



4th Open Science Meeting of the Global Land Programme

April 24-26, 2019 | Bern, Switzerland

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Conference Time: 30/Jan/2020 10:17am CET

Conference Agenda

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Session Overview

Session

150N: Scenario narratives for agriculture and land systems across scales and locations

Time: **Wednesday, 24/Apr/2019: 4:15pm - 5:45pm**

Location: **MB-206**

Session Chair: **Anja-Kristina Techen**

Main Building, room 206, second floor, east wing, 56 seats

Session Chair: **Hermine Mitter**

Session Chair: **Martin Schönhart**

Session Chair: **Katharina Helming**

Session Topics: What are the visions for the planetary land system?

Session Abstract

Future developments in agricultural management and land systems are difficult to anticipate. A thorough understanding of driving forces and their interactions is a prerequisite for governing multilevel decision making towards sustainable development under global change. This particularly holds for the agricultural sector as it is part of a highly complex global system with multiple biophysical and socio-economic drivers with uncertain future outlooks. Scenario development is an important method to analyze the interactions of driving forces and their outcomes under different assumptions. Such scenarios support the understanding of the mechanism of change and facilitate stakeholder inclusive research and knowledge co-creation. However, scenario development is a scientific challenge.

This 2-hour-session offers a forum for scientific exchange and joint learning in scenario narrative development to tackle some of these challenges. The session will be introduced by a 15 min presentation of protocol-based development of storylines for European agriculture in 2050, in which numerous researchers and stakeholders from across Europe were involved and which connects to the so-called Shared Socio-economic Pathways of the climate research community. Further scenario cases can be brought in by posters introduced by 1 min pitches after the introductory talk. The subsequent structured discussion will address thematic and methodological issues of scenario development, including multi-scale scenario development (top-down versus bottom-up), using existing scenarios when down-/ upscaling, process of developing narratives, guaranteeing stakeholder buy-in and linking qualitative and quantitative scenarios.

Depending on the number of participants, a roundtable discussion or world café format will be chosen. It is anticipated that as the outcomes of the session, researchers from different world regions and projects will have learned from each other, created insights together and increased the basis for potential future cooperation.

Contributions (poster with pitches, discussion topics) on recent developments of scenario narratives are highly welcomed.

Presentations



ID: 344 / 150N: 1

150N Scenario narratives for agriculture and land systems across scales and locations

Keywords: Shared diagnosis, participatory zoning, fine scale LULCC model

Downscaling and simulating scenarios of future land use and land cover changes using a participatory approach

Thomas HOUET

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Better understanding the pathways through which future socioeconomic changes might influence land use and land cover changes (LULCCs) is a crucial step in accurately assessing the resilience of socio-ecological systems. Participatory foresight involving local stakeholders may help building fine-scale LULCC scenarios that are consistent with the likely evolution of mountain communities. This proposal (pitch / poster) develops a methodology that combines participatory approaches in downscaling socioeconomic scenarios with LULCC modelling to assess future changes, and applied on a mountain case study (Cauterets, Pyrenees, France) exhibiting agricultural (pastoralism) and silvicultural (forestry) issues and connected stakes (Houet et al. 2017). Four spatially explicit local scenarios have been built each including a narrative, two future land cover maps up to 2040 and 2100, and a set of quantified LULCC. Although scenarios were then used to identify areas likely to encounter land cover changes (deforestation, reforestation, and encroachment) prone to affect gravitational hazards, this contribution would focus on the developed methodology. It provides a general framework to downscale global and national scenarios to local scales. It relies on the Storyline and Simulation approach defined by Alcamo et al. (2006) and as already been used for climate and water quality / biodiversity applications respectively on urban (Houet et al. 2016) and intensive agricultural (Houet et al. 2010) landscapes. It is currently used for research-action program Interreg Atlantic ALICE (<http://project-alice.com/>) for assessing trade-offs of future ecosystems services considering various blue / green infrastructures strategies. It doesn't claim for using one specific method on scenarios' development or participation, neither one specific LULCC model as many of them could be contributive, but proposes how to combine them to facilitate the definition of a shared vision for land.

