Agri4D

AGRICULTURE FOR FOOD SECURITY POST 2015 – THE ROLE OF SCIENCE

AGRICULTURAL RESEARCH FOR DEVELOPMENT CONFERENCE 2015

23- 24 September 2015
Undervisningshuset, Almas allé 10
SLU Campus Ultuna
Uppsala
Sweden

ABOUT

Millennium Development goals are set to expire in 2015 and the new set of goals is in the final stage of negotiations. At this time the discussion about the role of science in agricultural development and food security is highly relevant.

A lot has changed since the year 2000 when the first MDGs were formulated. Experts are now advocating for a paradigm shift that would bring the North and the South together, defining attainable objectives for an equal and a productive partnership, based on mutual interdependence. Food security based on sustainable agriculture can provide common grounds for such partnership. Implementation of the SDGs will not only require substantial political efforts, but will also need rigorous scientific advice. Agriculture for Development Conference 2015 will explore the role of science for agriculture and food security post 2015.

SLU Global

Swedish International Agricultural Network Initiative SIANI

focali.se Forest, climate & livelihood research network

SLU

CHALMERS UNIVERSITY OF TECHNOLOGY

SEI

LUND UNIVERSITY

Linköping University

UNIVERSITY OF GOTHENBURG

Future Agriculture FRAMTIDENS LANTBRUK

Sida

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DAY 2

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	Improving access to markets and developing value chains SAL G
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KEYNOTE SPEAKERS

John McDermott, IFPRI

Director for CGIAR Research Program on Agriculture for Nutrition and Health, IFPRI). Previously he was Deputy Director General and Director of Research at the International Livestock Research Institute (ILRI) in Nairobi 2003-2011. He has lived and worked in Africa for 25 years.

Christel Cederberg, Chalmers University of Technology

Professor at the Department of Energy and Environment, Chalmers University of Technology, Sweden. Her research is within the area of sustainable food and bioenergy production with focus on land use impacts. She is one of four members in the Swedish organization KRAV scientific committee. In 2012 Christel was elected "Agronomist of the year" by Agronomförbundet.

Jim Sumberg, IDS

Research fellow, Institute of Development Studies, IDS, University of Sussex, UK.He joined IDS as a Research Fellow in October 2009 and is an agriculturalist by training with over 25 years' experience working on small-scale farming systems and agricultural research policy in sub-Saharan Africa and Latin America.

Kostas Stamoulis, FAO

Director of the Agricultural Development Economics Division (ESA) at the FAO in Rome. Prior to that Kostas was teaching Agricultural Economics at the University of Illinois in Urbana Champaign. He has many years of experience in research and analysis of the role of agriculture in growth and poverty reduction

Margaret Kroma, ICRAF

Assistant Director General – Partnerships & Impact, World Agroforestry Centre, ICRAF. She joined the Center from the Alliance for a Green Revolution in Africa (AGRA), where she managed the genderportfolio and served as Special Assistant to the President (2010-2012).

Post green revolution possibilities and challenges ahead in South and South-East Asia

Sal C

Session leaders:

Ewa Wredle, SLU; Eskil Mattsson, Chalmers University

Session lineup

13:15-13:45 **Ecosystem services and future potential of tropical homegardens in Sri Lanka.** Eskil Mattson, *Chalmers University of Technology*

13:45-14:15 **Opportunities and threats from peri-urban livestock production: A study among small-scale farmers in Cambodia.** Gunilla Ström, *Swedish University of Agricultural Sciences, SLU*

14:15-14:45 **Improved calf performance in small-scale dairy production in Southern Vietnam Bui Phan Thu Hang.** Johan Dicksved, *Swedish University of Agricultural Sciences, SLU*

14:45-15:15 **Challenges in intensifying India small-holder dairy production-health risks and productivity gaps.** Johanna Lindahl, *Swedish University of Agricultural Sciences, SLU*

Ecosystem services and future potential of tropical homegardens in Sri Lanka

Eskil Mattsson[1], S.P Nissanka[2]

[1]Division of Physical Resource Theory, Department of Energy and Environment,
Chalmers University of Technology, Sweden.
[2]Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka

Tropical homegardens are agroforestry systems that play an important role in food security and nutrition and its canopy resemblance to forests incur that they conserve biodiversity, store carbon and hence mitigate climate change. Here we investigate carbon and non-carbon benefits as well as expansion and intensification potential of tropical homegardens in southern Sri Lanka combining quantitative and qualitative data. A total of 45 dry zone homegardens were sampled to estimate above-ground biomass carbon, soil carbon and species diversity. Semi-structured interviews were made with villagers to estimate homegardens importance for livelihoods and to understand local people's perception for future homegarden establishment and intensification potential. Results show that smaller homegardens hold a higher carbon content and tree diversity than medium and large homegardens while the soil organic carbon content were low relative to optimal crop production levels. Tropical homegardens offers the possibility to generate a wide variety of both environmental and socioeconomic benefits, although economic and legal constraints, land scarcity, and insufficient support from development programs hinder further development and scaling up possibilities. Homegardens could be included within an existing or new forest definition to mitigate climate change by lowering greenhouse gas emissions directly through the national REDD+ programme or promoted through intensification or extensification measures on marginal lands to serve as important buffers for natural forests that are experiencing pressure from increasing populations. Furthermore, low soil organic carbon content implies that homegarden practices are not sustainable in terms of soil fertility under present practices. Land-use planners need to take this account, since homegarden practices are promoted by the government as sustainable land-use systems.

Opportunities and threats from peri-urban livestock production: A study among small-scale farmers in Cambodia

Gunilla Ström[1], Ann Albihn[2], Sofia Boqvist[3], Agnes Andersson-Djurfeldt[4], Seng Sokerya[5], Sorn San[6], Holl Davun[7], Ulf Magnusson[1]

[1]Division of Reproduction, Department of Clinical Sciences, Swedish University of Agricultural Sciences (SLU), SE- 750 07 Uppsala, Sweden; [2]Section for Environment and Biosecurity, National Veterinary Institute (SVA), Uppsala, Sweden; [3]Department of Biomedical Sciences and Veterinary Public Health, SLU, Uppsala, Sweden; [4]Department of Human Geography, Lund University, Lund, Sweden; [5]Centre for Livestock and Agriculture Development, Phnom Penh, Cambodia; [6]Department of Animal Health and Production, Phnom Penh, Cambodia; [7]National Veterinary Research Institute, Phnom Penh, Cambodia.

Urban and peri-urban livestock keeping provides many benefits for the urban dwellers, such as improved food security, higher household incomes and access to food of higher nutritional value. The close contact between animals and humans, however, increases the risk of zoonotic disease transmission which, along with poor sanitary practices, can lead to severe consequences from both a public health and an environmental perspective.The study was conducted with 204 households keeping pigs and cattle in the peri-urban areas of Phnom Penh, Cambodia. Semi-structured questionnaires were used to gather information on socioeconomic status, disease awareness, manure management and livestock practices in the households.The majority of the farmers considered that animal production was of great importance for their livelihoods, and many households were depending on pigs as part of an integrated production system. More than 40% reported that they did not use the manure which was discharged behind the pens or into lakes and rivers close to the house. Nearly half of the households (47%) did not use any sanitary precautions when being in contact with the animals or the manure and around 45% did not think that diseases could transmit from animals to humans.Keeping livestock enables an important extra income among the peri-urban households in Cambodia. However, household practices applied among the farmers poses serious risks for zoonotic transmission and interventions are needed to develop sustainable urban livestock systems with special regard to manure and waste management.

Improved calf performance in small-scale dairy production in Southern Vietnam

Bui Phan Thu Hang, Johan Dicksved, Kerstin Svennersten-Sjaunja, Ewa Wredle.

Department of Animal Nutrition and Management, SLU, Uppsala

Dairy production is rather new in Vietnam. Governmental demand is to increase the domestic production since not more 20% of the consumed dairy products are produced from milk at Vietnamese dairy farms. The platform for high producing sustainable dairy cows is set early in life for the heifer calves, whereby special attention is needed already during the rearing of the new born calves. The female calves are recruited to replenish the herds while male calves are sold or slaughtered directly after birth, resulting in gross wastage of an available biological resource at farm. The aim of the project is to identify routines in the commercial dairy calf management that can be improved in order to reach sustainable dairy production considering both female and male calves. Firstly, a survey is done, including 40 randomly selected small scale farms, aiming to examine the management on farms, by the use of interviews and field observations. From a limited number of calves at each farm, samples are taken for analyses of colostrum quality, IgG absorption, antibiotic resistance and development of the gastrointestinal microbiota in the calf. Secondly, two management systems (restricted suckling versus artificial rearing) will be compared where calf growth, IgG absorption and development of the gastrointestinal microbiota will be studied in both female and male calves.

Challenges in intensifying India small-holder dairy production- health risks and productivity gaps

Johanna Lindahl[1,2] , Ram Deka[2], Tom Randolph[2], Delia Grace[2]

[1]Swedish University of Agricultural Sciences
[2]International Livestock Research Institute

India has over 300 million buffaloes and cows, and is the country that produces the most milk. Even though the commercial sector is growing, a large part of the milk is still traded through informal value chains. Many households have only few milking animals, and production is hampered by poor health and lack of adequate feed and water. Multiple zoonotic diseases are circulating, and even though milk commonly is boiled, the trade with raw milk products and lacking hygienic measures pose a risk to human health.
Informal value chains are unregulated and uncontrolled, and this increases the associated risks. In three projects, the International Livestock Research Institute is studying the white revolution of India.

1. Impact of an intervention on hygienic milk production on productivity, Assam. Farmers and milk traders had a low awareness about health hazards in milk, which improved after training, but the main impact noted by the farmers was healthier animals and better productivity.
2. Upstarting project on peri-urban dairy and risks of zoonotic disease and antibiotic misuse.
3. The dairy value chain in Bihar, one of the poorest states in India. Identifying the major limitations to efficient milk production, and the best bet interventions.

Transforming subsistence farming into commercial enterprises: The changing face of eastern and southern African agriculture

Aulan

Session leaders: Ivar Virgin, SEI; Matthew Fielding, SIANI.

Session lineup

13.15 – 13.20 **Welcome and introduction to the session.** *Co-chairs:* Matthew Fielding, *SIANI/Stockholm Environment Institute*, Ivar Virgin, *SIANI/Stockholm Environment Institute.*

SESSION 1

13.20 – 13.30 **Commercialisation of Agriculture among Smallholder Farmers** Catherine Komugisha Tindiwensi, *Makerere University Business School, Uganda*

13.30 – 13.40 **Food Security, Water and Sanitation for Improved Wellbeing of Smallholder Farmers in East and Southern Africa** Ngolia Kimanzu, *International Development, The Salvation Army, Sweden & Latvia Territory*

13.40 – 13.50 **New Products from Traditional Grains to Create a Market and Improve Food Security.** Mats Stading, *Structure and Material Design, SP Food and Bioscience, Sweden.*

13.50 – 14.00 **Rapid Ex-ante Environmental Impact Assessment for Livestock Value chains.** Ylva Ran, *Stockholm Environment Institute(SEI).*

14.00 – 14.45 **Breakout session**

Questions to consider:

- What are the issues/challenges/questions/opportunities regarding the successful transition in improving the ability of African small scale farming systems to support food security and rural development into the future?
- What could be done to address these by different actors, for example:
  - What should governments do?
  - What could the research and development community do?

What could Sweden do?

