
III. FRIDAY, 31 AUGUST 2018

A. PLENARY SESSIONS

PLENARY SESSION H

PI-H-01

Intensification and Climate Change Mitigation: What are the Incentives for Crop-Livestock Farmers?

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Abstract: Feeding the future world population will require undoubtedly intensification of agricultural production. The urgency of intensifying production is motivated by different pressing needs across continents but all are related to the demand for good quality diets, mitigating GHG emissions from inefficient crop and livestock production and to improve the livelihoods of millions of poor farmers worldwide. In particular, the African continent represents the biggest challenge of all. With a booming human population, very poor agricultural productivity, alarming poverty rates and the current migration waves, intensifying production in Sub-Saharan Africa (SSA) is everyone's concern. There is plenty of scope to improve productivity in SSA by implementing relatively simple crop and livestock management practices. Many of these changes require and inflow of inputs, of knowledge but above all stability of markets. Studies conducted in East Africa show how dedicated and intensive production of feed crops for dairy cows can improve farm profitability, the production of the farm, direct GHG emissions and contribute to spare forests and therefore reducing the absolute contribution of agriculture to the overall sector's GHG emissions. Our studies in East Africa show that climate policies could clearly support food production and poverty alleviation objectives, whereas truly contributing to mitigation. We see this as an opportunity for poor farmers to access climate finance, and for carbon financial mechanisms to support food security in Africa. In this study we show clear examples of attractive investments for small-scale crop-livestock farmers and for farming business to support East Africa food production.

Keywords: greenhouse gas emissions, fertilizers, maize, silage, milk, nutrients, soils

PLENARY SESSION I

PI-I-01

Farm-Centered Integrated Modelling for the Design of Sustainable Agricultural Systems

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Abstract: Farm modelling has been widely used over the past ten years for the assessment of agricultural systems in face of policy changes, technological innovation, economic and climate changes. Beyond the various modelling methods (optimisation, rule-based, agent-based...), these models are framed by their objectives -defining input data and users- which can be: policy assessment, technological innovation assessment, farming systems resilience studies, optimisation of water management at regional level, agricultural landscape design, a «boundary object» for strategic thinking in a stakeholder arena. Indeed these farm modelling tools are still poorly used for the design of innovative cropping systems which remains mostly based on field level experiments and modelling.

Nevertheless driving forces and assessment criteria for the design of sustainable cropping systems are increasingly expressed at larger scales than field or even farm. For example most environmental services are provisioned at landscape (e.g. biodiversity) or watershed levels (e.g. water quality), at regional level (e.g. climate mitigation) and in more global socio-systems (e.g. food security, rural development). On the other hand, a large part of the functions supporting these services are operating at field level where the interactions between farmer's decisions (crop selection, combination and management) and biophysical processes (soil, plants, pests, weeds and diseases) are occurring. A large part of these biophysical processes also occur at landscape level (biodiversity, water flows...) but they require information at field level to be upscaled in a landscape mosaic.

In-between these two levels (field and region) the farm level plays a key role in agricultural systems simulation: (i) it is the decision level of farm activities (crops, livestock, trees...) further applied to field level ; (ii) it is the first level of expression of socio-economical services (labour, income, food production...) and (iii) farm diversity is a major driver of assessment indicators value and evolution at regional scale.

In order to combine these up and downscaling processes between farm, field and regional levels for a multi-criteria design of agricultural systems, we propose a «farm-centered» integrated modelling of agricultural systems framework. In this approach farm models and typologies are the central node of scenario based analysis of technological innovation in a biophysical and socio-economic context. We will illustrate how it has been used in a wide range of assessment studies and how we plan to further develop it for the design of a « plant-diversity based » agro-ecological transition of agricultural systems.

Keywords: Cropping system, Farming system, Innovation, Multi-criteria, Agro-ecology, Diversification



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ABSTRACT BOOK



INNOVATIVE CROPPING AND FARMING SYSTEMS FOR HIGH QUALITY FOOD PRODUCTION SYSTEMS

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