ID: 256 / 150N: 2

150N Scenario narratives for agriculture and land systems across scales and locations

Keywords: SSP, scenario, integrated assessment, protocol-based storylines, European agriculture

Developing protocol-based storylines of future European agriculture to inform integrated assessments (Eur-Agri-SSPs)

1 2 3 2 4 5 6 7 8 9

Hermine Mitter, Anja Techen, Franz Sinabell, Katharina Helming, Benjamin Bodirsky, Ian Holman, Kasper Kok, Heikki Lehtonen, Adrian Leip, Chantal Le Mouel, Hermann Lotze-Campen⁴, Erik Mathijs¹⁰, Bano Mehdi¹, Melania Michetti¹¹, Klaus Mittenzwei¹², Olivier Mora⁹, Lilian Oygarden¹², Jörg Priess¹³, Pytrik Reidsma⁶, Rüdiger Schaldach¹⁴, Erwin Schmid¹, Hedi Webber², Martin Schönhart¹

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The climate change research community has established the Shared Socio-economic Pathways (SSPs) to support integrated assessments (IA) at large spatial scales. Their spatial resolution and scope is insufficient for IA in agriculture at European, national and regional scales. We aim at advancing the SSPs by developing storylines of future European agriculture, called Eur-Agri-SSPs. We address two research questions, (i) what should Eur-Agri-SSPs contain? and (ii) how can an ideal-typical process, i.e. following a protocol, be conducted to obtain storylines that are consistent with the SSPs and relevant to scientists and stakeholders? The design of the storyline development process is based on six ranked quality criteria – credibility, consistency, legitimacy, salience, richness and creativity – whereby trade-offs between these criteria may occur. We propose a science-driven, iterative process to enhance credibility and horizontal consistency and follow a nested approach to link storylines across scales while maintaining vertical consistency. The remaining quality criteria should be stimulated in a participatory and interdisciplinary process. We suggest combining the quality criteria and process design requirements in a protocol to increase conceptual and methodological transparency. The protocol specifies nine working steps: defining core elements, setting-up a stakeholder group, determining storyline elements, drafting storylines, consistency checks, developing presentation formats, peer and stakeholder review, dissemination, and process evaluation. For each step, we discuss the degree of stakeholder engagement and provide suitable methods. For developing Eur-Agri-SSPs, we interviewed about 50 European stakeholders representing a diversity of interests. They shared insights on drivers and potential changes of European agriculture. However, trade-offs between vertical consistency and stakeholder buy-in remain. We conclude that the protocol facilitates systematic construction and evaluation of storylines, can be transferred to other sectors and regions and helps to improve comparability of IA in agriculture. The Eur-Agri-SSPs form the basis of national and regional storylines and facilitate a goal-oriented dialogue.

ID: 460 / 150N: 3

150N Scenario narratives for agriculture and land systems across scales and locations

Keywords: Agriculture; climate change; representative agricultural pathways; shared socioeconomic pathways; stakeholders; West Africa

Linking regional stakeholder scenarios and shared socioeconomic pathways: quantified West African food and climate futures in a global context

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The climate change research community's shared socioeconomic pathways (SSPs) are a set of alternative global development scenarios focused on mitigation of and adaptation to climate change. To use these scenarios as a global context that is relevant for policy guidance at regional and national levels, they have to be connected to an exploration of drivers and challenges informed by regional expertise.

We offer scenarios for West Africa developed by regional stakeholders and quantified using two global economic models, GLOBIOM and IMPACT, in interaction with stakeholder-generated narratives and scenario trends and SSP assumptions. We present this process as an example of linking comparable scenarios across levels to increase coherence with global contexts, while presenting insights about the future of agriculture and food security under a range of future drivers including climate change.