14.45 – 15.15 **Coffee Break**

SESSION 2

15.15 – 15.25 **From Communal to Private: The Case of Changing Land Tenure and its Implications for Agricultural Practices in West Pokot, Kenya**
Laura Saxer, *School of Global Studies, University of Gothenburg, Sweden*

15.25 – 15.35 **The Impact of Large Scale Land Acquisition on the Right to Adequate Food of Small Scale Farmers in Lipokela, Tanzania.** Atenchong Talleh Nkoboul, *Institute of Social Sciences in Agriculture, University of Hohenheim, Germany*

15.35– 15.45 **Is Land Tenure Conversion Indispensable for Agricultural Transformation in Sub-Saharan Africa?** Lasse Krantz, *Unit of Human Geography, University of Gothenburg, Sweden*

15. 45 –15.55 **Land Use Consolidation in Rwanda: The Experiences of Small-scale Farmers in Musanze District.** Emmanuel Muyombano. *Unit of Human Geography, University of Gothenburg, Sweden*

15.55 – 16.05 **Large-scale Land Acquisitions and their Implications for Commercialization of Small-farms.** Atakilte Beyene, *The Nordic Africa Institute, Sweden*

16.05 – 16.40

Breakout session
Questions to consider:

- What are the issues/challenges/questions/opportunities regarding the transformation of subsistence farming in relation to land tenure/land use?
- What could be done to address these by different actors, for example:
  - What should governments do?
  - What could the research and development community do?

16.40 - 17.15 What could Sweden do?

Plenary and discussion
Co-chairs:
Matthew Fielding, *SIANI/Stockholm Environment Institute*
Ivar Virgin, *SIANI/Stockholm Environment Institute*

Questions to consider:

- Do we need to transform subsistence farming into commercial farming?
- Is there a sufficient market demand in Eastern and Southern African supporting this transition?
- What is the role of the private sector?
- Is there a clear pathway, or many alternative pathways, and do we have a decent map
- What are the key challenges in this transformation?
- There will be winners and losers in this transformation. How do we support those losing out? How do we support those spearheading this transition?
- What could the research community do? What type of information/data is lacking?
- What could governments and donors do?

What could Sweden do?

Smallholder Commercialisation: The Ignored Role of Entrepreneurship

Catherine Komugisha Tindiwensi

PhD Student/ lecturer
Makerere University Business School

Agriculture in Africa accounts for 65 % of total employment and 32 % of GDP with smallholder farmers contributing over 90% of Africa's agricultural production. Even when agriculture is described as a profession for the poor, it is expected to spur overall economic growth and poverty reduction. Indeed commercialisation of smallholder agriculture has become a focus for governments, policy makers and development partners albeit with less enthusiasm from researchers. Most smallholder commercialisation studies have focused on agricultural technologies, land access and financial services. Though entrepreneurship is traditionally linked with poverty reduction and wealth creation there is no evidence of scholarly effort to integrate entrepreneurship in the poverty stricken African smallholder agriculture. In addition, the few studies that integrate entrepreneurship in agriculture have focused on developed country contexts. Based on extensive desk review we explore the ignored role of entrepreneurship in smallholder commercialisation; identify the critical resources and capabilities required for small holder farmers to commercialise; and propose methodological approaches that might be helpful in understanding the phenomenon.

Food Security, Water and Sanitation for Improved Wellbeing of smallholder Farmers in East and Southern Africa

Ngolia Kimanzu

Frälsningsarmén

Improved food security, access to sufficient and high quality water and sanitation are essential components of human wellbeing and sustainable development. Food, Water and sanitation span a range of both development and academic disciplines yet they are tightly linked in a complex system of nutrient transfers and also contaminants.
Safe drinking water and sanitation is fundamentally important for nutrition and health. Irrigation also increases and stabilises incomes of smallholder farmers. On the other hand the collection of rainwater for supplementary irrigation has proved extremely valuable in dealing with rainfall variability. This has led to significant improvement in agricultural production, enhanced food security and poverty reduction.
A holistic approach to food security, water and sanitation is required to improve human wellbeing and promote sustainable development. This entails an interdisciplinary team of development experts and researchers to exchange and embark on a collaborative learning journey to:

a) Collate and synthesise the collective knowledge about the interface of food security water, and sanitation for improved human wellbeing;
b) Synthesise field experiences showing which interventions work in which context and which are less promising; and
c) Develop recommendations for food security, water and sanitation separately and their interactions for holistic and sustainable solutions for improving the wellbeing of smallholder farmers in East and Southern Africa.

Need of complementing investments in agriculture development

Gunilla Åkesson

Peace and Development studies
Linnaeus University Växjö, Department for Social Studies

A development of agricultural productivity in Africa has since long been a challenge. Two general tendencies have been visible in the debate. One in favor of a rapid transformation into large scale commercial farming, while others would favour a broader transformation of small scale family farming. In reality, it seems as if both strategies are challenged by what economists use to call "coordination failure". Coordination failure can be described as a lack of intra and inter sector complementarity in the local and regional economy. The coordination failure regarding large scale farming development are both horizontal and vertical. Vertical in terms of uncertain market access, volatile world market prices and competition from OECD subsidized agriculture. Horizontal in terms of weak infrastructure, few experienced agents, and deficient warehouse and storage capacity. Obstacles for a broader sustainable family farming development are to large extent the same, but with special emphasis towards lack of guarantee and continuity in access to inputs, extension service and commercialization systems, access to and control of land, weak material and social infrastructures and access to credits. A special issue is commercial credits to local and regional traders. The intra-household consequences observed in transformation processes is that low salaries in entrepreneurial agriculture and forestry are rarely compensating for the losses of land and subsistence agriculture in the household economy. This may increase vulnerability of the household, especially regarding food security. Hence, independently of chosen strategic priorities, it is important to identify interacting factors of which the absence is hampering investment outcome, such as road networks, energy, transport logistics, telecommunications, banking and credit systems, and market access. Any broad investment should also be accompanied by a real capacity building in local administration, as well as improved agricultural schools and agriculture extension systems. Identifying the necessary complementary investments requires integrated planning that involves the different sectors of society and permits local participation. Of crucial importance is to create salary and/or income structures that guarantee the household economy level during the process of transition, measured in sustainable livelihoods terms.

New products from traditional grains to create a market and improve food security

Mats Stading

SP Food and Bioscience, Structure and Material Design
Chalmers University of Technology, Materials and Manufacturing Technology
Gothenburg, Sweden

Wheat, rice and maize dominate the world food market and produce high yields under favourable conditions, but fail during draught. Traditional grains, such as various millets and sorghum, are well adapted to harsh conditions and are drought tolerant. In Africa alone there are more than 100 different grasses that have seeds which are consumed as food. Many of the traditional grains are nutritious with good amounts of the essential amino acids, antioxidants and are good source of minerals and fibre important for human health and growth. Despite this often there exists only a cash market for the large commodity grains, i.e. maize in the semi-arid parts of sub-Saharan Africa. This means that the subsistence farmers often take a chance and choose maize instead of the traditional crops to be able to sell a surplus on the local market, with impaired food security as a consequence during a drought year. One way out of this dilemma is to develop new products from the traditional grains such as instant traditional foods, breads and breakfast cereals. There are also good opportunities for export to Europe where "exotic" foods are in demand, as well as the present trend for gluten free and natural foods.

Rapid ex-ante environmental impact assessment for livestock value-chains; a case study of water use for small-holder dairy production in Tanzania

Y. Ran[1,2], J. Morris[2], J. Barron[3], M. Lannerstad[4]

[1] Animal Production Systems group, Wageningen University
[2] Stockholm Environment Institute, Stockholm, Sweden
[3] International Water Management Institute, Colombo, Sri Lanka
[4] International Livestock Research Institute, Nairobi, Kenya

The demand for animal-source foods is expected to double by 2050 and the major part of the production increase will take place in developing countries. Already today, livestock production is associated with profound environmental impacts: global warming, biodiversity loss, soil degradation, extensive use of land and water resources and water and air pollution. Thus, it will be imperative to limit agricultural expansion into vulnerable ecosystems and avoid irreversible undermining of agro-ecosystem resilience. Interventions and development projects for intensification of small-holder livestock systems need to ensure long-term sustainability. One key variable in impact assessment of livestock rearing is water use. This study presents results from the water use and water productivity for small-holder dairy keepers in Lushoto, Tanzania. We used participatory GIS and Aquacrop to estimate livestock water use, primarily for animal feed production. Results show a large difference between mixed crop-livestock and agro-pastoralist dairy production systems; 0.3 kg milk per m3water and 0.1 kg milk per m3water respectively. For a scenario with improved productivity, water demand in both systems decreases significantly. However, the demand for cropland increases for both systems in the high-productivity scenario. Although increased productivity may imply a decrease in a certain input or resource use, it may also require increased use of other resources, e.g. higher demand for land, water and nutrients for improved feeding. Thus, interventions must also consider that many regions suffer both natural and economic resource constraints.

From communal to private: The case of changing land tenure and its implications for agricultural practices in West Pokot, Kenya

Laura Saxer & Per Knutsson

School of Global Studies, University of Gothenburg, Sweden
Senior Lecturer at the School of Global Studies, University of Gothenburg, Sweden

There is an ongoing academic- and policy debate about how to understand ongoing land use changes in pastoral areas in East Africa, dominated by arguments for or against individual and communal land tenure. Based on data from interviews in the traditionally pastoralist Chepararia Division in West Pokot, Kenya, this study uncovers the political ecology of the dynamic shift from communal to private land tenure. The case-study area has witnessed a process of privatisation of communal land for the last 30 years, and the study provides an in-depth analysis of a changing land tenure system and its implications in terms of emerging agricultural practices. The results reveal an ongoing commodification of land and the rise of a vivid land market. Pastoralists employ new agricultural practices with an orientation towards commercial enterprises that constitute a general transformation from subsistence towards a market-oriented food production. However, the access to and the fruits of this transformation is not distributed equally within the communities. Rather, it produces and reproduces structures of inequality. The findings of the study contribute to an urgent and much needed discussion about the sustainability of ongoing land use changes in pastoralist East Africa that are relevant for both research and policy.

The Impact of Large Scale Land Acquisition on the Right to Adequate Food of Small Scale Farmers in Lipokela, Tanzania

Atenchong Talleh Nkobou[1], Stefanie Lemke[2], Maria Daniela Nunez Burbano de Lara[3], Anna Jenderedjian[4]

[1]University of Hohenheim, Institute of Social Sciences in Agriculture, Germany
[2]Senior Research Fellow, Gender Nutrition and Right to Food Policy Centre for Agroecology, Water and Resilience (CAWR) Coventry University
[3]University of Hohenheim, Institute of Social Sciences in Agriculture, Germany
[4]University of Hohenheim, Institute of Social Sciences in Agriculture Germany

In light of the opportunities and challenges that large scale land acquisitions pose in Sub-Saharan Africa, this study applied a sustainable livelihoods approach integrated with human rights principles to identify the

impact of land deals on the human right to adequate food of small scale farmers. As provided in General Comment 12 on the Right to Adequate Food of the United Nations Committee on Economic, Social and Cultural Rights (1999), states are obliged to respect, protect, and fulfil the right to food of their populations. Field work was carried out from July to September 2014 in Lipokela, Tanzania, where coffee is being cultivated in an area of 2,000 hectare as part of a land investment scheme. Structured interviews were conducted with 25 households and with six key informants. Two focus groups were conducted with community members and local NGO representatives. A decrease in the number of affordable daily meals, as well as in the intake of protein sources such as meat and fish were reported to have followed the acquisition of land. Staple foods such as rice and plantain, as well as fruit trees are no longer cultivated. In Lipokela, food crops are usually used as a medium of exchange for children's schooling. Hence, a decline of school attendance was also indicated, due to a decline of staple food production. Households' income from food production has been negatively impacted. Discrepancies exist between interviewees' personal accounts and official legal procedures for land acquisition, eviction, and compensation. In conclusion, the land investment project under study deprived affected individuals of productive resources to meet their daily food requirements. To meet its human rights obligations, the State needs to empower citizens to participate more effectively in and promote good governance and accountability during large scale land acquisition processes.

Is land tenure conversion indispensable for agricultural transformation in sub-Saharan Africa?

