

Contributions in Week 4 of the crop-livestock e-consultation

From the Moderators

-----Original Message-----

From: Crop-Livestock

Sent: Mon 2/22/2010 12:16 AM

To: Crop-Livestock-L@mailserv.fao.org

Subject: Welcome to Week 4 (February 22-26) of the e-consultation on Integrated Crop-Livestock System for Development

February 22, 2010

Dear Colleagues,

Thank you to all of you who provided your insights and inputs to our Week 3 theme focused on policy and institutional support needed for the implementation and scaling up of Integrated Crop-Livestock Systems for Development.

Now that we have gathered our thoughts on the “what” and “why” of innovative integrated crop-livestock systems, the input and market chains associated with these systems, and the policy and institutional dimensions, it is time to turn our attention to how the research community might respond to take integrated crop-livestock systems forward.

This week (February 22-26) we will focus the discussion on the research needed to generate knowledge and innovative practice to underpin farmer adoption and scaling of promising crop-livestock systems for sustainable production intensification. In our background paper, we identified associated elements around 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; and linking research result to policymaking, etc., all with a focus on addressing the global challenges of food security including issues of human nutrition, as well as the natural resource base and climate change.

Because this is our last week of the e-conference, we invite colleagues who have not yet had the opportunity to also respond to the Questions posed in Weeks 1, 2 and 3 (posted from Crop-Livestock on January 31, February 7, and February 14, respectively).

Let's get started on our research topic:

- If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems - from your perspective and context - what would you identify as the most critically needed research associated with:

a) On the ground implementation of integrated crop livestock systems? With which actors might you partner to carry this out?

b) The human and social dimensions of these systems? With which actors might you partner to carry this out?

c) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

- What are the gaps in evidence required to frame a policy intervention or to influence policies or institutional elements that can advance integrated crop-livestock systems.

- How might the research community respond to the structural constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? What can donors do to assist in ensuring robust research efforts?

- Please share any other thoughts on this topic or previous topics that will advance our discussions and thinking.

As a reminder, the three overall objectives of the consultation (what do we know about integrated crop-livestock systems for development – what works and what does not; define next steps for key stakeholders; and guide and empower FAO to better support member countries to harness the development potential of integrated crop-livestock systems) towards which the discussions must aim at over the next four weeks. Also, each week's topic should be addressed in the context of two cross-cutting issues – the role of stakeholders, and capturing public goods and incentives for action.

For the technical background document and other related information, please visit the website:

<http://www.fao.org/agriculture/crops/core-themes/theme/spi/iclsd>.

The Week 3 summary will be posted on the website as well as a folder containing all the Week 3 contributions. The documents that came with the contributions during Week 3 will also be available on the website in the documents section.

Thank you again and we look forward to reading from all of you in this final week.

Best wishes,

The Moderators

Amir Kassam
Constance Neely
Theodor Friedrich
Eric Kueneman

E-mail: Crop-Livestock@fao.org

Contribution 1 from Kwaku Agyemang in the FAO Sub-Regional Office for Southern Africa, Harare, Zimbabwe

-----Original Message-----

From: Agyemang, Kwaku (FAOSFS)

Sent: 24 February 2010 13:40

To: Crop-Livestock

Subject: Week 4 contribution from Kwaku Agyemang in the FAO Sub-Regional Office for Southern Africa, Harare, Zimbabwe

Dear All,

Below kindly find my Contributions to Week 4. I have provided Answers to the Questions asked. In addition to these answers I attach a Paper I gave at a GFAR Triennial Conference in Dakar in 2003, entitled: Agriculture and Livestock Integration in the Context of the developing World with emphasis on sub-Saharan Africa (K.Agyemang). This paper covers much of the issues raised in Weeks 1, 2, 3 and 4. Furthermore, the paper also contains a list of some 300 References on the subject of Agriculture-Livestock integration which interested readers may consult.

Warm regards

Dr. Kwaku Agyemang
FAO Sub-Regional Office for Southern Africa
Harare, Zimbabwe

- If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems - from your perspective and context - what would you identify as the most critically needed research associated with:

a) On the ground implementation of integrated crop livestock systems? With which actors might you partner to carry this out? The area of RESEARCH FOR DEVELOPMENT at the level of ground implementation that I would like to recommend is the testing of a few well-designed ex-ante formulated options that include technical, environmental and socio-economic components. Many at times one PACKAGE is forced on potential users to try. Two or three options tried under same conditions will often result in many of the potential users aggregating around one or two of the options. They may even would like aspects of the rejected options being incorporated into the "acceptable" options. The Research questions would be what of the technical results already known elsewhere can be useful in the production conditions under consideration, what environmental conditions in the area need to be captured in order to make the option feasible, and what market (inputs/Outputs) factors need to be considered for making an option profitable and sustainable. Actors would include a cross-section of the farmers/producers,

extension institutions, local government establishments, NGOs, etc. In general terms though since crop-livestock integration eventually tries to bring out the best out interplay of Plants, Soils, Water and Livestock, research that results in technologies that improve soil cover, improve feed production, reduction of nutrient losses and increased production efficiency should be supported.

b) The human and social dimensions of these systems? With which actors might you partner to carry this out?

Research that deals with human and social dimensions of C-L systems should not focus only on the Production side of the equation but also the consumer side. Research on who in the household or community are better suited for the specific integration being proposed, is appropriate. For example, is labour (quantity and duration) involved for promising technologies available at the household? Are children and women equipped to undertake the activities involved in integration? Is the addition of livestock to on-going cropping or horticultural or gardening system going to increase the work load of a category of household members? Are the benefits worthwhile in comparison with labour inputs? On the demand side, are consumers ready for products coming from integrated systems? Are they prepared to pay additional for what is perceived by producers as better products from integrated systems? Research questions will be related to those on markets, consumer preferences, household characteristics, environmental issues and concerns. Actors include Socio-Economic Institutions and, Public-Private Fora with interest in crop-livestock agriculture, urban/inner-town production systems, etc

c) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

- What are the gaps in evidence required to frame a policy intervention or to influence policies or institutional elements that can advance integrated crop-livestock systems. Areas of Research that analyze the current and past Government policies that have worked against the take-off of Crop-livestock integration need to be undertaken, and the potential negative impact on the C-L systems estimated to help designing more friendly policies. For example, it would be an interesting research to find out how subsidies on inorganic fertilizers in certain countries has contributed to downgrading the potential management and use of animal and farm manure. What has been the impact of tractorisation on development and use on-farm power such as animal traction. Actors include Government Technocrats and Policy makers.

- How might the research community respond to the structural constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? What can donors do to assist in ensuring robust research efforts?

It has been suggested elsewhere that Structural Constraints as related to undertaking research with full complements of disciplines needed for C-L generally result from some researchers not willing to think outside of the box. They are said to be sometimes afraid their planned research will be torn apart by partners who might want to probe more into

the logic behind such research. So it is common for Researchers or institutions to approach others of similar thinking, and thereby missing out on useful criticisms. Therefore a new paradigm shift is required where the range of actors is expanded, analyses of the research questions opened up for scrutiny and beneficiaries perspectives sought. Technologies and farming systems modification options coming from such open system of research planning and implementation are more likely to be more acceptable and more likely to be sustainable.

- Please share any other thoughts on this topic or previous topics that will advance our discussions and thinking.

Contribution 2, from Tom Thurow at the University of Wyoming, USA.

-----Original Message-----

From: Thomas Lee Thurow [<mailto:TThurow@uwyo.edu>]

Sent: 25 February 2010 01:28

To: Crop-Livestock; Crop-Livestock-L@mailserv.fao.org

Subject: Week 4 contribution from Thurow at the University of Wyoming, USA

Colleagues:

Here are several thoughts (this has turned out to be more lengthy than I intended) on the very interesting overall discussions prompted by this e-consultation in general and the issues posed for week 4 in particular.

In one of my favorite Sherlock Holmes stories, it is the dog that doesn't bark that is the most important clue. It says a lot about our collective disciplinary activity that there was a lot of discussion/interchange when the focus was on promising crop-livestock systems and innovations of merit, but the discussion trailed off dramatically when the discussion shifted to policy and institutional support needed for the implementation and scaling up.

AN OVERALL LIMITING FACTOR OF INTEGRATED CROP/LIVESTOCK SYSTEM RESEARCH

When I think of such a large topic as integrated crop-livestock systems, I think of management practices geared to the following gradient of conditions:

Relatively reliable climate.

Systems governed primarily
by biotic controls

Variable climate.

Systems governed primarily
by abiotic controls

<----->

optimize production/profit

minimize risk

It is troubling that many research or management publications discuss "production" as if it was synonymous with "profit" and/or "risk management", when in reality these concerns are often quite different and prompt radically different responses by farmers.

