

## **An International Consultation on Integrated Crop-Livestock Systems for Development - The Way Forward for Sustainable Production Intensification**

(Co-organized by the Agriculture & Consumer Protection Department of FAO  
in collaboration with Embrapa, IICA and IFAD)

### **CONTEXT**

After years of neglect, crises responses to agriculture and food related issues are taking a significant part of the “centre stage” of the global development agenda. The drivers are well articulated in recent major studies<sup>1</sup>. Below are some of the key areas of concern.

There are already over 1 billion (about 15% of the human population) people hungry and living in poverty, and 75% of them as well as other less poor but vulnerable people live in rural areas and depend on farming for their livelihoods, with the majority relying on small scale crop-livestock systems, including those that are integrated with long haul pastoral systems. Food (primary and secondary), feed, fibre and fuel needs must be met from agriculture of a still expanding population that is expected to grow from the current 6.7 billion to some 9.2 billion by 2050 while available land<sup>2</sup> for expansion of agriculture will become economically and environmentally unattractive. To meet the food needs of the population in 2050, production will have to expand by 70% compared to what it was in 2000. It is expected that 90% of the expansion will be through production intensification (i.e., increase in output per unit area), and 10% will be from area expansion mainly in Sub-Saharan Africa and Latin America. At the same time the environmental footprint of crop as well as of livestock production has to be reduced to improve sustainability. This poses both a development challenge as well as opportunities for livestock producers in crop-livestock systems to contribute to both overall food security and alleviation of their poverty as well as of non-agricultural rural population due to increasing employment opportunities in the input supply and output value chains.

Demand for livestock food products – red and white meat, dairy products, eggs -- are expected to grow significantly, thus offering opportunities for income and employment generation for the small-scale producers in crop-livestock systems as well as from the specialised producers, both small and large intensive and extensive systems, of livestock products. And in addition, the conversion of land from agriculture into many alternate uses (e.g., urbanization on productive soils) will continue to reduce production potential. Clearly food security, food safety and quality challenges are increasing, as is the growing awareness of needs for effective education on diet and lifestyle changes related to health. Human, livestock and plant health issues and their interactions are of increasing concern globally, especially the cross-infections between humans and major livestock populations and the transborder movements of such infections. Environmental issues such as climate change with greenhouse gas emissions being both increased by several agricultural activities. On the other hand it is increasingly becoming better appreciated by the general public as well as by the producers that selected agricultural practices can greatly increase productivity and incomes while simultaneously reducing the impact of climate change-related economic, social and environmental effects, for example, minimising mechanical soil disturbance and increasing soil organic matter helps reduce effects of dry periods on crop productivity and farm output. Similarly, it is possible to increase biomass in quantity and quality, and thereby increase livestock output in small-scale integrated systems, with crop diversification involving high biomass producing legumes that also improve soil

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<sup>1</sup> Bruinsma, J. (2009). The Resource Outlook to 2020: By how much do land, water and crop yields need to increase by 2050. Paper presented at the Expert Meeting on How to Feed the World in 2050. June 2009, FAO, Rome.

<sup>2</sup> The planet also has large areas of degraded lands in some regions that could be recovered for sustainable intensification if there were the political-will to confront the landowners and to make the infrastructure and capacity building investments required.

productive capacity. Further, these practices are suitable for rehabilitating degraded lands. What is not so obvious is how can applications of such better practices, often more knowledge-intensive, be scaled-up?

The list of development issues and opportunities goes on. Clearly, the need for introduction, adaptation and implementation of good farming practices with associated enabling environments and to address environmental and health issues linked to agriculture has never been greater due to the sheer scale of livestock related agriculture that will be required to maintain local and international food security and livelihoods in sustainable ways. Intensification of crop and livestock production, in smallholder crop-livestock systems as well as in other intensive or extensive systems, is essential to mitigate human suffering and providing time for needed social and economic changes. Harnessing the potential of well-integrated crop and livestock systems at various levels of scale (on-farm and area-wide), and that often have agro-forestry and forestry inputs, is one of the powerful entry points to address such needs, issues and opportunities. The integration of crop and livestock production systems increases the diversity, along with environmental sustainability, of both sectors. At the same time it provides opportunities for increasing overall production and economics of farming. This would reduce the preference for specialized livestock production systems, in view of their problems with environmental and economic sustainability.