Lasse Krantz, PhD

Unit of Human Geography, Dept. of Economy and Society
University of Gothenburg, Sweden

Tenure conversion, from informal customary tenure to individual freehold title, is often seen as a prerequisite for transforming small-scale subsistence peasants into commercial farmers. What those who advocate such a conversion tend to disregard, however, is that especially in sub-Saharan Africa customary tenure systems are adapted to the extensive and composite farming systems practiced by small-scale peasants there at the same time as their social inclusiveness fulfil an important safety-net function. Besides, experience has shown that where individual land titling has been tried it has often had some serious negative social consequences at the same time as it has proven to be expensive and difficult to sustain over time. This is the reason why some African countries such as Mozambique has opted for statutory recognition and registration of customary communal land rights through so called community land delimitation as the principal approach for securing small-scale farmer's tenure rights. Today there are however indications that this policy is about to change in mega agricultural development programmes such as ProSavanna in Northern Mozambique, where the granting of individual titles to land will be employed as a strategy for transforming shifting-cultivation subsistence farmers into sedentary commercial farmers. The question though is if this is a feasible and socially advisable approach, and if the same development of local farming could not be achieved without fundamentally altering the existing customary communal tenure system, e.g., by providing smaller groups of farmers with collective titles to land within the larger community holding? These and other related issues are explored in my on-going research on the implementation of the Mozambican land law in the northern province of Niassa.

Development and Release of New Stress Tolerant Canning Beansfor Smallholder Farmers in Eastern Africa

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[3]Njoro Canning, P.O Box 7076-20110, Nakuru, Kenya

Productivity of canning beans in eastern Africa has declined drastically in the last four decades due to susceptibility to drought, diseases and lack of adapted high yielding varieties with grain quality characteristics required by the processing industry. The objective of this project was to develop new bean lines with desired canning and agronomic qualities acceptable to the consumers, industry, farmers and seed producers. A genetically diverse nursery of 445 lines was evaluated for drought tolerance, grain yield, disease resistance, canning quality and sensory attributes. Results showed significant differences in drought tolerance, yield potential, resistance to disease, canning quality and 35% reduction in cooking time among the lines leading to the release of four new varieties superior to the industry standard check variety. Drought stress reduced grain yield by 18 to 31%. Several new lines out-yielded local and international drought checks by as much as 100% in drought stressed conditions. Grain yield under stress was positively associated with pod partitioning index ($r=0.89^{***}$), pod harvest index ($r=0.40^{**}$), and stem biomass reduction ($r=0.32^{**}$). These new varieties have the potential of increasing productivity, incomes of smallholder farmers, and ensure regular supply and diverse value added products for the processing industry and the consuming public.

Land use consolidation in Rwanda: the experiences of small-scale farmers in Musanze district

Emmanuel Muyombano and Margareta Espling

Unit of Human Geography, Dept. of Economy and Society
University of Gothenburg, Sweden

The post-genocide Rwandan government has stated ambitious development goals in its Vision 2020. Agricultural development is central, as some 80% of the population depend on agricultural livelihoods. However, Rwandan agriculture has long been characterized by high population pressure, land fragmentation and low productivity, leading to over-cultivation, soil degradation and erosion.

Rwandan strategies for economic development and poverty reduction envision a social transformation of the society, requiring a shift from subsistence farming to commercial agriculture. A main component in this transformation is land use consolidation, the joint cultivation of large areas, which is expected to deliver economies of scale and increased productivity of high-potential food crops. The program includes provisioning of improved seeds of selected crops, subsidized fertilizers and extension services. Serious critique of the program has been raised, such as authoritarian implementation, negative effects on food security from mono-cropping few selected crops, and increased rural socio-economic differentiation. The aim of this presentation is to discuss the effects of the agricultural policy of land use consolidation at community level, based on fieldwork in Musanze district. This presentation draws from 22 collective and 45 individual interviews with smallholder farmers (women and men) and local key informants in five administrative sectors with varying agri-ecological conditions. Findings indicate positive effects, e.g. increased productivity, especially for those farmers having access to large land areas. However, poor people with small plots within the land use consolidation areas may not cultivate non-selected crops, i.e. subsistence food crops, which has negative impact on their food security. Therefore, many people feel they have been deprived of their rights to decide over their own livelihoods.

Large-scale land acquisitions and their implications for commercialization of small-farms

Atakilte Beyene and Emil Sandström

Nordic Africa Institute, NAI
Swedish University of Agricultural Sciences, SLU

Rural Africa has been facing critical development, economic and governance challenges over the years. Insecurity of food and energy as well as current and projected changes in climate are compelling many countries to expand efforts and/or search for new trajectories. Recently, promotion of large-scale commercial farms are seen as important ways of introducing change processes in rural Africa, especially in introducing new production practices and in allowing small farmers to reach high market values. This presentation aims to specifically address 1) how the current large-scale land investments (both planned and implemented) by the private and public sectors interface with the rural people; and 2) their prospects in transforming small-farms in terms of capacities, economic benefits and management.

West Side Story: Threats and opportunities for livelihoods in West Africa?

Sal G

Session leaders:
Per Knutsson, GU; Madelene Ostwald, GU; Ulrik Ilstedt, SLU

Session lineup

13:15-13:30	Introduction. Per Knutsson
13:30-13:55	**The Role of Institutions for Inclusive Development of Agricultural Markets: The Case of Cocoa in Post-Conflict Liberia.** Gun Eriksson Skoog, *Nordic Africa Institute*
13:55-14:20	**Soil science for improving livelihoods in Semi Arid West Africa.** Zacharia Gnankambary, *Institut de l'Environnement et de Recherches Agricoles*
14:20-14:45	**Balanites aegyptiaca: an underutilized, indigenous African fruit tree species with potential for improving livelihoods.** Deborah Goffner, *International CNRS Research Unit n° 3189 'Environment, Health, and Society', CNRS Tessékéré Human-Environment, Observatory*
14:45-15:15	Coffee break
15:15-15:40	**Resolving the paradox of a rainfall induced greening and increase in drought tolerant vegetation in the West-African Sahel.** Lowe Börjeson, *Stockholm University*
15:40-16:05	**Linking landscapes and livelihoods in Sudano-Sahelian West Africa.** Hanna Sinare, *Stockholm Resilience Center*
16:05-16:30	**Satellite remote sensing of parkland trees – potentials, limitations and applications.** Martin Karlson, *Linköping University*
16:30-16:55	**More trees can improve groundwater recharge in the seasonally dry tropics.** Aida Bargués Tobella, *Swedish University of Agricultural Sciences (SLU)*
16:55-17:15	**Discussion - New opportunities for livelihoods in West Africa**

The Role of Institutions for Inclusive Development of Agricultural Markets: The Case of Cocoa in Post-Conflict Liberia

Gun Eriksson Skoog

Nordic Africa Institute, NAI

To increase understanding of the role of institutions for inclusive development of agricultural markets, this research studies developments in the Liberian post-war cocoa market. Based largely on interviews conducted late 2013, it examines changes in market structure and implications for smallholder farmers' beneficial market participation, identifies institutional changes and offers an explanation for how they contributed to the inclusive nature of the cocoa market. It finds that structural changes contributed to smallholders' participation on increasingly beneficial terms, with farm-gate prices increasing several-fold as well as their share of the world-market price. Access to output markets, inputs, services and credit have increased, and farmers' freedom of choice. Farmers have responded by processing higher-quality cocoa, investing in and expanding their farms. Combinations of institutional changes at different levels are suggested to have made the cocoa market more inclusive, through four major causal mechanisms: value addition through increased cocoa quality; improved coordination of transactions; strengthened bargaining power of smallholder farmers; and private provision of services and inputs in spite of non-existent markets. The research makes a theoretical contribution and discusses policy implications.

Soil science for improving livelihoods in Semi Arid West Africa

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Semi-arid West Africa faces challenges to increase crop production in a sustainable way to meet food and nutritional security and improve farmers' income and overall livelihoods in the region.
In the context of growing population and climate change, soil science has a key role in generating and or improving existing techniques /technologies to sustainably improve agricultural productivity and soil health. This paper is focused on key issues on agricultural techniques or practices widely used in Semi-arid West Africa such as water harvesting, soil conservation, organic matter input, nutrient management and to analyze how their contribute to increase soil health and crop production.

Balanites aegyptiaca: an underutilized, indigenous African fruit tree species with potential for improving livelihoods

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Balanites aegyptiaca, or the desert date, is one of the most widespread woody plants on the African continent and is particularly well-suited to arid regions. Beyond its robustness, ethnobotanical surveys from our study region (Senegalese Sahel) indicate that it is also the most useful tree species, mainly for food (fruit), wood for energy and construction, and medicines. Its fruit pulp is of high caloric value and rich in minerals (i.e. potassium) and ascorbic acid. The seed kernel is rich in oil that is suitable for both human consumption and cosmetics. B. aegyptiaca fruits are traditionally gathered by women and children and sold at local markets. Due to its potential to improve rural livelihoods, as a first step we mapped the current networks to describe how fruits are channeled from gathering to transformation, as well as the different actors and institutions involved at each step along the way. Market chain analyses of local products provide invaluable information for unlocking the potential of indigenous underutilized tree species. As B. aegyptiaca has recently been selected as one of the most promising species for reforestation by the majority of the countries along the pan-African Great Green Wall, research focused on this species could have potentially far-reaching, positive impacts.

Resolving the paradox of a rainfall induced greening and increase in drought tolerant vegetation in the West--African Sahel

Hendrik Hänke[1], Lowe Börjeson[2], Kristoffer Hylander[3] and Elin Enfors[4]

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[4]Elin Enfors, Stockholm Resilience Centre, Stockholm University, Sweden.

After two decades of severe droughts in the 1970s and 1980s and extensive debates about desertification in the West-African Sahel, rainfall seems to be recovering and a re-greening trend has been observed. We present a multi-method case study from Burkina Faso where tree density clearly has increased since the 1980s, but where this greening process is associated with a shift towards more drought tolerant tree species. This shift is difficult to explain as a rainfall effect. Instead, we propose that these landscape changes need to be understood in relation to land management. The findings have implications for policies relating rural livelihoods to climate change adaptation, ecosystem services provisioning and biodiversity conservation.

Linking landscapes and livelihoods in Sudano-Sahelian West Africa

Hanna Sinare

Stockholm Resilience Centre, Stockholm University

Livelihoods in West Africa are highly dependent on landscape production. Fieldwork in northern Burkina Faso has identified landscape units, ecotopes, and the sets of provisioning ecosystem services (ES) generated in each ecotope. All ecotopes (except bare soil) generate multiple provisioning ES that also contribute multiple benefits to livelihoods, and no ES is only generated in one ecotope. This must be considered in investments e.g. to increase crop yield, to avoid trade-offs with other ES important for livelihoods. 'Fields with trees' is one ecotope that provides a range of ES additional to crop provision. In a review of ES from woody vegetation on agricultural lands across Sudano-Sahelian West Africa we found that provisioning ES such as medicine, fodder and food are reported for almost all 30 reviewed species. Fewer species are studied for regulating ES, with mainly positive or no effects. Research on landscape scale effects and distribution of ES is lacking, while these aspects are central to understand effects on livelihoods. In current work I use aerial photography and satellite images from five years 1955-2010, to study how ecotopes and associated ES in northern Burkina Faso have changed under a period of climate variations and high population growth.

Satellite remote sensing of parkland trees – potentials, limitations and applications.

Martin Karlson

Linköping University, Sweden.