Most research is designed to focus on expressing the outcome of the innovation in terms of production. The value of the system in terms of profit is harder to document, but some studies make an attempt to do that. However, very few studies approach the problem by targeting minimizing temporal risk. Almost no studies do a sensitivity analysis of the proposed innovation (i.e., analysis of reliability of the proposed system under variable conditions/assumptions over time). Since many farmers and entrepreneurial middle-men developing links in value chains NEED to be risk adverse, adoption of innovations would be helped responses to variable conditions/assumptions were well understood/communicated.

Another problem with focusing on "production" is the failure to realize that pursuit of Maximum Sustained Yield can actually be dangerous if variable conditions are not quickly recognized and efficiently dealt with – an unreasonable assumption given the realities of human nature. Minimizing risk, and then optimizing production within the risk constraint sphere, will be an approach more likely to resonate with poor farmers.

LIMITING FACTOR -- DEVELOPED COUNTRIES

Existing agriculture policies strongly determine what sorts of agriculture is practiced. For example, I grew up in northern Illinois, U.S.A. on a integrated crop-livestock farm. I had 10 uncles that were also prosperous integrated crop-livestock farmers (as were the five generations in the U.S. that preceded them). Today, 12 of my cousins are still farmers, but NONE have integrated systems -- they are either large, specialized grain farmers or run factory-like dairy operations. Why did such a dramatic change occur within one generation? U.S. farm policy very strongly created direct and indirect feedbacks to drive these changes, especially the changes in government philosophy on crop subsidy structures enacted about 40 years ago. The point is that I and my cousins grew up seeing first hand the benefits of integrated crop-livestock systems, there are many generations of "indigenous knowledge" that we have regarding how to successfully operate such integrated systems (i.e., more information is not the limiting factor), each of my cousins would prefer to shift back to integrated crop-livestock systems, but none do so because the current U.S. agriculture policy makes it more likely to be ultimately profitable by crafting big, specialized operations designed to maximize production. Such a policy has indeed succeeded in creating abundant, cheap food for U.S. citizens (note that such policies do not internalize environmental costs {a big problem with value chain analysis in general} nor do they deal with subjective "quality" or moral issues of the U.S. food supply chain). European agriculture farm policy is likewise strongly influential in determining what choices farmers make there.

In sum, in developed countries policy is usually the dominant factor driving farmer decisions, not lack of knowledge about integrated crop-livestock systems. Therefore, it is vital that integrated crop-livestock system research be specifically designed to be policy relevant. How many scientific research journal papers or experiment station publications have you seen that specifically addresses in the study design and analysis the "policy implications" or "management implications (e.g., economic/social/biophysical interactions)" of the research? Of course this is very difficult/costly/time consuming to do, but this is this type of integrated research product that is needed to address the

limiting policy relevant information gaps and is therefore likely to have the most resonance in future policy formulation.

LIMITING FACTOR -- DEVELOPING COUNTRIES

In developing countries agriculture policy, of both the developed countries (tariffs and food shipments that often undercut local producers trying to build-up local production capability) and of their own national government, strongly influences what farmers choose to do or not do. That said, there is greater likelihood in developing countries that existing information/resources have not been effectively disseminated. For example, in cut-and-carry mixed farming systems of SW Kenya, Napier grass is often grown as a forage crop, but the choice of variety that is used can result in a 3-fold difference in yield. Many farmers are using varieties inappropriate for the soil/climate of their farm and do not know that the variety of Napier grass they use can make such a huge difference. Furthermore, a leguminous forage that could be easily grown in the understory of the Napier grass stand, such as Desmodium, is usually not present because people are not aware of this option, or if they are aware, they do not know how to access the seed or cuttings. The pity is that the benefits that these simple interventions can have in increasing milk yield have been documented almost 60 years ago.

In short, there would be huge potential for increased production/profit/risk management if we did a good job of applying what we knew even 20 years ago about mixed farming systems. Often, it is not that these unused innovations were inappropriate -- it is just that the innovations were never effectively disseminated. Why? There are a variety of institutional reasons for this, one big root cause is that the rhetoric of extension agencies (often at all levels) does not match practice -- small-scale, locally consumed production is often simply not a high priority in practice for extension programs. Another is the dissemination message often focuses on production, when the farmer is most concerned about minimizing risk (or at least understanding what the risk to adoption may be).

Best regards,

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Contribution 3, from Ralph von Kaufmann at FARA, Accra, Ghana.

-----Original Message-----

From: von Kaufmann, Ralph (ILRI) [<mailto:r.von-kaufmann@CGIAR.ORG>]

Sent: 25 February 2010 09:52

To: Crop-Livestock; crop-livestock-L@mailserv.fao.org

Cc: Jones, Monty (FARA); Wale Adekunle; Irene Annor Frempong; Emmanuel Tambi

Subject: Week 4 contribution from Ralph von Kaufmann at FARA, Accra, Ghana

I thank Prof. Thurow for a superb analysis and illustration of the impact of policy on what farmers decide to do.

I agree with him entirely but I would like to comment on his last paragraph:

" In short, there would be huge potential for increased production/profit/risk management if we did a good job of applying what we knew even 20 years ago about mixed farming systems. Often, it is not that these unused innovations were inappropriate -- it is just that the innovations were never effectively disseminated. Why? There are a variety of institutional reasons for this, one big root cause is that the rhetoric of extension agencies (often at all levels) does not match practice -- small-scale, locally consumed production is often simply not a high priority in practice for extension programs. Another is the dissemination message often focuses on production, when the farmer is most concerned about minimizing risk (or at least understanding what the risk to adoption may be)."

By changing the word “innovations” to “technologies and policies” the answer to his question ‘Why?’ would be that the agricultural innovation systems are weak.

There is plenty of evidence that enabling policies are welcomed and good technologies are readily taken up. Any ‘good’ technology that remains ‘on the shelf’ and is not being taken almost certainly has a fault that makes it inappropriate to one or more links in the input supply-production-processing-marketing value chain. Belated recognition of that explains the recent increasing interest in establishing innovation platforms which enable all the actors to be engaged in the innovation processes, as and when they need to.

An example of this is the multi-donor funded Sub Saharan Africa Challenge Programme which is coordinated by the Forum for Agricultural Research in Africa (FARA) in which the sub-regional organizations (SROs) have established multi-country Pilot Learning Sites in East, West and Southern Africa. Similar adapted approaches are being piloted by the International Livestock Research Institute (ILRI) and others.

The success of the innovation platforms, and their ability to scale-up, will ultimately be determined by the ability to learn how to engage the value chain actors efficiently and cost effectively. It will also require change agents who are skilled facilitators who are able to help the value chain actors get the information they need, when they need it and in the form that is useful to them. These facilitators will need training in the soft systems skills that will enable them to promote learning and problem solving, and to establish and sustain collaboration within and between individual actors and groups.

Training in systems skills is increasingly demanded as the work of the International Centre for development oriented Research in Agriculture (ICRA), FARA's UK-DFID funded programme for Strengthening Capacity for Agricultural Research and Development in Africa (SCARDA), the Bill and Melinda Gates Foundation-funded African Women in Agricultural R & D (AWARD) initiative and other such programmes become better known.

Best regards,

Ralph von Kaufmann
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Contribution from Natali KOSSOUMNA LIBA'A at the Université de Maroua, Cameroun.

-----Original Message-----

From: Kossoumna Libaa Natali [<mailto:kolibaa@yahoo.fr>]
Sent: 25 February 2010 10:36
To: FAO Consultation Crop Livestock
Subject: Week 4 contribution from Natali KOSSOUMNA LIBA'A at the Université de Maroua, Cameroun

Dear Colleagues,

Please, find enclosed my contribution for week 4 (and also pasted below).

Cordially

Dr. Natali KOSSOUMNA LIBA'A
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Contribution of Dr. Natali KOSSOUMNA LIBA'A

Department of geography
University of Maroua

- If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems - from your perspective and context - what would you identify as the most critically needed research associated with:

a) On the ground implementation of integrated crop livestock systems? With which actors might you partner to carry this out?

