486055; aad.kessler@wur.nl)



Bolivia: Social and communitarian watershed management for life



In Oruro – Bolivia, the Viceministry of water resources and irrigation together with the University of Oruro, is working with Cuenca Pedagógicas, establishing “school examples” of how to manage watersheds with local stakeholders, based on their values and visions, and taking into account the importance of water and Mother Earth in the daily land management activities. At present water is managed by local people at community level; the challenge is how to involve the watershed level. combining the hydrological and the social watershed (Central Campesina) territories. The Cuenca Pedagógica project started with training and land use planning exercises by means of intercomunal competitions, and covers several watersheds all over Bolivia.

This MSc thesis will be carried out within one of the Cuencas Pedagógicas approach and aims at investigating land use and land management aspects in the watershed, and how these affect mechanisms for equitable access, use and distribution of water for life (water not only for humans). The exact research focus is still open, but it combines both land and water aspects, and might include both biophysical and socioeconomic approaches. It will be supervised by the local coordinator of the project, and requires good analytical and writing skills of the student. The research furthermore requires good knowledge of Spanish, classes can be taken in Oruro if needed.

Host institute: Universidad Técnica de Oruro: Ing. Jesus Cardenas, and Viceministerio de Recursos Hídricos y Riego: Jaime Huanca. Jaime.huanca@riegobolivia.org

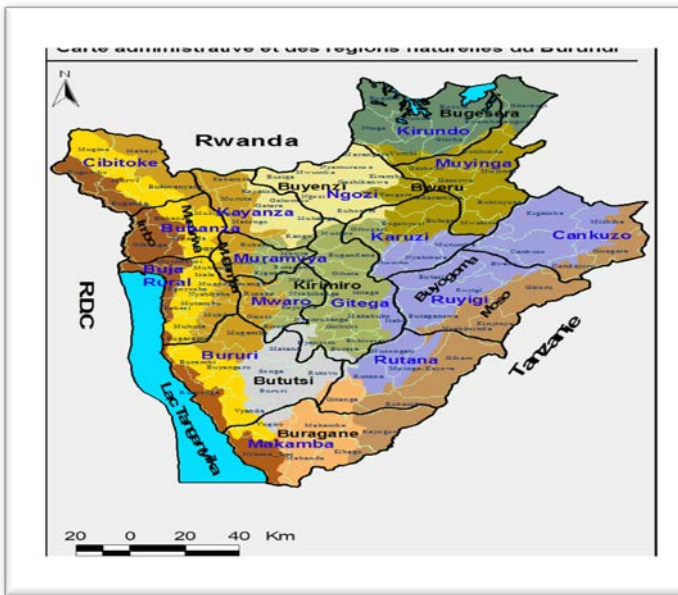
Country: Oruro, Bolivia

Starting date: any time

SLM contact person: Aad Kessler (486055; aad.kessler@wur.nl)



Burundi: Land sustainability and farmer group decision making



Burundi has a high population growth rate, and as the population grows, the amount of fertile land available for agriculture is decreasing. Farmers struggle to produce crops because of the low fertility of the soils and the steep nature of the hills on which they plant. Common cropping practices are primarily based on crop rotations, hardly any investments are made in sustainable land management (SLM). The SCAD project works directly with farmers, and aims at collaboration in farmer groups for SLM, achieving the triple bottom line of well-being of the *family, the farm community and environmental quality*. It is however questionable to what extent land sustainability is really taken into account in group farm decision making.

This MSc research thesis will investigate how farmers in organized groups take decisions to invest or not in SLM practices, and why differences occur, even within groups. It will involve fieldwork and interviews and/or focus group discussions with farmers to understand their reasons to invest in SLM, and how the group collaboration affects this decision. The research contributes to a recently started PhD research under SCAD project in Burundi. Basic knowledge of French is required for this research.

Host institute: SCAD project, PhD student belyse.mupfasoni@wur.nl

Country: Burundi

Starting date: any time

SLM contact person: Aad Kessler (aad.kessler@wur.nl)



Burundi: Risk perception by farmers and Sustainable Land Management



In developing countries farmers are the most vulnerable to agricultural disasters especially those linked to weather conditions such as drought, flooding, hail, excessive rainfall, etc. In Burundi climate change is already impacting agriculture: the means off living for 95% of the total population. The Burundian agricultural sector is characterized by a low food production due to the shortage of arable land, use of unimproved seeds and the depletion of soil fertility by erosion. Risk is a serious issue: farmers have hardly any means to invest, and the risk of crop failure is always present.