Agroforestry in parklands is the main means for subsistence in the Sudano-Sahelian zone of West Africa. The tree cover in the parklands provide both provisioning and regulating ecosystem services, which are key for a sustainable development in this region. Climate change and rapid population growth will put strong pressure on the parklands and sensible land management strategies are needed. One important aspect of such strategies is the ability to efficiently and accurately map and monitor trees. However, both field inventories and remote sensing have limitations in these landscapes. Field inventories are spatially limited and have problems to characterize the high structural and floristic diversity, whereas remote sensing has to characterize heterogeneous landscapes with an open tree canopy due to mixed pixel effects. This presentation will describe experiences from recent work on the use of satellite remote sensing for mapping different tree cover attributes in West African parklands. Specifically, the potential and limitations of easily accessible satellite data for mapping individual tree attributes (tree crown size and tree species), as well as aggregate tree cover attributes (tree canopy cover and aboveground biomass) will be discussed. Potential application areas of the satellite mapping approaches in the Sudano-Sahel will also be presented.

More trees can improve groundwater recharge in the seasonally dry tropics

Bargués-Tobella, A., Hasselquist, N., Nyberg, G., Laudon, H., Malmer, A., and Ilstedt, U.

Department of Forest Ecology and Management, Swedish University of Agricultural Sciences (SLU). Umeå, Sweden.

Tree planting is being promoted worldwide as a way to restore or enhance the provision of ecosystem goods and services. Despite its benefits, tree planting in drylands has been questioned as the current paradigm in forest hydrology predicts that more trees lead to less water resources. This trade-off theory contrasts with the widespread view of forests functioning as sponges and sustaining dry season flows, but empirical support for the sponge theory is lacking.

The trade-off theory is based on paired-catchment studies showing that afforestation dramatically decreases stream flow within few years of planting. However, in the seasonally dry tropics this theory rests on limited evidence, and thereby the applicability of its conclusions in most tropical drylands is strongly limited.

We conducted a number of measurements in a West African agroforestry parkland, including soil infiltrability, water drainage, tree transpiration, degree of preferential flow and tree water uptake using $\delta^{18}O$. We show that an intermediate tree cover maximizes groundwater recharge. Below this optimum, more trees increase water yields, as their beneficial effects on soil hydraulic properties outweigh their extra water consumption. Our optimum tree cover theory gives new perspectives for research and policy on the hydrological impacts of trees in the landscape.

Challenges and opportunities for reducing inequalities and protecting ecosystems in Latin America and the Caribbean

Sal D

Session leaders: Torsten Krause, LU; Kristina Marquardt, SLU

Session lineup

13:15-13:40	**The Violence of the Written Word: the impact of bureaucracy on smallholders' livelihood and environment in the Brazilian Amazon.** Örjan Bartholdson
13:40-14:05	**Forest transition, agrarian change and ecosystem services in the Peruvian Amazon - the case of the Kechwa-Lamista farmers.** Kristina Marquardt
14:05-14:30	**Governing indigenous territories in the Peruvian Amazon: placing people or forest first?** Josefin Egerlid
14:30-14:45	**Guayusa: An alternative commodity to decrease tropical deforestation and support grower livelihoods or another commodification pipe dream?** Torsten Krause
14:45-15:15	**Coffee break**
15:15-15:45	**Constructing agro-ecology in Northeast Argentina. Food production and local farmers' markets in the province of Misiones.** Andrea Nardi
15:45-16:15	**The Black Sides of the Green: Soybean-Pine-Eucalypt Plantations, the Reproduction of Inequalities and Environmental Degradation in South America and Contemporary Agrarian Questions.** Cristián Alarcón-Ferrari
16:15-16:30	**Biobeds – a Swedish contribution to protect the environment from pesticide contamination.** Maria del Pilar Castillo
16:30-17:15	**Discussion**

The Violence of the Written Word: the impact of bureaucracy on smallholders' livelihood and environment in the Brazilian Amazon

Örjan Bartholdson

Swedish University of Agricultural Sciences, SLU

The bureaucracy that regulates land tenure, agriculture and community based forest management (CBFM) in the Brazilian Amazon aims at achieving an impartial administration and process of practices that complies with the intention of laws, regulations and decrees and safeguards the rights of the citizens at large and the vulnerable particularly. Yet the actual interpretation and implementation of laws, regulations and decrees is to large extent opaque, arbitrary, and contingent on subjective intentions, interests and perspectives. These irregularities and arbitrariness affect poor smallholders hard and hampers their access to resources and formal rights. In order to transcend these difficulties the smallholders utilize their social networks, above all vertical contacts. This strategy assigns great power and influence to various intermediaries and brokers, and affects how policies are implemented, how resources are distributed or not distributed and how power relations are articulated. The elite domination of economic and political capital and the arbitrariness of interpretation and implementation of laws, policies and decrees greatly affect smallholders' livelihood options and the sustainability of food production and CBFM forest management, yet these aspects of governance and governmentality is grossly under-theorized in research on preservation and re-generation of ecosystem services.

Forest transition, agrarian change and ecosystem services in the Peruvian Amazon - the case of the Kechwa-Lamista farmers

Marquardt, K, Bartholdsson Ö and A Pain

Department of Urban and Rural development, SLU

During the COP 15 meeting in Copenhagen 2009, the Peruvian government committed itself to completely halt the deforestation of primary forest by 2021. Nevertheless, the region San Martín in the Peruvian Amazon is presently in a situation of rapid forest transition and destruction, facing increasing competition and conflicts over land resources and the institutional landscape. This study explores the contrasts between large-scale agribusiness and small-scale modes of agricultural production; the latter conducted by indigenous Kechwa-

Lamista groups in San Martín. This study scrutinizes how small-scale Kechwa--Lamista farmers experience land pressure, agricultural intensification and commercialisation, deforestation and access to forest, and market access. The authors discuss the dynamic processes of agricultural and forestry land uses and the meaning of spatial complexities for Kechwa--Lamista farmers, by investigating the wide spectrum of forest cover change, agrarian transition, forest related ecosystem services and their trade--offs. The Kechwa--Lamista have developed land use forms that provide and manage ecosystem services in a more integrated and diverse form than the market--based alternatives and this paper discusses what such agricultural systems may contribute to the drastic deforestation and loss of bio--diversity in San Martín. The findings are based on ethnographic field works in 15 Kechwa--Lamista villages in San Martín.'

Governing indigenous territories in the Peruvian Amazon: placing people or forest first?

Josefin Egerlid

Swedish University of Agricultural Sciences, SLU

The current competition for land in the Peruvian Amazon presents a challenge to many indigenous communities which do not have legal ownership over their customary lands. This study analyses the strategies of Alto Huaja, a Kechwa-Lamista community in the region of San Martín, to get a collective title for a forest areas which they consider as part of their ancestral territories. More specifically, it explores how this struggle is being influenced by different external actors and their views and models for how indigenous territories should be governed. Through the lens of governmentality, the study explores the two main tenure arrangements under discussion in San Martín – conservation concession and title – the rationales that underpin them and their possible consequences for Alto Huaja. The data was collected through participatory observation and informal interviews in Alto Huaja and semi-structured interviews with nine organizations (governmental authorities, NGOs and indigenous organizations) that are connected to Alto Huaja. The results suggest that the Kechwa-Lamista's opportunities to control their ancestral lands are becoming more tied to their ability to do conservation and behave as 'ecological natives' rather than their rights as indigenous peoples, a development that could turn them from being farmers to becoming conservationists.

Guayusa: an alternative commodity to decrease tropical deforestation and support grower livelihoods or another commodification pipe dream?

Torsten Krause & Barry Ness

Lund University, LUCSUS

Creating strategies to curb tropical deforestation and forest degradation is imperative. Agroforestry has received increased attention since it, in theory, is a measure to curtail deforestation and promote income-earning opportunities for smallholders through a system of more sustainable land-use. Guayusa (Ilex guayusa) is a native tree of the western Amazon region grown by Indigenous farmers in agroforestry systems; its leaves are harvested, processed, and used as a drink similar to tea. Recently, guayusa has been commercialized and marketed outside of the region, diversifying small-scale agroforestry systems beyond the conventional subsistence crops (plantain, cassava, maize, etc.) and cash crops (primarily coffee and cocoa). Commercializing guayusa has the potential to augment farmers' incomes, increase the diversity of agroforestry systems in the region and buffer against pests of conventional cash crops. However, there is a lack of evidence that this is

actually the case for the current production system of guayusa. In order to provide a pathway for a more sustainable and prosperous future for Indigenous growers, the current uncertainties associated with the longer-term economic and environmental effects of guayusa need to be addressed. First, does the shift to include guayusa as a cash crop, for example, contribute to land-use diversity, or does it in fact promote the development of monoculture systems? Second, does the inclusion of guayusa provide additional socio-economic benefits for growers beyond that of traditional agroforestry systems? Third, what are the socio-ecological implications of commercializing guayusa?
We conducted a pilot study of guayusa production as a niche agroforestry experiment. Based on the interviews with 14 guayusa growing farmers in 4 Indigenous Kichwa communities in the Ecuadorian Amazon, we found that guayusa so far does not seem to replace any of the other cash crops that people have planted in their agroforestry plots. Despite the fact that prices for coffee and cocoa market prices are very volatile and low and the pest pressure for both crops large, they continue to contribute largely to the family income. Our results indicate that the main reason for guayusa not yet replacing the traditional cash crops is farmer's hesitation to give up their investments of both time and space for traditional cash-crops, unless they can be more certain that guayusa will be a good and reliable replacement. These findings are in so far important, as it shows that despite new markets for new agroforestry products, farmers express the desire to continue with traditional cash-crops until the harvest from guayusa can be sold more regularly and relations between the farmer associations and the buying company are stable and respectable. Thus, we highlight that commercializing guayusa as a new agroforestry product can have benefits for farmers and the environment, provided that rigorous criteria measuring social and environmental impacts are adhered to if guayusa is not supposed to end up as another commodification pipe dream.

Constructing agro-ecology in Northeast Argentina Food production and local farmers' markets in the province of Misiones

María Andrea Nardi

Department of Human Geography, Lund University

In my presentation I will seek to describe, analyse and reflect on the challenges and opportunities of agroecology in the province of province of Misiones, Northeaster Argentina, and the territorial dynamics generated from the promotion of a particular way to produce and trade food. My focus will be on the discourses and practices around food production for family consumption and for local markets and about ecological agriculture (or agro-ecology): its promises and constrains to be implemented. What kind of territorial dynamics are put forward by these new ideas and practices of agriculture production, environmental concern and small-scale agriculture? More specifically, what kind of society - nature relation is intended to be constructed and

what does it means in terms of space - power production? In order to do so, I will explain the importance attributed to the discourse and practice of food production and agro-ecology by local actors and how they link it to poverty reduction and sustainable rural development. I present the actors involved, their discourses, practices and contradictions. I take into consideration as well the constraints to put forward this project and the construction of an 'alternative rural development'. The food production proposal in Misiones takes place and need to be understood in the context of internationalization of the provincial economy and landscape (international agreements of biodiversity preservation) among other processes that link the local economies and politics to international interests ("globalization"). The advance of international capitals in the forestry and tourism sectors along with the increase in tobacco plantation commanded by international tobacco corporation and the end of public land to be occupied by family farmers have created different conflicts over natural resources (particularly land) that the alternative strategies of rural development and food production seek to address.

The Black Sides of the Green: Soybean-Pine-Eucalypt Plantations, the Reproduction of Inequalities and Environmental Degradation in South America and Contemporary Agrarian Questions

Cristián Alarcón

Department of Urban and Rural Development, Swedish University of Agricultural Sciences

This papers aims at analysing the social-ecological dynamics of soybean, pine and eucalypt plantation systems by using case studies from Chile and Brazil. The paper explores processes of land-use change and explains such processes in relation to the logics of capital accumulation and value struggles thereof. Within this context the paper focuses on class relations to explain the links between the reproduction of inequalities and environmental degradation. The empirical material used to develop the theoretical arguments put forward in the paper originates from two different research projects including field research in Brazil and Chile. The paper draws some more general conclusions by also bringing into the discussion other studies from other parts of South America and thus the paper further explores the link between the reproduction of inequalities and environmental degradation in relation to class relations. Within this context the conceptualisation of contemporary agrarian questions is discussed and the paper explores the very meaning of agriculture today by engaging in a discussion on the agriculture-forestry divide, and its origins, and by discussing the term political agronomy. By doing so the paper critically interrogates the political dimensions of agriculture for food security and the role of science in it.