- ✓ I might analyze, with universities, research institutions, NGO, local, regional and international organizations, development project, associations of farmers and of pastorals, the conditions of valorisation of the animals of the exploitations in order to improve management of the fertility. It could be a question of use of the animals for the increase in production and of use of the organic manure. For the moment in the North of Cameroon, the stress is laid on the bovines and the technical recommendations are currently the following ones: production out of cattle shed (less than 5 bovines) and in parks (more than 5 animals), for a use at a rate of 6 tons per ha of manure every 3 years;
- ✓ I might better analyse, with universities, research institutions, NGO, local, regional and international organizations, development project, associations of farmers and of pastorals, the conditions of maintains animals in the exploitations for a better management of the biomass, in particular for significant availabilities in litter and fodder. The local offer of the cultivated biomass strongly depends on the production of the farmers which is influenced at the same time by the practices of the farmers (organic manure, mineral fertilization) and by those of the pastorals (common grazing land). Various modes of management of the biomasses are proposed to improve in the short run (compost produces in edge of the field, manure produced with the cattle shed, in pit or on fixes park, association of the cultures) or medium-term (farming systems on vegetable cover), production;
- ✓ I might adequately analyse with the Universities, research institutions, NGO, local, regional and international organizations, development project, associations of farmers and of pastorals the possibilities of integration of the fodder productions in the rotations. The annual plants proposed for this fodder production can be leguminous plants or the graminaceous ones. On the level of Cameroon at the present time, 4 species use this process. For the leguminous plants (*Stylosanthes hamata*, *Stylosanthis guienensis* and *Mucuna pruriens* are proposed. To the graminaceous ones, the choice was made on *Brachiaria ruziziensis*. The trees can also play a significant role in this management of the biomass, fodder hedge-sharp, ligneous family, etc;
- ✓ I might analyze with the Ministry for the breeding, associations of farmers and of pastorals, the need for organized circulation of the information which would make

- it possible to the sedentary agro-pastorals to know the moment of the release of the common grazing land. For a few years, the reinforcement of the climatic risks (late or early arriving of the rains), the insecurity and the resurgence of the conflicts with the farmers have led the pastorals to change strategy of transhumance sometimes each year even if the routes and the places remain generally the same ones. The pastorals adopt individual strategies more and more to reach small spaces of pastures. Thus one attends a thinning down of the group decisions around transhumance because of the competition between stockbreeders for the access to spaces of pasture;
- ✓ With the Universities, research centers, NGO, local, regional and international organizations, development project and association of pastorals, there is a need for supporting the pastorals in their adoption of the production and the use of the animal manure. For the moment, the valorisation of the organic manure produced by the animals does not respect yet the standards recommended by the agronomic research of 5 t/ha. Already, certain techniques are in the course of popularization by the SODECOTON near the agro-stockbreeders, like the production under hangar, of which can profit the stockbreeders who do not have or few animals;
 - ✓ With the Universities, research centers, NGO, local, regional and international organizations, development project and association of pastorals and of farmers, there is a need to study the possibilities of transfers of biomasses of the pastorals towards the farmers. For the moment, the results show that the organic manure is very limited on the ground of the farmers, whereas it is clearly very high on that of the pastorals because of significant cattle population that they park there. The latter obtain outputs in biomasses much more significant than those of the farmers, but on more reduced surfaces. A complementarities between the stockbreeders and the agro-stockbreeders of the close villages is to be developed and intensify so that the losses of manure are developed better;
 - ✓ There might be identification with the state authorities of the conditions of signatures of agreements between States (Cameroun, Chad RCA) for the movements of herds of a state to another. What would make it possible to raise uncertainty which makes the villages populations impotent on the depredations caused by animals coming from the other states;
 - ✓ With the state authorities, it might be the research of the load capacity inside even of the areas; this will avoid the conflicts for the occupation of spaces are accentuated because of the demographic development and the increase in livestock;
 - ✓ With the Ministers for the breeding, associations of farmers and of pastorals, local, regional and international organizations, development projects, environmental protagonist, it might be the study of the conditions of the safeguarding of great spaces of pasture and of the tracks with cattle for the transhumance seasonal of the herds which are important. The fodder crops could not bring a surplus of food sufficient unless resorting to very intensive farming systems, non compatible with the means of the stockbreeders (irrigation for a permanent crop, strong fertilization and fence). The recourse to transhumance as with the courses of proximity out of the territories of fastener is essential to the maintenance of the cattle; indeed, the rural territory in the North of Cameroon is

occupied mainly by agriculture, the breeding and the biodiversity. The agricultural territories are in constant increase because of the increase in the farming population due to the migrations. The increase in number of the bovines and the increase in cultivated surfaces generated the reduction of the territories of breeding. Lastly, the State classified broad surfaces of savannas in exclusive zones of hunting and protection of wild fauna prohibited to the pasture and agriculture. However, administrative authorities as far as traditional do not assume any more their role of arbitration and regulation for an organization harmonious of the rural territories which are forsaken or implemented of arbitrary manner without objective taking into account needs of the populations, of the requirements of the durable development and social peace.

b) The human and social dimensions of these systems? With which actors might you partner to carry this out?

- ✓ I might with the State and traditional authorities make safe the access and the durable exploitation of the ground so that the stockbreeders and the farmers can durably invest themselves in the use of the organic manure for the fertilization of the ground. Indeed, even if the Cameroonian land legislation exists since 1932, it does not prevent the domination of the common law in rural zone: *“the rural space belongs to the traditional authority which concedes the use of it on its subjects with the proviso of paying the zakkat”*. Concretely, no migrant can clear a piece nor to adapt the land one without the authorization of the head of the village which represents the traditional authority. On the other hand, it profits from a right of user and can even put its pieces in hiring. However, the law of 1976 on the management of the national field reinforced the legal arsenal and the capacity of the public services to regulate the conflicts and to organize the occupation of the grounds. But today, the public authorities do not assume any more their role of arbitration and regulation. The space management either is forsaken, or implemented of manner arbitrary without objective taking into account of the needs for the various socio-professional groups;
- ✓ With the associations of pastorals, universities and research centers and the NGO, local, regional and international organizations, the reinforcement of their capacity to fertilize the grounds by the valorisation of the animal manure. The systems of production of the stockbreeders were in the beginning strictly pastoral and evolve gradually to the agro-pastoralism. There exists within these systems a certain synergy between agriculture and the breeding with the consumption of the crop waste products but especially the production and the use of the organic manure for the corn pieces of the pastorals. This has favourable consequences on the agronomic performances their cultures. Indeed, the settlement of the families of pastorals imposes the practice of agriculture to them, in particular the very demanding culture of fertilizer corn. Not very usual the use of the manures mineral and not integrated into the chemical circuits of provisioning of entrants, the pastorals uses part of their animals to ensure the fertilization of their corn. They thus develop all the production of animal manure (dejections of the bovines without addition of litter) available with the generalization of the practice of night parking facilitated by the acquisition of barbed wire. This valorisation of the

animal manure modified their systems of transhumance. Formerly, the animals could spend the years without passing by the soil of fastener. Now, they pass there systematically between a month and a month and half to smoke the pieces per annum. It is the case also of many animals which remain in the territories. There is even a system of rotation of the animals between the zones distant from transhumance and the territories of fastener so that a constant number of animals remain in the pieces. In spite of the number of variable animals and pieces between the various exploitations, all the stockbreeders more or less manage to smoke their pieces, thanks to networks of mutual aid;

- ✓ With the associations of farmers and pastorals, incentive of the diversification of the exchanges and complementarities. The passage of the animals on the fields after harvest is also an example of co-operation between stockbreeders and farmers. The first use the crop waste products (straws, stems and raids of cereals, as well as the leguminous plant haulms: groundnut, niébé) to nourish the cattle, and that allows in same time to fertilize the ground for the next agricultural season insofar as the herds deposit their dejections there.

c) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

With the research centers, NGO, local organizations and associations of farmers and of pastorals, we need to associate the production of the economic manure and the valorisation of the crop waste products. To produce the organic manure is not very current practice in North-Cameroon, apart from some areas over populated. The demonstration of the techniques of manufacture of the manure (improved park, cattle shed dunghill) has not very interested the peasants (farmers as pastorals). To promote the organic manure near the peasants starting from the only demonstrations on cotton plants and cereals, is not enough obviously to convince them to adopt its use quickly. It is thus significant to set up actions on the bovine breeding in the exploitations. The objective being to bring the councils necessary to the farms having of the bovines so that these last develop better their bovine breeding in dry season by a better food (promotion of association *mucuna*/maize or sorghum, systematic collection of the crop waste products) and by a brought closer medical follow-up. Organic production of manure not seeming more like one principal objective, but a by-product of the activity of breeding, whose economic valorisation is possible several manners (sales of animals, animal haulage, milk, leather).

Contribution 5, from Brian Thompson at FAO, Rome.

-----Original Message-----

From: Thompson, Brian (AGND)

Sent: 25 February 2010 15:22

To: Crop-Livestock-L@mailserv.fao.org

Subject: Week 4 contribution from Brain Thompson at FAO, Rome

Using improved crop-livestock systems to close the "nutrition gap"

We have reviewed with great interest the various contributions made over the last four weeks of the e-consultation on the integration of crop-livestock systems for rural development. We appreciate the mention of the contribution that such systems have for human nutrition, and in particular the guidance provided by the moderators for the week February 15-19: "...we want to focus the discussion on those policies and institutional supports that must be in place to enable the adoption and spreading of innovations and practices associated with promising crop-livestock systems **for food and nutritional security**".).