This MSc research will focus on the question to what extent ***crop risk influences farmers' decisions to invest in land management***. Firstly, the research wants to investigate how farm characteristics and farmer variables impact perceptions of risk factors. Secondly, it will focus on how these factors combined with risk perceptions influence economic behavior and related risk management strategies. This research will be carried out within the SCAD project area in progress in Burundi. The research contributes to a recently started PhD research under SCAD project in Burundi. Basic knowledge of French is required for this research.

Host institute contact: SCAD project, PhD student marcien.ndagijimana@wur.nl

Country: Burundi

Starting date: any time

SLM contact person: Aad Kessler (aad.kessler@wur.nl)



Ethiopia: Land fragmentation and its effects on farmers' adoption of SLM



The Gamo highlands in southern Ethiopia are experiencing change due to climate and population growth, and the agricultural systems will need to adapt and intensify accordingly. It is however questionable to what extent high land fragmentation in the area will offer opportunities or obstacles to fulfil these aims. Pros and cons of fragmented landholding in terms of productivity, food security, and efficiency are not unambiguously explained. Explanation of opportunities and challenges in land fragmentation to sustainable land management (SLM) measures has been inadequately documented.

This MSc research thesis will investigate farmer's propensity to adopt sustainable land management practices on fragmented land as one means to adapt to climate change. It involves fieldwork to assess land fragmentation and SLM measures, and interviews and/or focus group discussions with farmers to understand their reasons (not) to adopt SLM measures on (parts of) fragmented land. The research contributes to a recently started PhD research project.

Host institute: with Tesfaye Cholo (tesfaye.cholo@wur.nl)

Country: Ethiopia

Starting date: any time

SLM contact person: Luuk Fleskens (485467; luuk.fleskens@wur.nl)



Ethiopia: The impact of malt barley production on smallholder livelihoods



The Ethiopian malt barley market is fast-growing at 20% per year, driven by the market growth for beer. Competition is limited and is unable to offer a high quality product and hence brewers are importing close to 60% of their malt, creating a significant market potential for high quality domestically produced malt barley; an opportunity for farmers in the highlands of Ethiopia. The Assela Malt Factory faces a shortage of 26,000 tons of barley this year (60% of its annual demand). To reverse the trend high yielding malt barley seeds must be distributed and buyers should give a better price for the farmers and this need the development of vibrant malt barley value chain.

In this research the impact of increasing malt barley is assessed on socio-economic and agri-ecological performance of smallholder farmers in the sourcing areas of the Assela malt factory. Case-studies will be carried out using MonQI, a methodology for monitoring management and performance of small scale farming systems. The questionnaire consists of different sections related to the main farm activities, and the software produces a wealth of farm management and farm performance indicators (e.g. NPK balances, gross margins) per activity at plot, compartment and farm level.

Host institute: CREATE project office in Assela

Country: Ethiopia

Starting date: a.s.a.p.

SLM contact person: Christy van Beek (christy.vanbeek@wur.nl, 86526)



Ethiopia: Effectiveness of adapted soil and water conservation technologies for sustainable land management



In the Gur watershed of the Girar Jarso woreda, central Ethiopian highlands, various soil and water conservation (SWC) technologies have been introduced and implemented over the past 5 years, based on a scaling-up strategy. Among others, soil bunds, stone bunds, stone faced soil bunds, cut-off drainage and tree plantings are widely spread. Farmers have been involved on conservation activities based on organized forms: farmers received intensive training by government officials, and then organized in groups, called farmers development groups, to work on SWC activities. In spite of this effort, limited adoption of introduced technologies has been seen.

More important than adoption is adaptation, i.e. what farmers do – based on their own knowledge – with the introduced SWC technologies, and how they make these practices better fit to the local conditions and farming systems. But, information is lacking on how local farmers adapt SWC technologies, and how effective these are in combating land degradation sustainably. The main emphasis of this MSc research is to investigate specific local conditions and farming systems determining farmers' decision to adapt introduced SWC technologies. It involves intensive field work and farm-household surveys. The research will contribute to an ongoing PhD research project.