In these scenarios, strong economic development increases food security and agricultural development. The latter increases crop and livestock productivity leading to an expansion of agricultural area within the region while reducing the land expansion burden elsewhere. In the context of a global economy, West Africa remains a large consumer and producer of a selection of commodities. However, the growth in population coupled with rising incomes leads to increases in the region's imports. For West Africa, climate change is projected to have negative effects on both crop yields and grassland productivity, and a lack of investment may exacerbate these effects. Linking multi-stakeholder regional scenarios to the global SSPs ensures scenarios that are regionally appropriate and useful for policy development as evidenced in the case study, while allowing for a critical link to global contexts.

ID: 618 / 150N: 4

150N Scenario narratives for agriculture and land systems across scales and locations

Keywords: scenarios, narratives, assessments, biodiversity, scaling

Scenarios and narratives in assessments of biodiversity and ecosystem services

Cornelia Bettina Krug

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Scenarios are useful tools to determine and analyse options for the future, or to assess the impacts of policy decisions. They are being used in global environmental assessments (e.g. IPCC reports, the Millennium Ecosystem Assessment, the Global Biodiversity Outlook, or, more recently, in the IPBES assessments) to assess the impacts of socio-economic development pathways on climate, land use and biodiversity and ecosystems. However, efforts are necessary to improve the representation of biodiversity and ecosystems in the SSPs. This is being achieved through the development of "Nature Visions" (Rosa et al., 2017), which use participatory approaches to capture different stakeholder visions and views to develop global scenarios.

Scenarios are also used to explore the pathways to reach certain targets (e.g. the SDG targets, or Aichi targets), including the trade-offs and synergies between different goals, such as food security or biodiversity conservation. But how can these global scenarios be applied on local or regional scale? The pathways taken to reach selected targets are very dependent on the local and regional context. This requires the narratives underlying the scenarios to integrate the various drivers at play, and take into consideration socio-ecological feedbacks and multi-scale processes. They will also need to consider how humans and societies will respond to change. Considering issues in tandem allows to develop new approaches that address competing demands, investigate impacts and explore solutions (e.g. Seppelt et al. 2016). However, ways still need to be found how the local experiences, visions and narratives can be integrated into global scenarios.

ID: 812 / 150N: 5

150N Scenario narratives for agriculture and land systems across scales and locations

Keywords: Foresight, Scenarios, Land use, Food security, Modelling

Scenarios for land use and food security at global, regional and national scales

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Researchers from Cirad and Inra, with the support of a Scenario Advisory Committee, have carried out an exploratory foresight exercise on 'Land use and food security in 2050' (Agrimonde-Terra) to prepare actors for different possible futures by providing them with elements for understanding and anticipating future issues. The method combines various approaches: a scenario method based on morphological analysis and applied at various system scales, the implementation of foresight forums to discuss hypotheses on evolutions of the system and the construction and use of a modelling and simulation tool, called GlobAgri-AgT. The land use system was broken down into sub-systems or external and direct drivers for which alternative hypotheses of changes to 2050 were constructed; then hypotheses were combined in plausible and internally consistent ways and gave shape to different traceable scenarios.

At the global level, Agrimonde-Terra proposes a trend analysis on the global context, climate change, food diets, urban-rural linkages, farm structures, cropping and livestock systems, and explores five scenarios. Three scenarios entitled 'Metropolization', 'Regionalization' and 'Households' are based on current competing trends identified in most world regions. Two scenarios entitled 'Healthy' and 'Communities' involve potential breaks that could change the entire land use and food security system. For six regions of the world (OECD, FSU, Latin America, North Africa, SSA and Asia), past and on-going trends towards each scenario have been identified.

The method has been used at the national level, in Tunisia. During several foresight fora, stakeholders and decision-makers of the agri-food system designed their own "land use and food security system", defined their hypotheses for each driver, built scenarios with these assumptions, compared scenarios using a number of criteria and discussed consequences

for policy-making. GlobAgri-AgT can be used for quantifying the consequences of scenarios on areas and trade.

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