## GOAL AND SCOPE

Several of FAO's development partners, such as ILRI and Embrapa have had recent intra-institutional consultations with primary focus on identification of priorities for research and the tactics to optimize their research processes with respect to the development of integrated crop-livestock production systems. This consultation process (both electronic and face-to-face) will build on these and other major stock-takings by pulling together ideas with a view to: (a) define next steps for key stakeholders, and especially for the Agriculture Department and Consumer Protection Department<sup>3</sup> of the FAO and its national and international collaborators (e.g., IFAD, IICA, ICRAF); and (b) guide and empower FAO to better support member countries to harness the development potential of integrated crop and livestock systems as one important entry-point for sustainable agriculture intensification for poverty alleviation and environmental stewardship.

While many of the issues to be addressed are relevant for all types and scales of agriculture and food systems, the principle focus will be on the needs and opportunities for family-farmers (small and medium-scale land holders) and the associated community and watershed-level development. The use of the concept of *integration*<sup>4</sup> for the consultation will not be restricted to only on-farm integration; it will endorse also the concepts of area-wide input supply and output value chains<sup>5</sup> and outcome oriented multi-stakeholder innovation systems. In this context it is intended that the appraisal of an *innovation and the associated innovation system* also reflect on the issues related to the linking to the commercial and corporate sector (local, regional, and global) in order to strengthen the role of input supply and output value chain markets and the service providers while taking into consideration environmental and human health issues.

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<sup>3</sup> The Agriculture Department of FAO seeks to define its role and clarify the tactics to help its member countries harness the potential of old and new approaches to integrated production systems. The AG Department is comprised of 5 divisions: Plant Production and Protection; Animal Production and Health; Rural Infrastructure and Agro-Industries; Nutrition and Consumer Protection; Joint FAO/IAEA Division for Application of Nuclear Technologies in Agriculture and Food.

<sup>4</sup> *Integration* will be considered both in the context of *horizontal integration* (e.g. crops and livestock optimization together) or *vertical integration* of a subcomponent such as horticulture crops where value chain from production to post harvest handling, to processing, to the market and the consumer.

<sup>5</sup> The recent (May 2009) ILRI consultation on research for Sustainable intensification of crop-livestock systems at ILRI chose to characterize the crop-livestock integration as a sub-system of larger value chains, presumably both for the crops and for livestock. The success of the value chain and the sub-components (integrated systems) would be based on productivity, economic benefits to stakeholders, sustainability and its resilience.

**Output value chains under consideration will include:** Animals for meat, milk and other dairy products, hides and skins from cattle and small ruminants, and meat and eggs from poultry, and meat from pigs etc, and respective processing and linkages to markets.

**Input supply chains will include:** Production inputs of seeds, agro-chemicals, farm power, equipment and machinery, veterinary services, advisory and innovation systems on good farming practices etc, and the organization and infrastructural connection to the farm producers.

**Crops for biomass and grain include:** Pasture and range species; cereals, grain and oil-seed legumes, fibres, horticulture crops and perennial industrial crops such as oil palm, coffee, cacao, coconut etc, and their primary processing of products and by products.

**Agro-ecologies include:** Agroecosystems in the tropics, subtropics (summer rainfall and winter rainfall) and temperate areas in the developing regions of the world.

The consultation will address, when appropriate the related issues in the context of promoting integrated systems such as (see also thematic groups in the next section):

- multiple demands of crops and their biomass, and soil and crop health related functions of rotations, associations and organic matter, and landscape level integration as well as animal health and nutrition as functions of the production system;
- how to scale-out? (merit of participatory approaches to foster farmers' interaction and learning, such as the farmer field school, farmers clubs and other approaches including structured extension in contract farming);
- demand and market driven and/or environment and health driven coupled to ensuring smallholder farm-level demand (linking to supply and output markets and services);
- infrastructure, incentives, credit, land tenure and insurance (policy and institutional support).