Nutrition has an obvious but often neglected role to play in food systems. Nutrition is important and nutritionists need to be engaged because:

1. food systems should be so designed and implemented that they address nutritional needs, the integrated crop-livestock sector offers practical opportunities for achieving this at national, sub-national and smallholder level which need to be acted upon;
2. increasing the diversity of crops and of the livestock can close not only the production gap or the yield gap by symbiotic mutualism or literal cross-fertilization, but can also close the "nutritional gap" by providing a broader range of nutritious, micronutrient-rich, seasonally available supplies of a variety of diverse foods whose consumption can optimize diets - very relevant both for net rural producers and consumers including smallholders; and
3. there is a huge opportunity to match and combine production education with nutrition education including for example the inclusion of nutrition modules in Farmer Field Schools curriculae.

The forthcoming consultation on the integration of crop-livestock systems for rural development (Brazil 23-26 March) is to focus on the needs and opportunities for smallholder producers. It is clear that if the MDGs are to be achieved and hunger and malnutrition are to be tackled effectively, such a focus must include looking at the needs and opportunities for achieving food and nutrition security. FAO's nutrition Division is interested in the overall nutritional contribution that micronutrient-rich plant foods and those of animal origin can make to nutritional well-being particularly as animal sourced foods have a clear and important role to play in human nutrition given the known deficiencies (essential amino acids, fats, minerals, vitamins) that exist widely.

Nutrition objectives, concerns and considerations need to be more prominently taken into account by agricultural and rural development planners in guiding agricultural and poverty reduction policies and programmes. AGN has been working towards this goal and we have prepared a Concept Note "Narrowing The Nutrition Gap: Investing in Agriculture to Improve Dietary Diversity". This paper presents an overview of agriculture's role in improving dietary diversity and nutrition outcomes in developing countries. Following a discussion on why increasing production of staple crops is not

enough to accelerate reductions in malnutrition, the concept of the “nutrition gap” is further developed - the gap between what foods are grown and available and what foods, including animal sourced foods, are needed for a healthy diet. This term helps to differentiate nutrition security from food security and to articulate the concept of dietary diversity, which requires increasing availability and access to the foods necessary for a healthy diet, and increasing the actual intake of such foods. Various food typologies or consumption patterns from around the World are used to illustrate how dietary diversity and quality is often insufficient in a variety of contexts, including those where total dietary energy supply is adequate. A series of agriculture-based interventions are proposed on how agriculture can improve dietary diversity and quality, and thereby accelerate reductions in malnutrition. Finally, a series of policy recommendations are made from raising nutrition’s profile on national development agendas at country level, to implementing agriculture-based nutrition programmes and for promoting nutrition security within international contexts. The paper provides a good starting point for our contribution to the debate on integrated crop-livestock issues but further work is perhaps welcome to focus on the crop-livestock sector related to points 1 and 2 above and on nutrition education and the farmer field schools FFS in point 3 above.

We look forward to hearing from list members as well as from the organizers of this consultation, ways in which the crop-livestock sector can best protect and promote nutrition particularly of those who exist on meagre monotonous cereal based low quality diets.

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Contribution 6, from Brian Thompson at FAO, Rome

-----Original Message-----

From: Thompson, Brian (AGND)
Sent: 26 February 2010 17:44
To: Crop-Livestock-L@mailserv.fao.org
Subject: Week 4 contribution from Brian Thompson at FAO, Rome

Using improved crop-livestock systems to close the "nutrition gap"

Narrowing the “nutrition gap” – the gap between what foods are grown and available and what foods are needed for a healthy diet – can only occur when national policy makers

and members of the international development community recognize that attempts to reduce malnutrition solely via increased production of staple crops are not enough. Agricultural development policies and agricultural development programmes that address food *and* nutrition security are an essential step in reducing malnutrition; they enhance national prospects for improved labour productivity and economic growth, and increase the chances of long, healthy lives for even the most vulnerable.

Agriculture has a crucial role in reducing malnutrition and contributing to better nutrition through improved food security and nutrition security. Improved crop-livestock systems, by improving nutrition, can enhance the quality of life and significantly contribute to achieving MDG 1 and thus make its agenda even more relevant to its clients and the development process.

Agricultural development programmes that aim to address food security by increasing production of staple crops are by themselves often not enough to accelerate reductions in hunger and malnutrition. Malnutrition can occur despite increased food availability and higher incomes for a number of reasons, including poor quality and variety of food i.e. ***low dietary diversity*** which is one of the primary reasons malnutrition persists. Monotonous diets that are too high in carbohydrates and too low in nutrient-rich foods are common in many parts of the developing world, even among households that can afford to eat better. Diets high in starch but low in protein, fat and micronutrients can result in malnutrition even if dietary energy supply (DES) is adequate. Stunting, nutrition-related anaemias, and iron, zinc and Vitamin A deficiencies are just a few examples of the types of ***“hidden malnutrition”*** that can occur in individuals who are consuming enough total energy but not enough macro and micro nutrient-rich foods such as meat, fish, eggs, dairy, legumes, fruits and vegetables. The repercussions of hidden malnutrition can be just as serious as are those from inadequate dietary energy supply.

To ensure increases in production or purchasing power lead to accelerated reductions in malnutrition, agricultural development programmes must focus on ***nutrition security*** not just food security. Nutrition security refers to the “quality” aspect of food production, consumption and utilization by all individuals in a household. While food security may increase the total *quantity* of energy available for consumption, only nutrition security can guarantee the *quality* and *diversity* of food necessary for protecting and promoting good nutritional status and health. Just as improving food security can be thought of in terms of narrowing the gap between current and potential production yields, improving nutrition security can be thought of in terms of narrowing the ***“nutrition gap”*** between current food intake patterns and intake patterns that are optimal in terms of macro and micronutrient content. Narrowing the nutrition gap means improving dietary diversity through increasing availability and access to the foods necessary for a healthy diet, and increasing the actual intake of those foods.

Rain-fed roots and tubers in West Africa: One of the most important staple food crops in West Africa is cassava. Cassava is hardy, drought resistant, maintains acceptable yields on low-fertility soils and is of great importance for subsistence farmers throughout the region. Yam, sweet and Irish potatoes, and taro are other foods grown in this area. Meals

typically consist of a starchy staple (e.g. cassava–based *gari or fufufu*,) and sauce; the latter can include a variety of ingredients, most commonly peanuts and/or vegetables. Consumption of animal source foods (ASFs) in western Africa may be low, especially among the rural poor. Bushmeat and insects, small livestock and poultry for both meat and dairy, and fish are eaten, but quantities are often inadequate to ensure nutrition security. Suggested agriculture-based interventions include *selectively breed cassava; introduce cassava leaves as a nutrient rich food; boost red palm oil production*:

Improving the protein content of cassava would be one very important way agriculture could narrow the nutrition gap in West Africa, as this crop is one of the most commonly consumed staples in the region. High protein genotypes have been identified and the current challenge is to increase endogenous proteins containing adequate levels of the desired amino acids within common cultivars. In addition to selective breeding to increase protein content and quality, encouraging consumption of cooked cassava leaves has potential for improving nutrient intakes in areas of West Africa where they are not considered a conventional food source. Vitamin A deficiency (VAD) rates are high in many West African countries. Stimulating production and consumption of red palm oil (RPO), which is extremely high in Vitamin A, is one way to reduce VAD and at the same time generate income in the region.

Irrigated/rain-fed rice in South and Southeast Asia: Rice-based food typologies are common throughout South and Southeast Asia. Consumption patterns do vary between and within countries, but most diets consist primarily of rice supplemented to varying degrees with vegetables, pulses, animal sourced foods, and some fruits. Fat and oil intake is often low, especially among low income groups. For many households, especially rural ones, DES is predominantly derived from carbohydrates. For example, based on data from FAO's Food Balance Sheets, 77% of total DES in Laos came from rice in 2002. In Bangladesh, 73% of DES was rice derived in 2003. For Cambodia, the amount was 68%, for Indonesia it was 80% and for Sri Lanka (where total DES is fairly high at 2416 kcals/per capita/day) it was 53%. Although these are aggregate figures and intake patterns vary substantially within and between countries, such statistics are indicative of monotonous diets that are too high in carbohydrates and too low in animal sourced foods and micronutrient rich fruits and vegetables. Although malnutrition in Asia as a whole is decreasing, South Asia still has the highest prevalence rates of malnutrition in the world, and in South East Asia, serious challenges also remain. For instance, stunting prevalence in Cambodia, Laos and Vietnam was 37, 40, and 36 percent respectively from 2000-2007. In addition, the estimated prevalence of iron deficiency anaemia for women and children is high throughout the region; for children under five varying from 50 to 80 percent. The monotonous diets described above are one of the reasons for these persistent high rates of malnutrition. Suggested agriculture-based interventions include *increase cultivation of nutritious dry season crops; integrated horticulture/aquaculture*:

Although rice production cycles vary according to country and region, most areas where rice is grown have dry seasons during which non-paddy rice crops can be harvested. Facilitating cultivation of dry season crops can be especially important in areas where rice mono-cropping is common, as mono-cropping can increase vulnerability to

production-based, cyclical patterns of food insecurity. For example, in Bangladesh, cultivation of lentils, peas and other pulses has declined, partly because rice is more lucrative, also because the growing season of pulse crops is longer than that of rice, and pulses require more input and maintenance than do rice crops. Introduction or re-introduction of nutritious, low-input, short duration crops might be appropriate to improve availability and access to a more diversified diet. From an agricultural perspective, mung beans have a short production cycle (approximately 60 days), minimal moisture requirements and improve soil fertility via nitrogen fixation. Moreover, recent improvements in mung beans' nutritional content, pest and disease resistance, and maturation cycle could facilitate their re-introduction. Soybean production for local consumption is another option. Integrated horticulture/aquaculture projects have potential to improve households' access to animal sourced foods, fruits and vegetables. In many areas of South and Southeast Asia, they fit into traditional production strategies. In Vietnam, for example, the VAC (Vegetation, Aquaculture, Cages for Animal Husbandry) system has been promoted since 1989 as part of a general policy to improve crop diversification and nutrition security. From a nutrition perspective, these strategies are exemplary in that they address deficits in animal sourced foods and fruits and vegetables simultaneously.