Biobeds – a Swedish contribution to protect the environment from pesticide contamination

Maria del Pilar Castillo and Leticia Pizzul

JTI - Institutet för Jordbruks- Och Miljöteknik, Uppsala, Sweden

Pesticide contamination of water bodies can occur via diffuse and point sources. Diffuse contamination is related to the application in the field, e.g. runoff, transport through drainage systems and spray drift. Point sources are mainly associated with localized situations, e.g. filling of the tank and washing of the sprayer. The spraying equipment is normally filled at the same place on the farm, often at the farmyard near a water

source and where the topsoil has been removed and replaced with a layer of gravel and sand. The risk of pesticide leaching from point sources at such places therefore is high. A low-cost system known as the biobed can minimize the risks of pollution when filling and storing the sprayer. Biobeds originated in Sweden for more than 20 years ago and are the product of an effective collaboration between university and farmers. The biobed is a simple and cheap construction on farms intended to collect and degrade spills of pesticides. It consists of three components in a 60 cm deep pit in the ground: a clay layer at the bottom, a biomixture of straw, peat and soil filling the remaining 50 cm depth, and a grass layer that covers the surface. The biobed is also equipped with a ramp for driving and positioning the sprayer over the grassed surface. The purpose is that all handling of pesticides when filling spraying equipment should be done above the biobed so when spills occur they are retained and degraded in the biobed. The composition of the biomixture is intended to promote microbial degradation activities, especially those of ligninolytic fungi. Experiences in Sweden have shown that biobeds are effective, low cost and simple. They are also flexible and can be adapted to different type of production units, including small farms. Because of this, biobeds and several other systems, based on the principles of the biobed, have now been developed and implemented in many countries. Just in Europe there are approximately 5000 biobed systems in use. There are also biobeds in America (Chile, Guatemala, Peru, Argentina, Brazil, Mexico, Uruguay, Canada, USA), Asia (China), Africa (Morocco, Uganda, Cape Verde) and Oceania (Australia and New Zealand). One of the challenges in the work with biobeds is that their implementation to other situations as for which they were designed (i.e. point sources) can require modifications. Another challenge is the dissemination of the technique at different levels. Although there is a considerable volume of information available, most of it is at the scientific level (research papers and conference proceedings) or in different languages and related to the local conditions of the country where it is adopted. Therefore, there is the need to collect, organize and adapt the information available to be able to disseminate it more effectively. Often, human activities lead to pollution of the environment and its expensive remediation. Therefore, there is the need for development of biobeds and other proactive techniques that prevent contamination from happening.

Sustainable intensification in agriculture

Aulan

Session leader: Ulf Magnusson, SLU

Session lineup

08.45 -10:30	**Introduction.** Ulf Magnussin, *SLU*
	Research-for-Development (R4D) platforms - a multi-stakeholder initiative for integrated farming towards sustainable intensification. Per Hillbur, Malmö University, IITA/Africa Risisng
	Biochar as an opportunity for agriculture i small-holder farming systems in Kenya – a win-win-win situation? Cecilia Sundberg, *Swedish University of Agricultural Sciences, SLU*
	Converting organic waste into valuable animal protein – Business opportunities for improved organic waste management. Cecilia Lalander, *Swedish University of Agricultural Sciences, SLU*
	Efficiency in small-scale urban dairy production has potential to increase in Uganda. Renee Båge, *Swedish University of Agricultural Sciences, SLU*
10:30-11:00	**Coffee Break**
11:00-12:15	**Next Generation Breeding of East African Highland Bananas – The Main Staple of East African Great Lakes.** Rodomiro Octavio Ortiz Rios, *Swedish University of Agricultural Sciences, SLU*
	The role of civil society in assessment of GM crops in Africa (Kenya, South Africa, and Uganda). Ksenia Gerasimova, *University of Cambridge*
	Opportunities and Challenges of 'Climate Smart Agriculture' Activities: A Critical Review of Empirical Evidence. Linus Karlsson, *Swedish University of Agricultural Sciences, SLU*

Research-for-Development (R4D) platforms - a multi-stakeholder initiative for integrated farming towards sustainable intensification

Hillbur, Perl[1];Ngulu, Festo[2] and Mateete Bekunda[2]

[1]Associate Professor, Malmö University, Sweden / Research Consultant to IITA/Africa RISING, Ibadan, Nigeria
[2]International Institute of Tropical Agriculture (IITA), Arusha, Tanzania

One of the main challenges to agricultural development in Africa is to recognize and take advantage of heterogeneity, both in terms of socio-cultural variation and bio-physical diversity. Research-for-development (R4D) platforms is an initiative to address these challenges of diversity and heterogeneity, while at the same time focus on smallholders' demands for development interventions to have positive impact in terms of improved productivity, income generation and nutrition.

The presentation will focus on the organization, facilitation and long-term sustainability of R4D platforms established by the USAID/Feed the Future research program Africa RISING (Research in Sustainable Intensification for the Next Generation) in Tanzania. The platforms serve as vehicles for prioritizing and scaling of sustainable intensification through integrated farm practices, focusing on crop/livestock interactions at the farm and landscape levels, and also linking farmers to input dealers, markets, extension and policy. The primary beneficiaries are small-scale farmers and other stakeholders in rural areas who, through the platform, will have better access to information, technologies, expertise, credits, and markets.

An important aim of the platform approach is that research outputs as well as outcomes of platform discussions/negotiations will inform decision makers, public and private players in agricultural development and educators about how to promote technological, social and institutional change, in order to put sustainable intensification to scale.

The interplay between research-driven activities and a demand-driven process led by the local communities is still a big challenge. An essential component for the future is to further involve private sector representatives, policy makers and NGOs to stimulate the incentives for the local communities.

Biochar as an opportunity for agriculture in small-holder farming systems in Kenya – a win-win-win situation?

Sundberg Cecilia[1], Karltun Erik[1] Mahmoud Yahia[2] Nyberg Gert[1] Njenga, Mary[3], Roobroeck Dries[4] Röing de Nowina, Kristina[4]

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[3]World Agroforestry Center (ICRAF)
[4]International Institute of Tropical Agriculture (IITA)

Biochar, or black carbon formed by heating biomass under oxygen-limited-conditions, can be used as a soil amendment to improve soil productivity and sequester carbon in the soil. Biochar-producing cook-stoves can have additional beneficial effects on greenhouse gas emission reductions and health by reducing fuel demand and reducing smoke. In a research project in Kenya, biochar production and use are investigated in small-holder farming systems. The effects of biochar on local soils is tested in pot and field trials. Experiments focus on combined effects of biochar, lime and mineral fertilizer. Different application rates of biochar produced from three feedstocks (coconut husk, maize and coffee husks) are compared. Moreover, the energy efficiency and GHG emission reduction potential from biochar producing cookstoves are tested in participatory field trials. Pot trials were performed growing maize during two consecutive seasons. Preliminary results from the pot trials show increased yields in treatments where biochar was applied, although the effect varied with soil type. The cookstove tests show significant reductions of fuel required to cook a standard meal, as well as reduced PM and CO emissions, in addition to well-functioning biochar production. In conclusion, biochar is seen as a very viable option in providing smallholder farmers with a win-win-win situation in their quest to improve soil productivity and crop yields , energy efficiency and health.

Converting organic waste into valuable animal protein – Business opportunities for improved organic waste management

C. H. Lalander[1], S. Diener[2], B. Vinnerås[1]

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[2]SANDEC, Water and Sanitation in Developing Countries, Switzerland

Inadequate organic waste management can lead to leaching of nutrients into the environment and spreading of disease. At the same time, the nutrients and energy stored in these sources can be a great resource. In recent years, the concept of converting the organic waste into animal feed protein has arisen. Two strategies have great promise as waste management strategy: fly larvae composting and vermicomposting.
For the fly larvae composting, one fly of particular interest is the black soldier fly. Their larvae are high in protein (40%) and fat (30%) and thus an interesting alternative in animal feed. Very high waste reductions are possible, between 50-75% on dry matter basis. The waste-to-biomass conversion (BCR) rate possible with this strategy is 10-25% on dry matter basis.
For vermicomposting, epic earthworms are employed. A material reduction up to 70% on a dry matter basis can be achieved. The worms are 60-70% protein on dry matter basis and also of great interest for use in animal feed. The waste-to-biomass conversion rates demonstrated have been >10% on dry matter basis.
Fly larvae composting requires a more complex infrastructure, possibly with a centralised rearing facility operated by trained personnel, with satellite treatment units at the point of waste production operated by the waste producer (medium- to large-scale farmer, toilet operator, a municipality). This is of particular interest for profit driven waste management entrepreneurs

The vermicomposting option, on the other hand, does not require sophisticated infrastructure, has a simple start-up and is not very work intensive. This strategy is of particular interest for small-holder farmers.

Efficiency in small-scale urban dairy production has potential to increase in Uganda

Renée Båge[1], Benon Mbabazi Kanyima[2], David Okello Owiny[2], Maria Goretti Nassuna-Musoke[2], Theodoros Ntallaris[1], Johanna Lindahl[1], Patrice Humblot[1], Ulf Magnusson[1]

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[2]College of Veterinary Medicine, Animal Resources and Biosecurity, Makerere University, Kampala, Uganda

Small holder dairy cow farms are predicted to become chief contributors of milk and meat to the increasing urban demands in low-income countries. Improved animal health and fertility may increase production efficiency. A cross-sectional study of reproductive performance, husbandry factors and production traits in 59 urban/peri-urban dairy herds was performed in two different Ugandan regions, the capital Kampala and northern town Gulu. In Kampala, farmers were more often male (p=0.002), commercialized (p=0.0025) and more experienced (p=0.0001) than in Gulu. Milk production (p=0.0005) and calving rate was (p=0.0001) higher in Kampala. An in-depth prospective study of the influence of husbandry factors on cow fertility was conducted in 59 dairy cows in 24 dairy farms in urban and peri-urban Kampala. Onset of sexual cyclicity after calving was classified as normal (< 56 days) in 81.4% of the cases and delayed (> 56 days) in 18.6%. However, only 23.7% maintained regular cyclicity after normal onset. Our data indicate that gender contribution, degree of commercialization and productivity varies with degree of development and that the efficiency in the production – meaning better use of natural resources and higher incomes for the farmer – is possible to increase by improved reproductive management.

Next Generation Breeding of East African Highland Bananas – The Main Staple of East African Great Lakes

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East and Central Africa grow around one thirdof banana cultivation area in Africa. Banana is the most important staple in this region and provides up to one fith of calorie consumption per capita. Its perenniality plus all-year-round fruiting makes banana the ideal crop for household incomes, food and nutrition security for smallholder farmers in the Great Lakes of Africa. Bananas show 9% of edible yield potential because of several constraints affect the crop. In the mid-1990s, the National Agricultural Research Organization (NARO) of Uganda and the International Institute of Tropical Agriculture (IITA) began crossbreeding cooking and juicy East African highland bananas. There are 27 released secondary triploid hybrids –known as NARITA– with host plant resistance to pests and high edible yield. Most NARITA bananas had an average bunch weight of 17.8 kg at trials in Central Uganda, while the bunch weight of the widely grown local landrace was 11 kg. The edible yield of many NARITA bananas was significantly above their founder triploid banana grandparent; i.e., heterosis ranging from 10 to 300%, thus showing significant breeding gains. IITA, NARO, SLU and other partners are engaged in breeding research to significantly increase genetic gains per unit of time, thereby accelerating cultivar releases.

