typology making and visualization can be developed to match and improve the level of understanding of local partners such as county chiefs and extension officers.

Keywords: classification, farming systems, variability, tailoring, innovations

12:40 LUNCH

14:00 SESSION 5 – (cont'd)

Theme 2a (cont'd): Integration of Crosscutting Issues - Nutrition Sensitive Landscapes - *Dr. Gina Kennedy, Dr. Jeroen Groot & Dr. Roseline Remans*

14:00 **What has our landscape to offer for community's food and nutrition security; a case of Vihiga County, Kenya**

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Background: With the global population expected to exceed 9 billion by 2050, the need for food to feed the growing population is paramount. This situation creates a double challenge to our economies: that of feeding its population while conserving the environment and ecosystems to ensure food production for future generations. Within the nutrition-sensitive landscapes initiative, nutritional, environmental and agricultural targets are set together and options that benefit these multiple objectives simultaneously are identified using a systems approach. The overall objective is to create synergies and minimize trade-offs between reducing malnutrition of vulnerable populations and restoring and employing ecosystem services.
Specific objectives: 1) characterize the diversity of plant and animal species within the landscape that have potential to boost diet diversity and diet quality; 2) to study actual dietary patterns and identify entry points for diversification.
Methods: The study was conducted in ten randomly selected sub-locations in Vihiga County, Western Kenya. Per sub-location, two focus group discussions (one with women, one with men) were organized to document species and varieties available at community level. Subsequently, in each sub-location 40 households with child aged 12-23 months were randomly selected. Interviews were conducted with household heads answering questions with regard to farm species diversity; and care-givers performing two non-consecutive 24h food intake recalls for themselves and the child aged 12-23 months. The food species were identified in the local language (Luhya). Voucher specimens were collected and later identified at the Kenya National Museums. Species and farm data was entered in MS Excel and analyzed using SPSS 22. Food intake recall data were entered and analyzed using Lucille software developed by Ghent University, Belgium.
Preliminary results: 400 households, with mean household size of 6.23 and a dependency ratio of 1.6 participated in the study. A total of 111 plant species were identified by the farmers in their farms, 88.6% of which are edible either as staples, fruits, vegetables or spices and condiments. The top five most popular species on the farms were maize (Zea mays L.), beans (Phaseolus vulgaris L.), bananas (Musa spp.), avocado (Persea Americana Mill.) and cowpeas (Vigna unguiculata (L.) Walp.). There are 45 wild plant species in the community, 59.2% of which are eaten as vegetable relish. In addition, 13 domesticated animals and 14 wild animal species were inventoried in the farms.

Keywords: Nutrition sensitive landscapes, food biodiversity, dietary diversity, farm diversity

14:20 **Multifunctional assessment of nutrition-sensitive landscapes**

Nester Mashingaidze, IITA/Wageningen University; Jeroen C.J. Groot, Wageningen University; Celine Termote, Bioversity International; Ray-Yu Yang, AVRDC; Jessica Raneri, Roseline Remans, Gina Kennedy, Bioversity International, N.Mashingaidze@cgiar.org

The Nutrition-Sensitive Landscapes (NSL) approach focuses on building diversity into the landscape and food system to provide multiple sources of nutrients as well as other ecosystem services that are critical for environmental and population resilience. The NSL method offers proactive management towards more sustainable diets for vulnerable populations. Case studies are undertaken in Vihiga County (Kenya) and Son La province (Vietnam) to assess the interactions and interconnectivity in agricultural production, natural resource management (NRM) and nutrition diversity. In each country, two small landscapes were selected for a spatially explicit inventory of

diet diversity and sufficiency in relation to farm productivity, market relations, ecological functions, and the availability of food resources in the landscape. The case study landscapes are contrasting in natural resource availability, farming practices and/or dominant market orientation (subsistence or commercial). The current diet and nutrition, productivity and NRM are characterized and evaluated through the use of AgroBioDiversity and IMPACT Lite survey tools at household level. The potential of new options for land-use and diet composition will be explored using the Landscape IMAGES model. Synergies and trade-offs between the functions in the landscape related to nutrition, productivity and NRM will be quantified. The outputs from this study will contribute to an increased understanding of the system and can be used to inform discussions with stakeholders in the planning process of possible interventions to increase nutrition diversity, agricultural productivity and NRM in Humidtropics action sites.

14:40 **Technical Efficiency Differences between Men and Women Farmers - A Meta-Analytic Assessment**

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A plethora of empirical studies have sought to determine the effect of farm and farmer characteristics including gender on estimated technical efficiencies. However, the findings of respective studies have tended to differ markedly on conclusions, location, agricultural product, time, measurement of technical efficiency, sample size and other factors. In respect of conclusions some studies noted that men are more technically efficient than women, whilst others reported that women are more technically efficient than men. Yet, others found that there was no difference between both sexes relative to technical efficiency. Therefore, combining evidence, who are more technically efficient, men or women? What factors account for the differences? The study seeks to assess the gender differences in technical efficiency in farming, identify which gender is more technically efficient and investigate the factors that account for gender differences in technical efficiency in farming. Diverse publishers' websites and databases namely, Oxford University Press, Wiley, Taylor & Francis, Sage and Emerald among others were accessed for studies on gender effects on technical efficiency in farming. Databases accessed included EBCOHost, Google Scholar, Cab Abstract, DOAJ and AgEconsearch. Additionally, the reference list of papers dated 2013 and 2014 were searched to identify additional literature. Using the coefficient of gender in the second stage of technical efficiency model as explained variable and study as well as socio-economic characteristics as explanatory variables, regression model will be estimated. The paper is unique for four reasons. First, it will provide opportunity for a straight forward answer to the question of which gender is more technically efficient than the other based on meta-analytic methodology. Second, the identification of the factors that explain the differences will be useful for policy purposes. Third, the study presents meta-analyses of a second stage variable in the technical efficiency estimation procedure. Fourth, publication bias is explicitly accounted for in technical efficiency meta-analysis procedure.

Keywords: farmers, gender, meta-analysis, technical efficiency

15:00 **Integrating nutrition to systems research: Impact pathways and theories of change**

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Presented by Roseline Remans, The Earth Institute at Columbia University

Nutrition, like gender and other IDOs, is both an outcome and a driver of other outcomes in an integrated system. This paper identifies some of the ways that nutrition affects and is affected by other elements of the systems, building on work on "agriculture-nutrition" pathways. Using the implications from the conceptual analysis, we assess whether and how nutrition is currently addressed in the impact pathways of systems and NRM CRPs. The paper concludes with some ideas about a cross-CRP research agenda in this area, illustrated with examples from the field.

15:20 General Discussion

16:00 End of session