Rain-fed cereals in Central and East Africa: The most common cereals used as staples in many areas of Central and East Africa include sorghum, millet, rice and maize. Other foods grown and consumed in this region include cassava, other starchy roots, and pulses. Fruits and vegetables are also cultivated, but production may be limited due to little or no access to water, seeds and other inputs, time constraints, and lack of knowledge regarding horticultural techniques. Livestock production in Central Africa is the lowest on the continent, due in part to endemic trypanosomiasis, which causes anaemia, emaciation, decreased milk yields and death in non-resistant breeds of cattle and other livestock. Typical diets in Central and East Africa consist primarily of a cereal-based porridge or paste (e.g. *nsima* in Malawi, *ugali* in Kenya) complemented by a meat or fish-based sauce, or by a relish which could include meat, fish and/or a variety of vegetables or legumes. Such meals are usually eaten twice a day. Fruits may also be consumed but intakes are highly seasonal and may be limited in terms of access (e.g. budget constraints, poor market infrastructure). Like the other food typologies described above, diets are often lacking in micro and macronutrients and may also be inadequate in terms of energy. The lack of diversity in the Malawian diet is especially pronounced and most certainly contributes to very high rates of stunting (48% in 2004). However, stunting rates are high or very high throughout Central and East Africa (e.g. Chad 41% in 2004; Tanzania 38% in 2004, Central African Republic 38% in 2007). Micronutrient deficiencies are also common. Thirteen countries in this region had prevalence of Vitamin A deficiency above 10% and/or a 20% prevalence of iron deficiency anaemia in 2007. Suggested agriculture-based interventions include *keyhole gardens; increase production of small ruminants and poultry; reduce post-harvest losses:*

Increasing small-scale production of micronutrient-rich foods at the community or household level is one way to improve crop diversity and increase availability of fruits and vegetables. However, implementation is contingent on, *inter alia*, water availability,

soil quality, and seed availability. In many parts of Central and East Africa, these factors are of limited supply. Keyhole gardens, which are simple to implement and require minimal inputs, are one solution in such contexts. Trypanosomiasis is one of the constraints facing the livestock sector in Central Africa, and, while production is higher in East Africa, many smallholders in this region could still increase outputs of poultry and small ruminants. Cross-breeding to improve hybrid vigor, increase resistance to trypanosomiasis, and increase meat and dairy yields is one way to improve production. Reducing post-harvest losses also requires greater attention.

Irrigated/ rain-fed maize and beans in Central America: Maize and beans are grown and eaten throughout Central America. Together with sugar, these staples provide the bulk of DES (dietary energy supply) for most households. In Guatemala, for example, almost 90% of DES was cereal (primarily maize), bean and sugar derived in 2003. These items may be complemented by a cow's milk cheese (*queso blanco*), eggs, plantains, avocados, bananas, carrots, chilis, onions, tomatoes and/or leafy greens. However, in many cases, meals are lacking in diversity and inadequate in terms of fat, animal sourced food-based protein and micronutrients. Meat is often too expensive for regular consumption, especially among low-income and indigenous groups, and fruits and vegetables may be consumed in insufficient amounts to ensure nutrition security. This lack of dietary diversity contributes to high rates of malnutrition in much of Central America. Suggested agriculture-based interventions include *increase consumption of "trash fish"*:

Fish farming is increasing but the fish raised are primarily for export and not generally consumed by the local population. Since many aquaculture ventures displace indigenous species that may be a traditional food source for local populations, the consumption of indigenous fish species may decline and the end result is an overall decrease in animal sourced foods intake. Moreover, even when farmed species are consumed by local populations, net micronutrient intake can still decrease, as many small, indigenous fish (referred to as trash fish) are actually higher in micronutrients than popular farmed varieties. Other potential interventions include intercropping using the Milpa System, greenhouses, integrate agro-forestry to increase fruit production and extension-based nutrition education.

Finally key policy recommendations for agriculture-based approaches to narrow the nutrition gap include incorporating explicit nutrition objectives and considerations into agricultural policies, programmes and research agendas, building capacity of institutions and individuals at country level, and promoting nutrition security at regional and global levels.

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Contribution 7, from Sandra Santos at Embrapa, Brazil

-----Original Message-----

From: Sandra Santos [<mailto:sasantos@cpap.embrapa.br>]
Sent: Fri 2/26/2010 10:29 PM
To: Crop-Livestock-L@mailserv.fao.org
Subject: Week 4 contribution from Sandra Santos at Embrapa, Brazil

Dear moderator

I send you a small contribution on my experience on beef cattle sustainable production systems of the Brazilian Pantanal, which I consider one of the most sustainable in the world

Sustainable production systems has been constantly debated in recent decades, especially focusing on the influence of cattle on the environment and biodiversity conservation. Actually, one of the main challenges of humanity refers to the production of food associated with the conservation of the environment. Therefore, there is need to understand the functioning of the systems, especially the flow of energy (solar energy), so that there is a balance between the different components of the system (man, vegetation, animals, soils, climate).

There are some parts of the world that are located in marginal and transitional areas that are not appropriate for conventional agriculture as the Pantanal, considered one of the largest flood plains in the world. It does not support intensified technologies and on farm management of landscapes and plant resources would be the best strategy for the conservation of this region which is considered Biosphere Reserve and World Heritage Site. The Pantanal has many landscapes arranged in mosaics, many of which are dominated by grasses as open grasslands as well as savannas dominated by grasses and other herbaceous plants. Therefore, these landscapes allowed to integrate forest and livestock that have been performed for hundreds of years by traditional farmers, which contributed to the conservation of the region. Currently, the main challenge is to contain the replacement of forest landscapes by exotic pastures. In situations of native pastures of low quality, it is recommended to replace or manage part it with native or exotic species, conserving the forest and savanna areas, maintaining the natural pattern of landscapes. The sustainability of these systems also depends on valuation of environmental goods and services provided by sustainable systems.

I attach two papers on the subject

Best Regards

Sandra Aparecida Santos
Researcher of Embrapa Pantanal

Contribution 8, from Adrian Catrileo at INIA, Chile

-----Original Message-----
From: acatrile@inia.cl [<mailto:acatrile@inia.cl>]
Sent: Sat 2/27/2010 3:44 AM
To: Crop-Livestock-L@mailserv.fao.org
Subject: Week 4 contribution from Adrian Catrileo at INIA

Dear All,

Please find some comments about the topic of the Week 4 in the e-consultation.

- If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems (IC-LS)...

a) On the ground implementation of integrated crop-livestock systems.

As some of the contributors have pointed out, including myself, farmers follow markets constraints to implement some specific IC-LS, in fact, market constraints and politics have influenced the implementation of specialized crop or livestock systems rather than its integration. This is because farmers are looking not only to maximize production but also in some way to increase their income. Even small farmers try to get fair income of the production surplus they sale after satisfy their basic nutritional requirements. Then, the implementation of IC-LS has complex interactions between research (INIA or / and a university), the government, the farmers and the industry (processors).

b) The human and social dimensions of these systems.

The role of farmer's organizations is of primary importance. These organizations should be strong enough and representative to enable them to negotiate with agricultural government institutions and the bank actors, in order to participate in defining politics and financial support to the rural sector. Even, nowadays, with increasingly public concern about the way the food is produced and its effects on the environment, consumers associations may play another important role in to the dissemination of the benefits to implement IC-LS.

c) Enhancing market chains or incentives to production.

The industrial actors like slaughter houses, food processing companies, supermarkets and others, which are following consumers' expectatives, are key actors in the added value chain. They should promote prices contracts (according to quantity and quality

required) with the farmers and on the other hand, the government should have a policy of economic incentives to those IC-LS which are demonstrated to be less pollutant to the environment.