Host institute: CASCAPE project (WUR), with Meskerem Abi (meskerem.teka@wur.nl)

Country: Ethiopia

Starting date: any time

SLM contact person: Aad Kessler (486055; aad.kessler@wur.nl)



Niger: the hanza tree and its socioeconomic effects on livelihoods and land management



Niger is a sahelian country battling malnutrition and droughts since decades. *Boscia senegalensis* (Hanza) is a tree species that has been used for centuries as food source by the local population of Niger. Up to 2012 it was considered a famine food and therefore strongly stigmatised, but the negative stigma is clearly regressing since the development of new food products based on the seeds. The social enterprise Sahara Sahel Foods buys seeds of this perennial from the farmers.

This MSc research targets socio-economic effects of the new hanza market on local livelihoods and land management. Questions are whether the incentives of selling hanza for cash influences farming families own consumption of this food, and whether farmers change their investment in land management and crop production due to recent hanza market expansion. Also, who is doing the collection of hanza seeds and gaining benefits from this new market? How does the growing market affect the presence of hanza trees?

International staff is available for feedback and supervision to the study. A basic knowledge of French is required.

Host institute: Sahara Sahel Foods in Zinder (Josef and Renate Garvi)

Country: Niger

Starting date: any time

SLM contact person: Aad Kessler (486055; aad.kessler@wur.nl)



Netherlands: Spatial variation in costs of SLM technologies



In research of upscaling potential of sustainable land management (SLM) technologies, there is a knowledge gap about the spatial variability of the costs of such measures. Whereas the factors influencing the costs of SLM technologies are known (depending on e.g. slope, soil texture and depth, land use), by *how much* environmental variations influence costs is not well-known. A possible reason for this is that SLM projects report on the total expenditure and implementation areas, but not on spatial variations within areas treated. Nonetheless, incidental reference is made in international literature to such variations, and grey literature may hold a wealth of information on this. When such information is synthesized, formulas can be inferred and used in model assessments of upscaling potential (e.g. the DESMICE model used in several EU research projects).

This desk study will seek to: i) compile available data on spatial variations in costs of SLM measures; ii) derive generic formulas that describe spatial cost variation for use in DESMICE. Methods to be used include literature survey, retrieving project documentation, mobilizing expert knowledge through international SLM lists and portals, and data analysis using Excel.

Host institute: Wageningen University

Country: NL

Starting date: any time

SLM contact person: Luuk Fleskens (0317-485467; luuk.fleskens@wur.nl)



Peru: Reversing land degradation by means of changing farmers' management practices



In Cuzco – Peru, the civil society organization Pachamama Raymi (PR) is since the 1990's working with a methodology aiming at breaking the vicious circle between environmental degradation and poverty. This is achieved by means of training and farmer competitions on natural resource management and other relevant issues to eradicate poverty. One of the areas of action of PR is the reclamation of degraded soils, which is mainly achieved by changing farmers' management practices. PR claims that changing land management of a majority of the population of a village is possible with the PR methodology, and that it fosters the spreading of innovations and good practices at a large scale.

This MSc thesis will be carried out within PR and aims at writing a scientific paper on the impact of the PR methodology on reversing land degradation. PR has already collected many data, but still additional data are needed as input for a sound scientific analysis that evidences the success of this methodology. The research will be supervised by the local coordinator of the project, and requires good analytical and writing skills of the student. The research furthermore requires good knowledge of Spanish, classes can be taken in Cuzco if needed.

Host institute: Wim van Immerzeel, <http://pachamamaraymi.org/>

Country: Cuzco, Peru

Starting date: any time

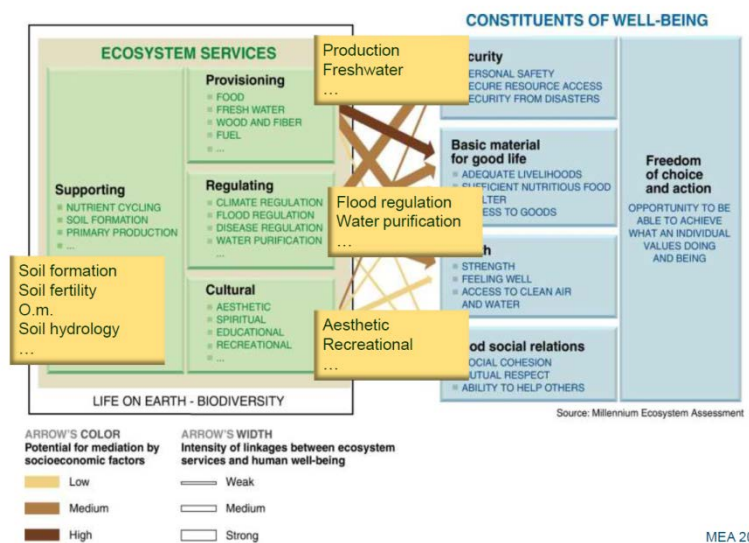
SLM contact person: Aad Kessler (486055; aad.kessler@wur.nl)