The role of civil society in assessment of GM crops in Africa (Kenya, South Africa, and Uganda)

Ksenia Gerasimova

University of Cambridge

This paper will compare two cases – South Africa and Eastern Africa (Kenia, Uganda) for understanding of acceptance and use of biotechnology in agriculture. It will start with a brief review of GM crops status in each country at the moment. While South Africa is the eight largest producers of GM crops, Kenya and Uganda have only recently come across the development of regulatory measures that can allow commercialization of GM crops. Both countries have started GM trials, but no crop is produced commercially. Unlike the case of South Africa, where a small number of local NGOs protest against GM (Biosafety South Africa, Earthlife), Eastern Africa is a current battlefield of the GM debate. Scientists and state authorities experience heavy lobbying from both proponents and opponents of the use of GM technology in African agriculture. A broad range of international organizations, such as Friends of the Earth, Greenpeace, the Bill and Melinda Gates Foundation (particularly with their the Water Efficient Maize for Africa (WEMA) project, and smaller local NGOs, such as Kenya GMO Concern, Uganda National Farmer's Federation) argue about GM crops in Africa. Interestingly, both sides link GM crops to smallholder farmers. GM supporters believe that new technology can enhance farmers' ability to grow enough to feed their families and 'invest in their future' (WEMA, 2011. On the opposite, farmers-based NGOs are convinced that GM seeds might work for commercial farmers, but not for subsistence farmers, who would be trapped in a system they could not afford.

Triple Wins or Double Faults? A Critical Assessment of the Power and Influence of Discourses on Climate Smart Agriculture

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Based on 'triple wins' between adaptation, mitigation and food security, Climate Smart Agriculture (CSA) has been enthusiastically embraced by a variety of global institutions and programs. However, CSA has received

criticism for its overemphasis on mitigation, for sanctioning agroindustrial expansion, and for being inattentive to structural causes of the problems it seeks to address – all of which risk undermining livelihoods for the poorest segment of society. Yet, little is known about how CSA has shaped field level activities on agriculture and climate change, and what impact CSA activities have had on targeted populations. While CSA is not in itself prescriptive beyond the focus on triple wins, what practices are rendered 'climate smart' are shaped by the actors adhering to its principles. This paper identifies agricultural approaches that have subscribed to CSA to gain leverage in practice and policy, encompassing Sustainable Intensification, Agroforestry and Conservation Agriculture. Is it probed how CSA has evolved into different field level activities, to examine the extent to which these activities are both climate-smart and people-sensitive, and what their relative emphasis on mitigation, adaptation and food security are. The paper will provide evidence of CSA activities to date, and identify opportunities and challenges for future implementation of CSA approaches.

Empowering women and youth in agriculture

Session leaders:

Sal F

Agnes Andersson Djurfeldt, LU; Jim Sumberg, IDS

Session lineup

8:45-8:50	**Introduction**
8:50-9:15	**Empowerment through entrepreneurship? Pursuing gender equality through agriculture in LDCs.** Cecilia Fåhraeus, *Uppsala University*
9:15-9:40	**The role of women´s networks in local gender contract negotiation** Martina Angela Caretta, *Stockholm University*
9:40-10:05	**Turning the tables? REDD+ and changing gender relations.** Lisa Westholm, *University of Gothenburg*
10:05-10:30	**Understanding the intersectionality of entitlements, access and use of agricultural land in Burkina Faso.** Jenny Friman, *University of Gothenburg*
10:30-11:00	**Coffee break**
11:00-11:20	**Wet land agriculture, low technology irrigation and agricultural production in Africa: A study of dambos and dimbas in Malawi.** Ellen Hillbom, *Lund University*
11:20-11:40	**Mirage of progress? Gender dimensions of agrarian structural transformation in six countries of sub-Saharan Africa.** Göran Djurfeldt, *Lund University*
11:40-12:00	**Is the gender gap in agricultural productivity meaningful?** Christine Okali, *Independent Research Professional*
12:00-12:15	**Discussion**

Empowerment through entrepreneurship? Pursuing gender equality through agriculture in LDCs.

Cecilia Fåhraeus

Department of Human Geography, Uppsala University

Among prominent development institutions such as the World Bank and UN agencies, there is a general notion that livelihood support targeted towards women will have a beneficial impact on their degree of empowerment. Female entrepreneurship is typically framed as an instrument to address structural gender imbalances, as it is assumed that income generation will result in greater independence and self-reliance as well as an improved social standing. As a result, empowerment is typically pursued through policies aimed at enhancing women's entrepreneurial skills. The assumed link between income generation and women's empowerment is also predominant within agriculture, where numerous interventions have been made to forward this aim. However, studies have demonstrated an ambiguous relationship between livelihood support, income generation and gender equality. There is, for example, evidence of increased levels of domestic violence in households where women have received training in agricultural entrepreneurship.
The aim of the presentation is to give a research overview of empowerment outcomes for women engaged in agriculture, rural as well as urban, in Least Developed Countries (LDCs), most notably sub-Saharan Africa. This involves a problematization of the discourse of female entrepreneurship prevalent within development policies geared towards agricultural livelihood practices.

The role of women´s networks in local gender contract negotiation

Martina Angela Caretta, PhD candidate

Department of Human Geography, Stockholm University

This paper examines the negotiation of local gender contract – or in simple terms, gender relations - thanks to engagement in group enterprises. While this dimension has been pointed out in the definition of local gender contract, it has not been explored yet. I analyze this missing analytical category by using the concept of communities of practice by investigating how negotiation interplays and overlaps between groups and individuals. Based on two case studies of women´s groups from Eastern Africa, I contend that communities of practice can help understand negotiations that shape local gender contracts. In this work, I argue that Eastern African women partake in social initiatives which can enhance their learning and negotiating skills

and allow them to gain recognition at the household and societal level or can reinforce imbalanced local gender contracts. Additionally, based on a recent re-reporting and exchange trip done among these two groups, reflections will be presented on how Kenyan and Tanzanian women triggered reciprocal learning by challenging each other to improve their group routines and practices to further their proactive role in the local agricultural communities.

Turning the tables? REDD+ and changing gender relations

Lisa Westholm

Univesity of Gothenburg

The REDD+ programs in Burkina Faso hope to mobilise women in forest protection by increasing their incomes from the forest and thereby incentivising forest protection. The projects proposed are to compensate the loss of income from a predominantly male activity -- commercial fuelwood cutting -- with increased incomes from a traditionally female activity – extraction and processing of NTFPs. Forest related activities are highly gendered and the traditional division of labour as well as social norms prevents many women from going to the forest, especially for some ethnic groups.
This raises important questions about the potential impacts of the program on gender and social relations.
This study analyses the gender roles and divisions of labour related to the forest and how these may come to change with the planned REDD+ activities in two villages in south-western Burkina Faso. How do policy makers and project documents talk about gender roles in the projects and how does this relate to the gendered divisions of labour in the villages? How do they relate to existing institutions? What might be the effects from the REDD+ projects' intentions to shift income-generating activities from traditionally male to traditionally female domains?

Understanding the intersectionality of entitlements, access and use of agricultural land in Burkina Faso

Jenny Friman

University of Gothenburg,School of Global Studies, Environmental Social Science Program

Research shows that agriculture in Burkina Faso, West-Africa is faced with a number of challenges as well as windows of opportunities for improving livelihoods. This presentation will discuss issues of how and by whom rights and access to agriculture land is gained and maintained and why this matters for how land is used. Special attention will be placed to how differences such as age, gender and class matters for gaining rights and access to agriculture and the role that use has for producing and re-enforcing inequalities. Analyzing inequalities in access and entitlements to agriculture can help us to understand why certain challenges are created or persist and how possibilities for improving livelihoods can arise. I draw on theorizations related to intersectionality and difference in order to understand why and how issues of power, authority and intersecting differences matter for shaping access and entitlements and how this relates to how resources and agricultural land is used and by whom. The presentation is based on fieldwork conducted during six months in Burkina Faso, 2014 – 2015. Data was collected mainly through semi-structured interviews with people in two villages as well as with environment and agriculture governmental officials at local, regional and national level.

Wet land agriculture, low technology irrigation and agricultural production in Africa: A study of dambos and dimbas in Malawi

Ellen Hillbom

Lund University

Only a modest 6 percent of farm land in sub-Saharan Africa is managed under constructed irrigation systems (You et al. 2010: 1; Svendsen et al. 2009: 3). Instead, most smallholders rely on either moisture, farming natural wet lands, or low-technology small-scale solutions, e.g. using water cans. While these farming techniques only secure modest amounts of water, they have proven important for a large number of farmers striving to prolong growing seasons, produce off-season and growing high value crops (Scoones 1991).
In this study we turn to rural Malawi where smallholders access *dambos*, plots on marsh lands used for crop farming and grazing, and *dimbas*, gardens situated along rivers and streams where plants can be irrigated with low-technology systems. Both land types are understood to be highly productive and we ask to what extent accessing *dambo* and *dimba* land influence smallholders' increase and diversification of crop production. Further, by comparing male and female headed households we investigate the validity of Chants' (2007) proposed 'feminization of poverty' for the *dambo/dimba* case, i.e. whether institutional structures hinder women's access and control over these agricultural resources.

Mirage of progress? Gender dimensions of agrarian structural transformation in six countries of sub--Saharan Africa

Agnes Andersson Djurfeldt and Göran Djurfeldt,

Lund University

Sub-saharan African economies have ranked among the world's fastest growing since early this millennium. Has this growth at all spilled over into the agrarian sector? Has it affected the majority of the poor in the sub-continent; have the life chances of children, women and men among the smallholders in its villages been at all improved? These questions are addressed in this paper, which follows up on an earlier work (Andersson Djurfeldt and Djurfeldt (Andersson Djurfeldt and Djurfeldt 2013) that modelled agrarian structural transformation and three processes of change: intensification, diversification of cropping and pluriactivity. The earlier work concluded that for the first panel wave, covering 2002 to 2008, smallholders decreased their degree of crop diversification, focusing their cultivation of staples, but without necessarily intensifying their cropping of staples. As unexpectedly, pluriactivity decreased rather than increased as a consequence of

greater attention to staple crop production. In the earlier paper the authors did not go much into the gender aspects of these processes.
We will now revisit the original paper and compare the 2002 to 2008 period with the most recent panel wave, 2008 to 2013, and the three processes commonly associated with structural transformation, viz. staple crop intensification, diversification of crop patterns and diversification out of agriculture into non-farm activities. Are there signs of either of these processes, what are their gender aspects and what seems to be driving them? Does the earlier period differ from the latter, and in that case how?
We will discuss the gender aspects of the three processes based on a comparison between female and male-headed households and use complementary qualitative data collected from individual farmers and focus group discussions to illustrate and problematize the quantitative findings.

Is the gender gap in agricultural productivity meaningful?

Christine Okali

Independent Research Professional

That gender inequality acts as a significant constraint to growth in sub-Saharan Africa, and that removing gender-based barriers to growth will make a substantial contribution to realizing Africa's economic potential (Blackden and others 2006; Blackden and Bhanu 1999) is a central claim supporting much of the current interest in engaging women in agricultural development programmes. The 2006 article here pulls together data on gender intensity of production for all countries in SSA.
In the case of agricultural production, the evidence of gender inequality derives from a large sample of households in Burkina Faso and focuses on yield and productivity gaps between farm plots managed by women and men reported by Udry et al. (1997). This single paper has been a, if not the central source used to support the existence of, and the policy prescriptions designed to close the identified gaps. Policy prescriptions have focused on increasing access to a range assets and inputs, especially individual land tenure rights for women, and fertilizer for plots which they farm. Changes in land tenure arrangements have been at the centre of gender advocacy for decades, however concerns about low fertilizer usage in SSA have never featured significantly in the women in agriculture literature.
Recent analysis of the gender gap (World Bank 2014), based on large-scale data sets from six African countries including Ghana, Ethiopia Malawi, Niger, Nigeria and Tanzania, compared women and men with similar-sized plots in a similar context. Gaps range from 23% in Tanzania to 66% in Niger. The explanations for the existence of the gaps and suggested policy prescriptions provided the stimulus for this paper. The paper joins others (e.g. Jackson 2006) in questioning gender analyses of development that are taken up at the level of categorical comparisons of women and men with, in this case, rural, especially agricultural development conceptualized as starting from an assumed male subject, with men being the norm against which women, 'the deviant gender', are measured.