- What are the gaps in evidence required to frame a policy intervention or to influence policies or institutional elements that can advance IC-LS.

The need to understand the System Analysis Approach at different levels (university, research institutes, the government and donors) and the importance in to study innovative IC-LS, especially at the small farmer level for which this type of agriculture is part of their way of life.

To think in the response of the IC-LS not only in production terms but also in its results in economics terms.

A better knowledge and dissemination of innovative IC-LS developed in the world.

- How might the research community respond to the structural constraints of carry out interdisciplinary, multi-institutional and multi-stakeholder efforts?

Donors should have into account that IC-LS have long term response and the multi-effort research associated to its study must be compensated by adequate funds. Ideally, also farmers and the value chain actors should financially support the research which is proposed to carry out under the IC-LS perspective.

Best Regards,

Adrian Catrileo PhD
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Contribution 9, from Jorge Grijalva Olmedo at INIAP, Quito, Ecuador

-----Original Message-----

From: Jorge Grijalva Olmedo [<mailto:jgrijalva55@hotmail.com>]

Sent: Sat 2/27/2010 1:29 PM

To: Crop-Livestock

Subject: Week 4 contribution from Jorge Grijalva Olmedo at INIAP, Quito, Ecuador

buenos dias,

En relación con el tema 4, en respuesta a la pregunta 3 y 4, mi aporte en el ámbito de las particularidades del Ecuador, es el siguiente:

La participación del Estado y la Cooperación Internacional es esencial para orientar proyectos de desarrollo alternativos que tomen en cuenta las condiciones ecológicas, sociales y culturales de las poblaciones y que guíen toda estrategia de uso sostenible y conservación de los recursos naturales, especialmente los bosques, comprometiendo a la empresa privada y a las comunidades en procesos de co-gestión. Por un lado, partiendo del “principio de responsabilidad ética” estos proyectos deben enfocarse en la intensificación y recuperación de áreas que ya han sufrido un proceso de transformación, conforme a su potencial, sin descuidar incentivos diferenciados que motiven a los productores a mantener áreas boscosas e investigar usos de la tierra más sostenibles, como los sistemas integrados agricultura-ganadería.

En apoyo a este propósito, debe considerarse la valoración económica de externalidades ligadas con los bosques y sistemas integrados que sustenten incentivos y medidas de compensación más equitativas, que privilegien la conservación del mismo en términos de simple economía, donde esta actividad presente mayor beneficio que otras actividades como la ganadería extensiva y que al mismo tiempo, hagan viables iniciativas locales o regionales que buscan comprometer a las comunidades con estos objetivos.

En ese ámbito, se requiere intensificar las acciones para el desarrollo de mercados para los servicios ambientales derivados del bosque tales como: secuestro de carbono, provisión de agua, ecoturismo, prospección de la biodiversidad, entre otros, lo cual coadyuvaría al incremento de los ingresos de los productores. El pago por secuestro de carbono podría cumplir no sólo un objetivo ambiental sino también social, siempre y cuando las acciones gubernamentales se encaminen a negociar la inclusión y desarrollo de alternativas “con sombra” entre las cuales se puedan incluir las innovaciones agroforestales, al menos de aquellos predios del sector campesino menos favorecido y más vulnerable, en los acuerdos internacionales de implementación conjunta de venta de este servicio. Asimismo, identificar los productos forestales no maderables, fibras, gomas, cortezas, especias, frutos y productos menores, de potencial socioeconómico e investigar su manejo, aprovechamiento y procesamiento, y desarrollar mercados para estos productos.

De otra parte, la organización y la capacidad de negociación de las comunidades se presentan como una debilidad, por lo cual es imperativo el fortalecimiento de sus capacidades a fin de consolidar condiciones técnicas, económicas, organizativas y de gestión que les convierta en interlocutores válidos en procesos autogestionarios de manejo y resolución de conflictos que involucren sus recursos. El Estado debe garantizar que empresas transnacionales, tales como las petroleras y farmacéuticas, así como organismos nacionales usuarios de servicios del bosque cumplan a cabalidad con los estudios de evaluación de impacto ambiental, para que no menoscaben los derechos de las comunidades, a sustentar el desarrollo sobre la base de sus recursos y a ser

compensados por los mismos. Las capacidades e intereses de organismos nacionales e internacionales de investigación y las poblaciones locales deben ser potenciadas mediante alianzas que contribuyan a llenar vacíos de conocimiento en estrategias de uso múltiple de recursos. En este contexto, las innovaciones integradas cultivos-ganado, tienen la prioridad.

A pesar de que las prácticas agroforestales forman parte de sistemas tradicionales manejados por los productores y que la interdependencia entre la silvicultura y la agricultura ha sido reconocida como base ecológicamente sólida para mejorar las condiciones de subsistencia de las comunidades rurales, en el Ecuador, las actividades agroforestales caen en alguna instancia entre aquellas manejadas por los Ministerios de Ambiente y Agricultura, por lo cual es preciso que se definan desde una visión sistémica, la competencia institucional y las responsabilidades estructurales para la investigación y extensión; las alianzas entre las Ong's y instituciones estatales representan una estructura organizacional con potencial para incorporar la agroforestería en la planificación nacional. Asimismo, deben examinarse las reformas políticas necesarias para promover la Agroforestería como sistema integrado, dentro de una estrategia de uso múltiple de recursos, dándole atención preferencial al mejoramiento de la estructura institucional para el desarrollo de mercados de productos arbóreos y apoyo a los esfuerzos de investigación, extensión y promoción campesina.

Futuras investigaciones deben enfatizar en el análisis de los instrumentos de política más apropiados en cada estrategia de desarrollo sostenible involucrando a productores de diferentes categorías. Para los propósitos de desarrollo múltiple del bosque, los estudios de clasificación de la tierra de acuerdo con su capacidad de uso son de igual o mayor importancia que los inventarios forestales, es necesario que en las decisiones políticas para determinar el uso de la tierra, la información sobre su capacidad de uso sea balanceada con otros factores sociales y económicos, que a veces son los únicos que se analizan, así como apoyar las investigaciones multi-escala sobre cambios de uso del suelo, en donde las técnicas de sensores remotos pueden jugar un papel primordial. Igualmente, hace falta mayor información sobre la capacidad de respuesta de los ecosistemas amazónicos y andinos, establecer el deterioro causado por la intervención antrópica, incluyendo el efecto retroalimentador sobre las características socioculturales de las poblaciones rurales.

muy cordialmente

Jorge Grijalva Olmedo, Ing. Agr. Ph.D
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Contribution 10, from José R. Campero, ABDES, Bolivia

-----Original Message-----

From: José Campero Marañón [\[mailto:jrcampero@hotmail.com\]](mailto:jrcampero@hotmail.com)

Sent: Sat 2/27/2010 8:56 PM

To: Crop-Livestock

Subject: Week 4 contribution from José R. Campero, ABDES, Bolivia.

Dear Colleagues,

Below kindly find my contributions to Week 4. I try to give response to three questions from Bolivian context and the perspective.

Best regards,

M. Sc. José R. Campero

DIRECTOR NACIONAL DE LA ALIANZA BOLIVIANA DE LA SOCIEDAD CIVIL
PARA EL DESARROLLO SOSTENIBLE.

La paz, Bolivia.

A. If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems - from your perspective and context – what would you identify as the most critically needed research associated with:

From our perspective and context (BOLIVIA)

1) On the ground implementation of integrated crop livestock systems? With which actors might you partner to carry this out?

The principal objective of integrated crop-livestock systems is to produce grain for human nutrition and straws and other by-products in order to produce meat and milk with ruminants. In this context is crucial:

- a) To increase the crop production not only the grain but also the straws.
- b) To develop nutritional strategies for improvement the utilization of low –quality roughages and straws by ruminants for productive purpose
 - a. To optimize the availability of nutrients from the fermentative digestion
 - b. To optimize the microbial growth in the rumen
 - c. To ensure an effective metabolism in the ruminant

In this way, it is very important to establish agreements with International Centers of Investigation that have worked or that work these topics. The FAO is and it will be the

principal actor to articulate the efforts of the developing countries to establish agreements with those International Centers of Investigation. Not only these but also to facilitate the diffusion and validation of those investigations.

To achieve on the ground the development of integrated systems of production, the FAO should establish a program similar to the program of conservation of genetic animal resources that was a successful program.

2) The human and social dimensions of these systems? With which actors might you partner to carry this out?

In Bolivia, the economy based on used of large and unproductive lands (latifundios) reduced drastically the forest area, and also result in an inefficiently land used by virtue of the low cost of the land and the existence of programs of exportation of soy bean or sugar. We hope that a model integrated crop-livestock allows the rational use of the land and the democratic access to the poor people to it.