Portugal: evaluating the impacts of soil conservation measures in recently burnt areas on soil ecosystem services



Soil Functions & Ecosystem Services Affected



Wildfires are well-known to enhance runoff and transport of sediments and nutrients, especially during the early stages of soil and vegetation recovery. These enhanced runoff and erosion rates can be mitigated by post-fire emergency stabilization measures and, in particular, by the application of organic residues on the soil surface, as was observed in a series of field experiments. However, these studies have been limited to assessing the degree to which runoff and erosion were reduced by the treatment. Therefore, there is a strong need to evaluate the impacts of the treatments more broadly and, in particular, in reference to the full suite of ecosystem services provided by the soils.

The main objective of the present MSc thesis topic is to get more insight in how to assess the impacts of soil conservation measures in recently burnt areas on soil ecosystem services, involving developing a framework for assessing the impacts of wildfires and selected post-fire erosion mitigation measures in terms of costs and benefits. The work foresees desktop work and regular fieldtrips to one of the ongoing field trials and, if needed, consult local stakeholders in the case study site.

Host institute: RE CARE project, University of Aveiro (Sandra Valente and Jacob Keizer)

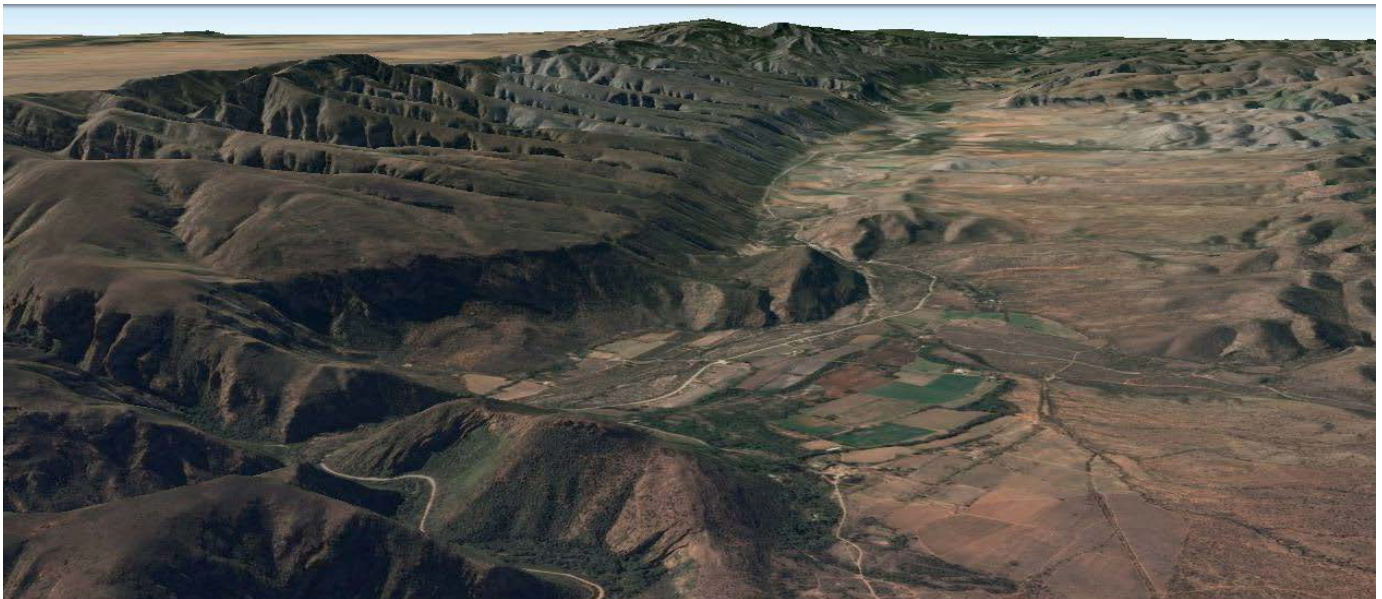
Country: Portugal

Starting date: any time

SLM contact person: Luuk Fleskens (485467; luuk.fleskens@wur.nl)