## NATURE AND STRUCTURE OF THE CONSULTATION

The consultation process will comprise a wide electronic discussion during February 2010, followed by a small 4-day face-to-face workshop in Sete Lagoas, Minas Gerais, Brazil, from 23 to 26 March 2010 co-organized by FAO, Embrapa, IICA and IFAD, and will include one full day field trip to see innovative action on integrated crop-livestock systems in central or southern Brazil. The only language for documents will be English. There will be no translation.

There will be four thematic areas for discussion at the face-to-face consultation. Each thematic area will be covered by a working group across a range of types (on-farm and area-wide) and scales of crop-livestock integration for sustainable production intensification in different agroecologies. The four complementary and inter-connected thematic areas will address:

1. **Promising integrated crop-livestock systems and innovations that merit mainstreaming and scaling, and the tactics for implementation** (including: technical designs of integrated systems and their economical, environmental and social dimensions; functional biomass production for multiple use; Farmer Field Schools, Farmers Clubs, Cooperatives, Associations etc for participatory farmer learning and adoption, and for economies of scale and competitiveness; knowledge services and communication needs, common resource management issues etc).
2. **Input and output market linkage development for promising crop-livestock systems and associated input and output supply chain processes and public-private service providers for different production systems and diverse markets** (including: constraints and opportunities in input supply chains covering production inputs of seeds, agro-chemicals, farm power, equipment and machinery, veterinary services, advisory and innovation systems on good farming practices, marketing infrastructure and organization forms etc; constraints and

opportunities in output supply chains covering animals for meat, milk and other dairy products, hides and skins from cattle and small ruminants, and meat and eggs from poultry, and meat from pigs; and opportunities for processing in integrated production systems etc).

3. **Political will, and policy and institutional support for the adoption and enabling the spread of innovations and practices associated with promising crop-livestock systems for food and nutritional security** (including: sector policies, goals and strategies; strategic planning; enabling environment - infrastructure/credit/marketing/insurance/land tenure etc; tactics for action, incentives, regulations, strategic directions for change in extensive and intensive crop-pasture-livestock systems etc).
4. **Research needed to generate knowledge and innovative practices to underpin farmer adoption and scaling of promising crop-livestock systems for sustainable production intensification** (including: technical, biological, nutritional, landscape, economic, environmental and social dimensions of integrated systems and practices; on-farm and area-wide integration of crop-livestock systems; functional biomass production and prioritization of its multiple role and use; feed and nutritional formulations; animal health management; effective innovations systems and processes; linking research result to policymaking etc).

The above four interlinked themes will address, in addition to the topic-specific core issues and their interactions, the following two cross-cutting themes:

- (i) **Roles of stakeholders** (public sector, private sector, civil Society -- NGOs and parliamentarians, international research and development institutions, including the FAO, donors, etc.); and
- (ii) **Capturing public goods and incentives for action** (payment for environmental services, special market access based on adoption of good practices – including food safety and quality, global awards to private sector and civil society champions, etc).

The output from the electronic discussion in February will feed into the working group discussions at the face-to-face workshop in Brazil in March. The number of total participants for the face-to-face workshop will be limited to some 60 individuals, and will include experts from FAO and Brazil/Embrapa, CGIAR, regional and sub-regional organizations, developing and developed countries, and selected donors such as World Bank, AfDB, IFAD, IICA, Gates Foundations as well as private sector (e.g., Bunge, Yara) and NGOs (e.g., WWF, Heifer International) etc.

## **EXPECTED RESULTS/OUTPUTS**

The consultation will formulate recommendations and the supporting rationale to foster government awareness and support, stakeholder action and international cooperation.

The outputs of the working groups (electronic and face-to-face) and plenary discussions will be organised to generate the elements of a Framework for Action (including consolidated recommendations) which will be the main output from the consultation.

The Framework elements will focus on the Role of Crop-Livestock Integration in Sustainable Agricultural Intensification for Development. The consultation will propose a mechanism for follow-up action to be facilitated by FAO in collaboration with partners and stakeholders.