Improving access to markets and developing value chains

Sal G

Session leader: Kostas Karantininis, SLU

Session lineup

08:45-09:00	**Willingness to pay for organic food in Africa.** Kostas Karantininis, *Swedish University of Agricultural Sciences, SLU*
09:00-09:30	**Cooperatives and Farm Gate Prices for Agricultural.** Jens Rommel, *Leibniz Center for Agricultural Landscape Research.*
09:30-10:00	**Farmland investment in Africa: What's the deal?** Luca di Corato, *Swedish University of Agricultural Sciences, SLU*
10:00-10:25	**Coffee break**
10:25-10:55	**Choice of Marketing Channels in the Kenyan Domestic Organic Market.** Leah Murimi, *University of Nairobi*
10:55-11:25	**Value chain governance and its influence on integration: Evidences from the malt-barley value chain in Ethiopia.** Mulugeta Watabaji, *Ghent University*
11:25-11:50	**A model for Prototype Testing, Up-scaling and Commercialization of New Stress tolerant Canning Bean varieties in Eastern Africa.** Paul Kimani, *University of Nairobi*
11:50- 12:15	**Discussion**

Cooperatives and Farm Gate Prices for Agricultural Produce: Multilevel Evidence on Non-varietal Wine in Mendoza, Argentina.

Agustina Malvido Perez Carletti[1], Markus Hanisch[1], Jens Rommel[2]

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[2] Leibniz Center for Agricultural Landscape Research, Institute of Socio-Economics

The Agricultural Economics literature has looked at the impact of cooperatives on farm gate prices in two distinct ways. First, it has been argued that, at the farm level, cooperatives can reduce transaction costs, and farmers may, thus, be willing to accept lower prices when selling to a cooperative. Secondly, at the regional level, cooperatives may exhibit a yardstick function. With increasing market share they can have a positive effect on prices in a monopsonistic regional market. In this paper, we combine both arguments in an analysis of the price effect of cooperatives in the non-varietal wine market in Mendoza, Argentina. We explicitly distinguish between the two opposite price effects by estimating a series of multi- level regression models for a panel data sample of 4,076 wine selling transactions for 2007– 2012. In line with theoretical predictions, we find that cooperatives pay lower prices than investor-oriented firms at the individual level. However, we do not find a large positive effect of cooperative strength within a department on regional prices. The results are robust to different specifications of the econometric model.

Farmland investment in Africa: What's the deal?

Luca Di Corato[1], Sebastian Hess[1,2]

[1]Swedish Universituy of Agricultural Sciences, SLU
[2]Christian-Albrechts-University Kiel

Foreign direct investment by multinational corporations or governments in the agricultural land of developing and least developed countries is an ongoing trend which appears to be driven by the rising and increasingly volatile prices of agricultural commodities. Ideally, this type of FDI would benefit not only investors but also the host countries, since it may lead to infrastructure development, technology transfer and job opportunities in rural areas.
In our paper, we present a dynamic stochastic programming model that reflects the typical bargaining situation concerning large land deals in Africa. The model allows assessing the effect of market- and country-specific risks and taxation. It shows that commodity price volatility increases the value of the land development option, but slows down the land development process. Furthermore, it shows that host country attempts to negotiate fixed commitments to the speed of project development may run counter to the structure of economic incentives at the project site. Finally, the applicability of the model is demonstrated for a recent 10,000-hectare cotton project in Ethiopia.

Choice of Marketing Channels in the Kenyan Domestic Organic Market

Murimi L. M.[1], Nzuma J.[1], Kostas K. [1,2] and Wahome R. G.[1]

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[2]Swedish University of Agricultural Sciences

A questionnaire was administered to provide data on farmers' marketing practices as well as their demographic,

farm characteristics and transaction costs. Using this data, the determinants of market outlet choices by organic farmers were analysed based on a theoretical model of marketing channel choice, under random utility maximisation. Results indicate production and marketing of high value products such as organic vegetables is impeded by transaction costs and limited credit facilities. Lack of market information and gender affect choice of marketing outlets. The findings suggest a need to improve market coordination, the modes of communicating market information as well as establishment of more organic outlets closer to the producing areas.

Value chain governance and its influence on integration: Evidences from the malt-barley value chain in Ethiopia

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Previous studies question the effectiveness of a single governance tool for value chain integration (VCI), especially in the face of uncertain environment and more dependence on value chain partners. The paper, hence, addresses this complex research question using empirical evidences obtained from the Malt Barley Value Chain (MBVC) in Ethiopia. The paper also presents a conceptual framework that links value chain governance (VCG) and VCI given the different governance tools and transaction attributes. The study has utilized survey data collected from 320 smallholder farmers and 100 traders from four malt-barley growing districts in Ethiopia. Besides, qualitative data were captured through in-depth interviews with MBVC members to complement the survey data. Both descriptive statistics and ordered logit regression were used for data analysis. The study highlights some of the key findings. One, the use of contracts at farmers-cooperatives link has positively influenced VCI. Two, the use of relational tool (i.e. trust) also exhibits positive influence on VCI at some studied links. Three, the influences of transaction attributes on VCI vary from link to link. For more robust results, wider empirical data from several agro-food value chains are needed.

A model for Prototype Testing, Up-scaling and Commercialization of New Stress tolerant Canning Bean varieties in Eastern Africa

[1]Kimani P. M., [1]A.[2]M. Njiru, [2]P. Waidhima and [3]S.Omondi

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[2]Trufood Ltd, Nairobi
[3]Njoro Canning, Kenya

Poor linkages among the key actors in the canning bean value chain are a major constraint to large scale production and commercialisation of the new high yielding stress tolerant varieties released in eastern Africa. The objective of this study was to test a prototype innovation platform linking actors along the grain value chain which supplies grain to processing industry. Bean research program provided seed for six new varieties to two collaborating canning firms. Each firm developed contractual agreements with four clusters of smallholder farmers to produce grain for processing. Results showed that the new varieties were more drought tolerant, higher yielding, uniform, resistant to diseases than local farmer's varieties. Mean grain yield varied from 740 to 3043 kg ha-[1]compared to less than 500 kg ha-[1] in the past. Farmers produced and sold 3900 kg of high quality grain to the companies for processing, and 3300kg of nucleus seed. Farmers are keen to produce grain and seed because they were assured of a market, while the industry can now control and predict the quality of the grain supplied by farmers. The model innovation platform demonstrated linkages along the value chain required to scale-up and commercialize the new varieties.

POSTER SESSION

Session leader: Karolin Andersson, University of Copenhagen

Agripreneurship to drive productivity, opportunities and innovation in global agriculture

Kim Eriksson[1], Olaide Idiat Jinadu[2], Rickard Karlsson[1], Christine Sandén[1], Simon Wancke[1], Charlotta Ydrén[1]

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In 2012 the International Institute of Tropical Agriculture (IITA) took the initiative in developing solutions to youth unemployment, livelihoods and food security through enhancing youth entrepreneurship in agriculture in Africa. To this end IITA created a group called the IITA Youth Agripreneurs (IYA), a group of well-educated youth with a multidisciplinary background. The program has been successfully replicated in various Africa countries, Central Africa (D.R Congo), Eastern Africa (Tanzania and Kenya) Western Africa (Nigeria). The group exploits various opportunities that exist in agricultural value-chains as a means of creating wealth and achieving enhanced income and self-dependence amongst youths and as a means of empowering women. Because of the clear parallels between YAP and the Lantmästare-kandidat program in approaches, challenges and opportunities, we are exploring the possibilities of aligning programs and provide opportunities for exchange. The goal is to enhance global aspects and perspectives in education, find the synergy in global agricultural entrepreneurship, and ultimately to rejuvenate, innovate and upscale sustainable agriculture with a global perspective. Here we report on the findings of two exchange visits between Nigeria and Sweden and the possible routes of synergy between the programs.

A network for capacity building on biochar production and use in Africa

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Pyrolysis technology and biochar have the potential to contribute to improved livelihoods for smallholder farmers in Africa, especially women, through increased soil fertility, farm productivity, energy efficiency, improved health and reduced drudgery. Biochar also has the potential to contribute to carbon sequestration and improve climate change adaptation options. However, it is a relatively young field of research with limited expertise.

As biomass resources are limited, there are inevitable trade-offs between different uses of biomass for energy or as biochar applied to soil. Nevertheless, there are opportunities and niches for pyrolysis technology to enable win-win-solutions to improve livelihoods, natural resource management and climate change mitigation. A coordinated African Biochar Consortium can contribute to realizing the potential benefits and overcoming challenges of biochar development, production and use.

To this end, a SIANI-funded xpert network for biochar in Africa is being created, aiming to create a platform of biochar research for development (R4D) in Africa, to generate gender-responsive, evidence-based, accessible, and applicable knowledge that will equip farmers and practitioners with tools and technologies for pyrolysis and biochar production and use. The network will exchange experiences, coordinate research, facilitate participatory development and disseminate knowledge on biochar and pyrolysis technology.

Social cash transfers, generational relations and youth poverty trajectories in Lesotho and Malawi

Nicola Ansell, Flora Hajdu, Thandie Keromamang Hlabana, Evance Mwathunga, Elsbeth Robson, and Lorraine van Blerk

Swedish University of Agricultutral Sciences, SLU

Growing evidence shows that the major recent innovation in policy responses to poverty in sub-Saharan Africa, social cash transfer schemes (SCTs), are successfully addressing symptoms of poverty among their target populations, particularly children and the elderly. However, impact evaluations have paid minimal attention to their effects on youth or on how they intervene in and are negotiated through structural relationships. Drawing on recent calls for a 'generationing' of development, this project examines how SCTs shape generational relationships (between older and younger people; between members of an age cohort; between young people and wider structural contexts) and how this intersects with gender and other social relations. It focuses on two countries that have instituted contrasting SCTs in the past decade: Lesotho (pensions and child grants) and Malawi (SCTs targeted to ultra-poor labour constrained households). The research will augment a rich dataset from a previous project (2007/8) which detailed the life histories and aspirations of 80 young people, then aged 10-24. Follow-up interviews will map the poverty trajectories of these young people and explore various influencing factors, including SCTs which some of their households will have begun receiving since 2007. The research will feed into policy through continuous workshops/interaction with policy makers.

Landscape approaches in practice in the South

Fredrik Ingemarson

The Think Tank for International Forestry Issues, SIFI

A new sense of urgency has evolved that traditional sectorial approaches are no longer working to identify challenges and opportunities in global land use development. This policy brief identifies priorities on how to proceed from the current level of understanding in applying landscape approaches in practice. The governing structures today do not correspond to landscapes, but rather to sectors at all hierarchical levels. It remains to be seen if the integrated landscapes outweigh their transaction costs. The conclusion is that an interaction

between the landscape approach and the sectorial administration would be the most fruitful way forward at this stage. Well represented sectors and trust among stakeholders are necessary for the Landscape Approach to become successful. Another advice is to be careful with a formal institutionalization of the landscape approach. There is a need for taking environmental services more into consideration in all parts of the landscape. The way forward is suggested to focus upon all aspects of sustainability, notably also economic aspects. Without the consultation of supporting economic incentives a new concept will hardly be successful. Instead of only evaluating economic and ecological criteria it is suggested to focus more on what the landscape contributes toward achieving societal goals.