South Africa: A Model for sustainable Agriculture in the Baviaanskloof



Unsustainable land use in the Baviaanskloof has resulted in degradation of the landscape, economic hardship and water risk issues over the past decades. Historically, the area was overstocked with goats and sheep, the rivers, streams and alluvial fans were modified and the marginal land was exploited to its fullest. Now has come a time to restore, rebuild and reconnect to the landscape. This Study will focus on building a feasible model for sustainable agriculture in the Baviaanskloof within the framework of the Four Returns model (LINK). In so doing this study should seek to understand the applicability for low impact agriculture as well as alternative land use practices. Finally, the student should include participatory mapping of various scenarios to measure the social, ecological and economic climate.

This research will contribute to the work of Living Lands, CommonLand and the Four Returns Development Company

Host institute: PRESENCE Learning Network – Living Lands (stephie@livinglands.co.za)

Country: South Africa

Starting date: any time

SLM contact person: Michel Riksen (482833; michel.riksen@wur.nl)



South Africa: Can alien invasive trees fuel sustainable restoration in the Kouga catchment



Black Wattle (*Acacia mearnsii*) is a highly invasive species across South Africa. In the Kouga catchment, these trees pose a serious threat to not only to the ecological integrity of this fynbos landscape but also to water security, locally and extending as far as the Nelson Mandela Metropole which relies heavily on this area for water. This research should focus on potential solutions for clearing black wattle in a sustainable and even profitable context within the framework of the Four Returns model (LINK). As a first step a detailed mapping and biomass calculation of alien invasive trees in the Kouga is necessary to assess the feasibility of different business cases. Further, it is crucial to understand their applicability for secondary use (through a number of factors e.g: what kind of secondary uses exist, how much wood is available, what type of wood, is it easily accessible, are farmers wiliness?). Lastly this study could extend to design a business model on added value creation from alien trees in the Kouga catchment.

This research will contribute to the work of Living Lands, Common Land and the Four Returns Development Company.

Host institute: PRESENCE Learning Network – Living Lands (stephie@livinglands.co.za)

Country: South Africa

Starting date: any time

SLM contact person: Michel Riksen (482833; Michel.Riksen@wur.nl)



Spain: erosion, land management and collective action in olive orchards



In olive monocultures of Southern Spain unsustainable land management practices and climate change effects have exacerbated levels of soil erosion. Frequent mechanized tillage and intensive herbicide use to avoid competition between crops and weeds, as well as the removal of natural vegetation in unproductive parts of olive orchards have paved the way for striking levels of soil loss and the formation of huge gullies. This MSc research will give follow-up to a previous study carried out in the town of Aguilar in Andalucía, which investigated a farmer-managed initiative to implement a programme of soil and biodiversity conservation in local olive orchards.

This MSc study will analyse the initiative and collective action process, but it will also map the spatial distribution of erosion features (gullies) and land management techniques. As such the study investigates the problem-solving processes, by combining physical and socioeconomic research methods. The student must do ample fieldwork, and the ability to speak Spanish is therefore a requirement.

Host institute: Instituto de Agricultura Sostenible (IAS-CSIC), Córdoba (José Gomez)

Country: Spain

Starting date: any time

SLM contact person: Aad Kessler (486055, aad.kessler@wur.nl)



Tanzania: Valuing Ecosystem Services in the Kilombero Valley Wetland



The Kilombero valley is an important source of livelihood for the majority of dwellers in the area as it provides different benefits. However, currently the valley is subjected to extensive expansion in direct resource based extraction which threatens its ecological integrity. Valuation of ecosystem services is required for decision making on sustainable management of the wetlands.

This MSc research thesis will assess the values of ecosystem services in the Kilombero valley wetland. It involves field work to assess values of different ecosystem services through economic techniques such as market price approach, revealed preference method and stated preference methods. Also non-economic techniques will be used such as consultative methods. The research contributes to a recently started PhD research project.

Host institute: with PhD student Irene Koko (irene.koko@wur.nl)

Country: Tanzania

Starting date: any time

SLM contact person: Luuk Fleskens (luuk.fleskens@wur.nl)