This model of agricultural production disdained the ecological concept of productions, and the development of the agronomic systems was based in:

- a) Opening of new lands, joined problems of inadequate utilization.
- b) Substitution of basic cultures for the food safety for exportable items.
- c) Introduction of Modified Genetic Seed.
- d) Intensive use of machineries and other agricultural instruments.

We think that this one is a topic of political definition and the principal actors to solve the topic of the sustainable and intensive use of the agricultural lands are the government and the organizations of the civil society.

3) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

We believe that very important for the agricultural products of developing countries the enhancing of the access to the markets in the industrialized countries, especially those markets associated with organic or ecological products. In this line of action, the suspension of agricultural subsidies in the industrialized countries (USA and European Community) is necessary; only under this condition, agricultural or livestock products from developing countries will have chance of being competitive on the global market.

B. What are the gaps in evidence required to frame a policy intervention or to influence policies or institutional elements that can advance integrated crop-livestock systems.

With only five years left until the 2015 deadline to achieve the Millennium Development Goals, it is clear that is needed to advance intensively to guarantee the food safety in Bolivia. For this reason the integrated crop-livestock systems must be focused in small and medium producers. In this producers' category, the topic of land is key to achieve the food safety and the reduction of the poverty the same as development of agricultural products with added value and the support of the State to the marketing of these products. All this passes for the development of policies with special focus on the reduction of rural poverty.

C. How might the research community respond to the structural constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? What can donors do to assist in ensuring robust research efforts?

In addition to promote the capacities of the scientific national community is important the development of participative processes of investigation;. With this intervention logical, the investigation could solve the problems of the integrated crop-livestock systems identified by the producers. The latter concept is very important, to guarantee the efficiency of the investigation.

It is very important that the donors take part in the Directive Committees of the national institutions of investigation. And, the most important is, that the donors will be lined up by the national policies of rural development.

Contribution 11, from Kosi Awuma at the University of Cape Coast, Ghana

-----Original Message-----

From: KOSI AWUMA [mailto:k_awuma@hotmail.com]
Sent: Sun 2/28/2010 9:23 PM
To: crop-livestock-l@mailserv.fao.org; Crop-Livestock
Subject: Week 4 contribution from Kosi Awuma at the University of Cape Coast, Ghana

Hi Moderator,

Attached are some answers to issues raised for Week 4 (also pasted below).

Thank you

Kosi Awuma
University of Cape Coast
Ghana

Week 4: Crop-Livestock Integration;

Prof. Thurow's contribution was a well written one, spelling out what killed the mixed farming system of old in the USA and what caused the change from crop-livestock integration system of the developing countries to mono-crop and mono-livestock production systems.

Without doubt, extension messages in the developing countries such as Ghana are basically government's agricultural policies largely driven by developed countries policies through donor funding geared towards increased food production to provide food for the ever increasing population. In which case indigenous knowledge became obsolete and was superseded with "new knowledge"

of large scale production depending solely on imported inputs such as fertilizers, improved seeds, improved breeds of animals and feed, all of which had to be imported. In the process, the risk-averse reasons of the farmers in their old fashioned production methods were totally ignored.

Now to some of the questions posed for week 4

- if you could secure funding to carry out research on the gaps

associated with integrated crop-livestock systems – from your perspective and context what would you identify as the most critically needed research associated with

(a) On the ground implementation of integrated crop-livestock systems: with which actors might you partner to carry this out?

In the first place, we need to re-examine available information or conduct fresh study on what has been done before (indigenous knowledge), what worked for the rural farmers and why they were involved in a specific production system as opposed to others as well as the benefits and constraints of plantation crops-livestock integration. Most probably rural farmers who are now used to mono-cropping may need reorientation on crop – livestock integration of old. For example, Ministry of Food and Agriculture, (MOFA) Ghana and DFID, UK carried out some research on the role of livestock in rural livelihood in Ghana in 2002 from which it came out clearly that the reasons most rural farmers kept livestock in addition to their crop farming were at variance with government's policy on livestock production implemented by MOFA.

We will need researchers in animal production, animal health, crop production, social scientists and identified farmer groups.

(b) The human and social dimension of these systems? With which actors might you partner to carry this out?

The farmers both rural and plantation crop owners, farmer based organizations, the research scientists, community leaders i.e. chiefs, Non-Governmental Organizations (NGO) operating in the locality, policy makers and implementers will be required in the research.

(c) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

Most often, farmers are encouraged to increase production with incentive packages at times, which eventually led increased production leading to seasonal glut on the market with the attendant fall in producer prices. This, in itself, is a disincentive to further production. Thus, for the crop-livestock integration model to work effectively for sustainable food production the appropriate storage system should be put in place to take the produce off the farmers at guaranteed minimum prices to enable farmers concentrate on production. The storage system works into produce processing systems leading to wholesalers and retailers. Along the marketing chain, value could be added to each produce in terms of processing into various forms and packaging. In Ghana, marketing has been in the hands of private small to medium scale operators however there is a need to organize them effectively. Storage seems to be the greatest challenge for food crops especially during the bumper harvest season. This is one single area I expect governments to lead the way and nurture the private sector to eventually take over. For agricultural produce from the developing world to become competitive on the international markets a level playing field should be developed. The developed countries may have to look critically at and possibly remove the agricultural subsidy on their products. If this is impossible, then double standards of forcing developing countries not to subsidize their agricultural inputs should be stopped.

(d) What are the gaps in evidence required to frame a policy interventions or to influence policies or institutional elements that can advance integrated crop-livestock system.

Research information on the benefits of crop-livestock integration as a means of reducing rural poverty, rural-urban drift and environmentally sustainable production system could provide the necessary evidence which must be sold to policy maker for a change in policy direction. The research institutions, the Faculties of Agriculture in the various Universities, the NGOs in rural agricultural development should be instrumental in this.

(e) How might the research community respond to the structural constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? What can donors do to assist in ensuring robust research efforts?

The above issues raised should not create any problem for the research institutions or the researchers. They are not new to most researchers or research institutions in Ghana.

The donor institutions or organization including the FAO should be conscious of the quantum of work and amount involved and the time span for each research to be carried out effectively. Donors should be involved in the planning and the supervision of implementation however budgets for their experts coming from outside the project country should be separated from the project budget. This is one item which drained project budgets in the past.

Contribution 12, from José Guillermo Velásquez, Corpoica, Colombia

-----Original Message-----

From: José Guillermo Velásquez Penagos

[\[mailto:joseguillermovelasquezpenagos@gmail.com\]](mailto:joseguillermovelasquezpenagos@gmail.com)

Sent: Sun 2/28/2010 11:32 PM

To: Crop-Livestock

Subject: Week 4 contribution from José Guillermo Velásquez, Corpoica, Colombia

Colleagues,

1. la principal fuente de alimentación del ganado para desarrollo y finalización en Colombia son los pastos de pastoreo, sal mineralizada y agua a voluntad. Algunas explotaciones utilizan suplementación proteica y energetica balanceada, la base de esta suplementación es la soya, maiz, sorgos. En Colombia la Corporación colombiana de investigación agropecuaria - Corpoica, es la que lidera la investigación en el sector agropecuaria en áreas como la alimentación nutrición bovina, recursos genéticos con gran participación de las razas criollas, ecofisiología, agrosillvopastoril, salud e inocuidad. los estudios y apoyo al sector agropecuario son financiados por el ministerio de agricultura, Colciencias, alcaldias, gobernaciones y la industria petrolera, y menor porcentaje por la empresa privada

Los sistemas de producción ganadera, son apoyados con creditos blandos del gobierno Colombiano a los productores, hay un insentivo por la conservación de bosques, por otra parte se viene trabajando en los pagos por servicios ambientales

A nivel nacional se cuenta con una institución policiva que contribuye en la conservación de los bosques, ya se ha permitido los tipos silvopastoreo (cercas vivas) como sistema de reforestación. La industria petrolera de su producción aporta el 1 por 100 para procesos de conservación de aguas y reforestación en donde se incluye las cercas vivas

2. Los sistemas de producción que más predominan en Colombia son del pequeño productor, que abarca un mínimo porcentaje del área explotada en sector agropecuario, el mediano productor y gran productor es el que tienen mayor cobertura

Los sistemas de producción de carne son manejados de dos formas, con grandes extensiones con baja y mediana tecnología y los de mediana extensión con mediana y alta tecnología y el pequeño productor que recibe apoyo de las instituciones que contribuyen con el sector agropecuario

Los productores son los principales actores, apoyados por Corpoica y ministerio de agricultura, a nivel regional las secretarías de agricultura juegan un gran papel en el desarrollo del sector agropecuario.