Fat Bulls and Gender Equity; Land use management that matters

Gert Nyberg[1], Per Knutsson[2], Ingrid Öborn[1,3], Stephen Mureithi[4], Peter Mwangi[5], Said Mohammed[6], Magnus Jirström[7], Jan de Leeuw[3], Madelene Ostwald[2,8], Vera Karmebäck[4,7], John N Waiore[4], Ewa Wredle[1], Anders Malmer[1]

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Drylands cover around 40% of the world, host nearly 1/3 of its human population and 50% of the livestock, and has traditionally been used and managed by pastoralists through communal or common property rights. In Sub-Saharan Africa, 40% of the total available land is utilized by 265 million pastoral/agro-pastoral farmers. A transformation of livelihood and agricultural production system is, and has been for around 30 years, going on in drylands in West Pokot, Kenya. Enclosures as a management system to reduce land degradation and to increase fodder production was introduced by Vi Agroforestry. Enclosures are now the dominating form of management in Chepareria division; 90% of farmers use enclosures. Adaptation continues to spread long after the NGO phased out their activities in the area in 2001; almost 40 % of enclosures are established since 2004. Enclosures have more soil C and higher vegetation cover and diversity than adjacent areas with open grazing. Enclosures have enabled agricultural diversification of e.g. increased crop agriculture, poultry production and the inclusion of improved livestock. Along with the use of enclosures comes a transition from common to more private access and user-rights, and a commercialisation of agricultural produce, including fodder. Other factors that may drive the land use system towards more market orientation are improved infrastructures and communication. Enclosures and other development drivers have increased agricultural productivity and increased opportunities for women to integrate in the economy. Poultry is not part of the Pokot tradition, but has now become common. Poultry rearing and marketing is dominated by women; 74% of households rear poultry. The transformation from pastoralism to a livestock based agro-pastoral system where enclosures are an integrated part of the land use management may hence represent a sustainable and productive development that could be a valid way forward in many dryland areas.

The White Revolution in India: the end or a new beginning?

Ram Deka[1], Johanna Lindahl[1,2] , Tom Randolph[1], Delia Grace[1]

International Livestock Research Institute
Swedish University of Agricultural Sciences

The milk revolution, popularly known as White Revolution, started in India in 1970 with a government-sponsored programme - Operation Flood. This brought significant improvement to smallholder dairy systems by promoting cross-breeding, improving access to feed, veterinary services, markets, milk processing and preservation infrastructure. By 2013, India was the world's largest milk producing country with total production of 132 megatonnes up from 17 in 1951. However, the cooperative system, the main vehicle for dairy development, was not successful everywhere especially, in regions where dairying had less potential to scale-up, leaving traditional milk production, with 80% of the market share, behind. Although cross-breeding became popular, average milk productivity per animal is still far below the global average and the traditional sector lacks awareness, capacity, incentives and resources. Simultaneously, urban and peri-urban dairying is developing rapidly, but accompanied by health and environmental experiments, Overall, we need systematic, location specific, holistic approaches to address the constraints. We present initial findings on promising approaches from research in Assam, Bihar and urban and peri-urban dairying. These suggest a 'third way' of dairy development driven by demand and value chain evolution that can complement the approaches implemented by co-operatives and more recently by large private sector investment.

Food security and farm revenues among smallscale farmers in Malawi Under changing climate, population growth and landuse options

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In Malawi, like in many other Sub-Saharan African countries, smallscale farmers comprise up to 80% of the population and agriculture is often the sole source of livelihood. Due to financial and resource limitations, smallscale farmers are faced with fewer opportunities in choosing or accessing adaptation options, hence being more vulnerable.

In this study we consider welfare as an aggregate measure of food security and farm revenues. Through an integrated climate biophysical and economic modelling process, welfare of smallscale farmers' is analysed over a period of 50 years (2010-2060), under different novel crop management practices against probable scenarios of landuse, population growth and farm input subsidies. The analysed crop management practices include subsistence system, representing the no adaptation option, conservation agriculture, use of fertilizer trees (agroforestry), optimal fertilization and intensive farming systems. The study includes all major crops, which represent over 95% of cultivated land in Malawi.

The climate biophysical modelling utilizes the Environmental Policy Integrated Climate (EPIC) model to simulate crop productivity under different crop management practices while the partial agriculture sector economic model is developed through the Generalised Algebraic Mathematical Systems (GAMS). Welfare sensitivity to climate impact is discussed under different management options and scenarios alongside the role played by reproductive health services. We conclude by highlighting a number of probable policy recommendations regarding investments levels on crop management practices, landuse change and reproductive health services that optimize welfare of smallscale farmers in Malawi.

Structure and gender dynamics in the value chain of cassava leaves in Mkuranga District, Tanzania

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In view of the political-economic context of transforming agricultural value chains with potentially altered gender relations as a consequence, this study explores the structure and gender dynamics in the value chain of cassava leaves in Mkuranga District, Tanzania. This was done to reveal factors that inhibit or facilitate value chain development, which can inform researchers and policy makers on efficient and gender sensitive strategies for support of the value chain actors. Data was collected through a household survey, semi- structured interviews, focus group discussions and observations, and quantitatively and qualitatively analysed and described.

Production, consumption and marketing of cassava leaves were widespread in Mkuranga District. Production and retail were dominated by women, whereas male participation was higher in wholesale of large volumes in urban areas. Processing was manually performed by women. Value added activities, horizontal and vertical integration was limited. Women's increased market participation was impeded by little business skills and low financial capital and education. Issues were grounded in social gender roles and norms and perceived to limit further value chain development. New processing technologies and horizontal and vertical coordination was suggested as pathways for increased market linkages and improved business opportunities for actors, especially farmers.

On farm experiments with water harvesting, conservation tillage and productive sanitation in Bolo Silasie village, Ethiopia.

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Future agricultural intensification will need to be "triply green", i.e. increasing yields (green) using sustainable methods (green) while emphasizing green water management, as the potential of expanding blue water use for irrigation is limited in many areas. The present research explores the "triply green potential" of combining promising agro-ecological approaches for improved conservation of local water, soil and nutrient resources:

1. **Water harvesting**: Collection of run-off water in ponds close to the fields to bridge crucial dry spells with supplemental irrigation
2. **Conservation tillage:** Reduced or "wise" tillage methods that enhance infiltration and reduce erosion
3. **Productive sanitation:** Safe and productive recycling of nutrients and organic matter in human excreta

On-farm experiments (2012-2015) test the hypothesis of positive synergies for crop yields and resilience against rainfall variability and water scarcity that together outweigh in social, economic and biophysical terms the effects of each separate strategy (i.e. that 1+1+1 > 3). Researcher led trials combining the technologies have been complemented by farmer managed experiments comparing the effects of using local fertility sources with external inputs. Preliminary results from field trials as well as farmer interviews will be presented.

LARRI – The Land Rights Research Initiative

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Twitter: @LandRights_Swe
Facebook: LandRightsResearchInitiative

The Land Rights Research Initiative is a platform for discussion and collaboration among researchers, students and others interested in land rights issues in the context of global change. LARRI is hosted by GCGD - the Gothenburg Centre of Globalization and Development at University of Gothenburg. The secretariat is placed at Centre for Environment and Sustainability, GMV.

LARRI was officially launched in 2012. Through our activities we have built up an extensive network of contacts with researchers, students, consultants, civil-society representatives and development officials within Sweden, in Swedish development cooperation in Africa as well as with international organizations and research institutes.

Land rights issues have been on the development agenda for a long time but they have taken on increased importance in recent years due to the escalating global competition for land. This process risk to deprive local people of their access to land if their tenure rights are not secured. How to secure individual or communal tenure rights is thus crucial but in itself a very complex issue. This and related topics has since the launch of the initiative been the focus of LARRI networking meetings, our open seminars, joint events, conference sessions, reports and our newsletter (with 200 recipients in Sweden and abroad).

The 2015 drought in Papua New Guinea: vulnerable people and places

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Most people (80%) in Papua New Guinea (PNG) are rural villagers who produce most of their own food, with sweet potato being the most important food crop. Rainfall is usually high to very high in PNG (1000 to over 9000 mm/year), but since mid-2015, much of PNG has been gripped by a major drought. At high altitude locations (2000 – 2800 m), all plantings of the staple food crop sweet potato have been destroyed by repeated severe frosts.

All indications are that the current drought and frosts is more severe than the worst event in recorded history, which was in 1997. In some remote locations, the death rate increased dramatically (up to 70/1000 people/year) during the 1997 drought.

A 10 year study using five parameters has identified locations where people are most sensitive to drought and other stresses. This information is key to understanding who is most vulnerable to shortages of food and drinking water and to an increased risk of disease during the current drought. The locations where people are most subject to climatic extremes and other pressures are presented in this poster as: 'Priority locations for rural development in Papua New Guinea'.

Impact of push-pull technology on smallholder farmers' welfare: A generalized propensity score approach

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The paper evaluates the effect of intensity of adoption of push-pull technology integrated in maize-dairy farming systems on household welfare measured by poverty, and incomes. Five hundred and sixty eight households were interviewed in four districts in Eastern Uganda in November and December 2014. Cross-sectional data was collected using structured interview schedule and focus group discussions and data was analyzed using STATA software. The parametric estimation models the intensity of adoption of the technology whereas generalized propensity score methodology estimates the dose response (average treatment effect) relating intensity of adoption and household welfare. Preliminary findings from the parametric analysis revealed that as households increase land area under push-pull technology, their incomes significantly improves while the extent of poverty declines. This implies that increased investment on push-pull technology dissemination is essential to increasing incomes and reducing poverty among smallholder farmers.

Market Participation by Male and Female Rice Farmers': A Case for Ahero Irrigation Scheme, Kenya

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Agricultural commercialization has a potential to increase farming households' income and standard of living. This study assessed the degree of rice commercialization and the determinants of commercialization of rice farmers in Ahero Irrigation Scheme, Kenya. Stratified and probability proportionate to size sampling were used to select 221 rice farmers. A Household Commercialization Index (HCI) was computed to estimate the degree of commercialization and then modeled as a function of explanatory variables. Informed by the Chow test, three regressions were estimated; male, female and the whole sample. The HCI were 0.77, 0.79 and 0.78 for male, female and whole sample respectively. Household size, off-farm income generating activities, household income, rice price and pesticides usage were significant determinants of rice commercialization. The recommended policy options are to advice and train farmers on pesticides use and the government to have a planned exit from agriculture by introducing attractive off-farm income generating activities.

Small-scale forestland leasing for coffee production affects local livelihoods and forest conservation in Southwestern highlands of Ethiopia

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This study invistigated the effects of small-scale forestland leasing since late 1990s to mainly domestic investors for coffee production on local livelihoods and forest conservation in the southwestern highlands of Ethiopia. Data were generarated through interviews, dicussions, document review and field observation. The results showed that subsistence farmers living in and around the forest substantially rely on the forest for shaded-coffee and honey productions, and woods for contruction and farm implments. Fuelwood and grazing livestock in the forest were other important forest benefits to farmers living close to forest. State leasing of part of the forest to companies for coffee investment disrupted farmers' forest-based livelihoods, and caused conflicts between farmers and companies. Court cases about the expropriated land and imprisonment inflicted financial and opportunity costs to farmers. Livelihood opportunities created by the companies including low-paying jobs were considered as insufficient to justify the expropriation. Technological transfer from the companies to farmers, and the contribution of these companies to foreign currency earning through coffee export were not yet materialized. Coffee cultivation related deforestation by the companies, farmers resent about the state forestland leasing and forest conversion by some farmers afterwards affected forest conservation efforts.The study concludes that forestland leasing has been counter productive and preventing similar future intiative is a critical part of fostering local community and forest harmony as well as local food security.

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