Brief Summary Week 1/Theme 1
E-Consultation *on*
Integrated Crop-Livestock Systems for Development:
***the way forward for sustainable production intensification*.**
February 1-5, 2010

Building off of the background paper provided at the website http://www.fao.org/agriculture/crops/core-themes/theme/spi/iclsd, Theme 1 focused on **promising integrated crop-livestock systems and innovations that merit mainstreaming and scaling, and tactics for implementation**. This week's discussion was rich with interventions and reactions and responses. There were some 50 enthusiastic contributions bringing insights from countries in the Middle East, Asia, Latin America, the Caribbean, Africa, Europe, and North America. The following brief summary is meant to highlight the range of points that were brought into the discussion. The summary is not exhaustive and can not adequately capture the full richness of the discussion. That said all of the individual interventions can be found on the website as well as all of documents, photos and links that were submitted by participants. Further, the reflective thoughts of Andrew McMillan also provide a useful synthesis (Contribution 44).

This document is organized according to the questions that were used to prompt the discussion.

1) Do you believe that integrated crop-livestock systems are an answer for sustainable intensification? Do they have a place in our strategy for feeding 9 billion people in 2050?

There was a resounding yes in response to this question, which was almost always accompanied by various qualifiers and expanded ideas.

These integrated crop-livestock systems:
must build off of their interdependencies; be managed for efficiency; take into consideration the application of technical principles; implemented for a profitable enterprise; allow for chemical fertilizers essential to increasing productivity, and using manures and organic matter as integral to the sustainability of any cropping system; ensure sustainability upon which the fate of human survival is dependent; have a clear market focus moving beyond the goal of food security at the household level; are defined by trajectories that are regional, agroecologically specific and influenced by different scales (examples of South Asia where the bulk of meat and dairy comes from integrated systems yet these integrated systems are not well enabled in Europe); can be optimized to improve rural economies and agricultural-environmental impact; are recognized for their heterogeneity; require vastly different approaches for research and development better linked to policy, institutional and social dimensions that enable small holder market participation; provide resource efficient farming systems that dictate that resources be shared among components of a diversity of production systems; play a role in sustainable intensification and that should be a priority over area expansion; are here to stay while recognizing that they are in transition with different paths of intensification driven by internal and external factors; are a sustainable option as they mimic natural processes; and provide flexibility and resilience; scaling up to the landscape level are necessary steps to development; provide potential for adaptation and mitigation of climate change; require innovations to manage transitions; are potentially more robust in the face of global change and crises; are the systems upon which poor

farmers are dependent; and must follow the Modern Sustainable Highly Productive and Profitable Agricultural model (MOSHPPA); among others.

2) What have we learned about integrated crop-livestock systems since the 1980's?

Colleagues offered up a broad range of existing examples of systems from various agroecologies and scales and with different component emphases and each with their opportunities and constraints. Examples included: crop-tree-livestock systems in Nepal, Bhutan, India; small holder farming systems in semi-arid Zimbabwe; small scale dairy in India and Tanzania; alley cropping in West Africa and Indonesia; use of fodder legumes of *Calliandra calothyrsus*; Zero tillage systems in tropical Brazil and Canada with cover crops; systems with high densities of trees in (sub-humid-humid) Southern Africa including conservation agriculture with Faidherbia albida (CA/Agroforestry/Evergreen Agriculture) in Africa; conservation agriculture in Madagascar; dual purpose crops such as cow-pea (West Africa) and potatoes (East Africa); integration of cotton, corn, sorghum and legumes with animal management in Burkina Faso and Mali; dairy systems on Reunion Island; zero tillage soybean utilizing *brachiaria* grass in the Cerrado of Brazil; Crop-livestock-tree systems using eucalyptus and teak; alfalfa in rotation with grain in Canada; Spanish 'dehesa'; "faxinal" system of Southern Brazil; no-till cassava in Paraguay. Colleagues identified that there are multiple ways to integrate crop and livestock systems - crop farmers can rent out their pasture rotation to livestock owners rather than own the livestock themselves as well as landless livestock keepers can link with crop producers – integration does not have to be at the farm scale but can be across the community. Different scales make a difference – smallholders often have an advantage over large scale enterprises for dairy, but not so for pigs and poultry

3) **What are the key benefits that arise from these systems? economically, environmentally, and socially? From a production standpoint, what are the gains in terms of functional biomass, multiple purpose production?;**
Among the environmental, economic and social benefits related to integrated crop-livestock systems, the following were shared:

- From an *environmental perspective* colleagues noted the importance of the ecological resilience, ecosystem efficiency and recycling, building organic matter, carbon and water storage, the reduction in dependence on external inputs, reduction in pollution and erosion (CA/ground covers), the interdependence of cropping and livestock systems, and the increase in biological diversity as well as overall bio-diverse productivity.
- The systems are *socially* of value in rural areas as they are typically practiced in small-holder operations (where they are very much acceptable) but have not been promoted/enabled in larger scale farming systems, yet they exist. The systems often build upon traditional and indigenous knowledge. Livestock are considered an indicator of wealth. The systems also bring a diversified diet and increased nutrition to the household. Sustainable systems can decrease migration pressures.
- The systems are considered *economically profitable* and serve as a risk-averse strategy that enhances overall farm resilience in times of low crop yield, additional income from livestock products, reduced external inputs due to optimizing recycling of manure, tree and crop residues. It was expressed that economics will drive and the other co-benefits will come with the use of these integrated systems.

4) How are these innovations being scaled up? What are the mechanisms for sharing knowledge (Farmer Field Schools, Farmer Cooperatives, Farmer interest groups or associations)?

Colleagues generally highlighted the role and importance of innovative farmer leaders, women, community organizational/institutional strengthening, strong producer groups, farmer field schools, farmer participatory research, introduction to youth in schools, and training for community based expertise (e.g. community animal health workers), and efficient information technologies. It was noted that single technologies (e.g. alley cropping) are not likely to be scaled up without allowing for strong farmer involvement in the local discovery and adaptation processes, and integrating market, institutional, and policy dimensions with technological aspects. There need to be simultaneous engagement at a landscape level through collective action and farm level intensification through technology integration.

Further, it was suggested that a Global Crop Livestock Initiative could be put in place including an inventory/database of references and activities.

5) What are the key constraints to implementing integrated crop-livestock systems? What about constraints to scaling up/out?; 6) How best do we integrate these sustainable intensive production systems into a landscape scale approach?

- *Segregation of components and disciplines (hyper-specialization)*. Farmers, scientists and development professionals recognized that our approach to agriculture tends to separate our crop production systems and our livestock production systems (and expertise) and that this has closed a window on systems and holistic thinking and subsequently undermined the success of integrated crop-livestock systems. Enhancing communication among disciplines was emphasized and ensuring that scientists are working directly with farmers. Rethinking participatory approaches, adaptive research, co-learning, and co-experimentation beyond plant, animal, field bases were suggested.
- *Regional Differences.* It was recognized that many systems are moving away from integration and in the direction of specialization (e.g. China, Vietnam) while it may actually take further (drastic) limitations from climate change or energy crises to encourage robust integrated systems in Europe.
- *Access to resources and productive inputs.* Land tenure is a critical constraint in terms of both farmer investments in improvements on land that is not guaranteed as well as movement of livestock (example from South Yemen). Further, benefits from integrated systems must be substantial enough for producers to adjust their systems to incorporate livestock or other infrastructure needs. Access to markets, knowledge, credit and seeds and in some cases subsidies were also highlighted. Conflict among land uses (including bio-fuel production) and issues of trespassing were raised. Once land is under irrigation in dry areas, it tends to be put under crops, relegating livestock to hill sides.
- *Policies*. Support tends to promote the status quo and international markets and taxation are promoting cropped areas (e.g. Argentina). Policies must shift from sectoral to integrated decision making. At present, there are no organized public-oriented initiatives to foster these systems.
- *Competition/tradeoffs of use of Crop Residue*. Crop residue has multiple uses. There continues to be a competition for crop residues (whether used for ground cover, soil

improvement and nutrient cycling) or as fodder for livestock ('feed the soil or feed the animals"), cooking, fence, thatch, biochar, etc. Further choices of crop varieties may be based on grain or quantity and quality of crop residues for feed in these systems.

- *Labor.* There are potential labor constraints in the management intensive systems.
- *Limitation of natural resources.* In many cases, water is the limiting factor and existing land degradation (and subsequent low forage quality) is also considered as a constraint.
- *Livestock in 'the balance'.* Livestock are not looked upon favorably in society because of the potential of environmental issues. It was noted that it is important that whole farm systems are analyzed for net green house gas emissions/sequestration.