3. Las metas del gobierno es duplicar la población bovina, para lo cual con apoyo de instituciones como Corpoica, viene trabajando en la reducción de los días improductivos del sistema bovino con el mínimo impacto al medio ambiente. Existen algún tipo de incentivos para cultivos como caucho, palma, etc. En la ganadería existen créditos blandos que tienen apoyo del gobierno y exoneran porcentaje del crédito

un saludo

José Guillermo Velásquez

Contribution 13, from Alan Franzluebbbers at USDA-ARS, Georgia, USA

-----Original Message-----

From: Alan Franzluebbbers [<mailto:alanfranz@gmail.com>]

Sent: Mon 3/1/2010 3:20 AM

To: Crop-Livestock

Subject: Week 4 contribution from Alan Franzluebbbers at USDA-ARS, Georgia, USA

Dear Colleagues,

Some responses regarding the questions for Week 4 –

1. Research needed for integrated crop-livestock systems (ICLS) with special emphasis on:

a. On-the-ground implementation and who might play a role.

Successful identification of the key limiting elements of systems within the region must first be identified. The research hypotheses should then center on how best to optimize crop-livestock balance to meet the opportunities offered within a particular landscape setting. An ideal research focus would characterize the production potentials of multiple facets of a system approach and determine the suite of environmental benefits that might

be obtained, as well as identify the turning points where systems might fail and contribute to environmental degradation if not functioning properly.

Economic outcomes must be a key element of the research. Partners in the research would include plant, animal, soil, water, and air scientists working collectively with economists, social scientists, and policy makers to continuously modify systems to eventually obtain a robust set of efficient practices that can be selected for a particular region. Research should be ideally shared among regions to characterize ecosystem services provided by ICLS in different regions so that robust recommendations can be made across regions, as well as identify unique niche opportunities.

b. Human and social dimensions and who might play a role. This dimension should focus on how to promote adoption of truly sustainable ICLS.

How can positive change be incentivized? There is a need to define the goals of farmers and how these goals might be promoted within government support policies.

c. Enhancing market chains or incentives to production and who might play a role. Developing economical access to inputs and creating viable market outlets are needed. Should markets drive the type of production system employed or should a sustainable production system influence how markets develop as a response? Can farmer activities to achieve sustainability override market prices, and if not, then how can policy instruments be used to support economic, environmental, and social sustainability?

2. What evidence is lacking to frame policy interventions for advancement of ICLS? Clearly defining the ecological, economic, and social outcomes of ICLS, as well as its limitations in achieving broad sustainability goals, could significantly influence policy makers' abilities to understand the value of ICLS – thereby giving them better informed background to promote improved policies for adoption of ICLS on a wider scale.

3. How can research community overcome constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? How can donors help? There are no easy solutions, but sometimes well-established researchers without regard to potentially political repercussions simply have to “just do it”, because it’s the right thing to do. Getting the right team for full cooperation under stressful conditions will not be easy. Securing funding for such broad goals is a challenge. There are some limitations in the university and federal research structure that stifle freedom to pursue such broad social agendas – one change needed is the reward structure for research productivity. We need to pursue such robust research agendas not just by spinning our wheels, but to make progress in getting meaningful results.

With best regards for a successful workshop and robust outcome from the meeting in Sete Lagoas BRAZIL in March!

Alan Franzluebbbers

USDA-ARS, Georgia, USA.

Contribution 14, from Lindsay Coulthard at the Manitoba Zero Tillage Research Association, Brandon, Canada

-----Original Message-----

From: mztra [<mailto:mztra@mts.net>]

Sent: Tue 2/03/2010 3:35 AM

To: Crop-Livestock-L@mailserv.fao.org

Subject: Week 4 contribution from Lindsay Coulthard at the Manitoba Zero Tillage Research Association, Brandon, Canada

Hello All,

After having read several of the other submissions there seems to be one thing that stands out. The government policies and programs, primarily in the developed nations have ushered us into systems in agriculture which involve specialized cropping and livestock systems and high levels of commercial input. I was reluctant to forward my comments for the fourth week because I felt that I had put too much emphasis on the problems caused by poorly planned support programs in Canada. However after having read the other submissions I am more convinced that there are serious problems in agricultural policy which are a detriment to sustainable agriculture. My comments on the questions in week four suggest that the research emphasis needs to be toward providing evidence to governments worldwide that sustainable agriculture will only be reached when the farm support programs that are in place in the developed countries are radically changed.

- If you could secure funding to carry out research on the gaps associated with integrated crop-livestock systems - from your perspective and context - what would you identify as the most critically needed research associated with:

a) On the ground implementation of integrated crop livestock systems? With which actors might you partner to carry this out?

The most critically needed research to fill gaps in the crop livestock systems in Western Canada would be an economic assessment demonstrating the benefits to farmers over the long term. These benefits can be demonstrated and accepted by farmers but until the policy makers can be shown that the practice is one step towards sustainability we will continue to see policy that encourages farmers to accept the status quo and not innovate. Good long term verified economic results are needed to present to policy makers to have them make this change in policy.

b) The human and social dimensions of these systems? With which actors might you partner to carry this out?

In western Canada we have seen a migration of small to medium size farmers moving out of farming. A crop-livestock system which can lower cost of production for both the livestock production and crop production is a practical and sustainable alternative for small and medium sized farms in western Canada. Again we need to have data to prove to policy makers that the current system of support programs need to be changed to encourage farmers to use the crop livestock integration practices that will lead them to sustainability.

c) Enhancing market chains or incentives to production? With which actors might you partner to carry this out?

Market chain development to be successful will be a grassroots movement. We will need to support the innovators in our agricultural industry who are willing to look outside the box for solutions to our marketing needs. In order to see a non factory approach to our markets where the large meat packers demand that the livestock that comes to the factory door is from the cookie cutter so that the packers can maximize their profits researchers will have to support with the innovators to find and fill a niche in the markets.

Research will also have to provide support with data on the sustainability of the ICL systems to policy makers.

- What are the gaps in evidence required to frame a policy intervention or to influence policies or institutional elements that can advance integrated crop-livestock systems.

Governments in the developed countries will need significant proof showing the costs to the farming systems that have come as a result of the support programs they have put in place. The programs have guided farmers into specialized systems which rely almost completely on commercial inputs. We need both economic and soil science related data to prove that an ICLS is a sustainable system.

- How might the research community respond to the structural constraints of carrying out interdisciplinary, multi-institutional and multi-stakeholder efforts? What can donors do to assist in ensuring robust research efforts?

- Please share any other thoughts on this topic or previous topics that will advance our discussions and thinking.

Lindsay Coulthard

Farm and Extension Manager,

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email: mztra@mts.net <<mailto:mztra@mts.net>>

Contribution 15, from Bruno Gerard, SLP-ILRI, Addis Ababa, Ethiopia

-----Original Message-----

From: Gerard, Bruno (ILRI) [<mailto:B.Gerard@CGIAR.ORG>]

Sent: Tue 2/03/2010 8:20 AM

To: Crop-Livestock

Subject: Week 4 contribution from Bruno Gerard, SLP-ILRI, Addis Ababa, Ethiopia

Dear Colleagues,

Some elements of response to week 4.

Research should help better targeting and setting priorities

Which systems do we want to support in priority and which priority criteria do we use (and how do we rank and combine criteria to look at potential technical, institutional and policy 'solutions' and the sequence in which these have to be addressed?

- Focus on small scale crop-livestock enterprises (seems we have a good agreement on that)
- Addressing food security and poverty alleviation
- Is integration between crop-livestock at the farm scale always the 'best' solution?
- Sustainability (or non-sustainability) and what does that mean and how we envisage possible positive changes through action,
- Faster changing systems requiring technical/institutional/policy support and innovative approaches?
- Systems with potential for quick and large returns (markets,...)? (High potential systems might not be the ones with the most acute poverty problems)
- Chance of success and how do we measure success (livelihood, macro-economic indicators, environmental impact)

Research should have a longer term vision of the possible futures of small scale crop-livestock enterprises and their evolving opportunities and constraints in response to a series of drivers

Most recent forward looking publications have a 2030-2050 horizons. What is our vision of the future of small-scale farms by then? What are the possible pathways out of poverty for small scale farmers and their families? By 2050, I imagine that many farming systems will have drastically changed and we must hope that the next generations will have more livelihood options and off-farm opportunities. Helping the transition, contributing to identify solutions that will permit rural communities to leverage additional income and becoming less vulnerable (better health through better nutrition and better farm income, access to education,...) in order to give the chance for the next generations to access something else. For most systems we are probably looking, in the long run, at less numerous but larger and more productive farms with less people directly living from agriculture, and in some systems a rapid shift to large industrial enterprises (i.e. land deals). This is going to differ across systems – in the trajectory of transition and the end point – some end points will be industrial and some a combination of smallholders.... driven by policies and the huge increase in demand for livestock products

Research should provide the methods, approaches, and tools to put into better use past research findings and existing knowledge

Referring to Mark Powell's contribution in week 2 (and looking at the existing knowledge imbedded in most contributions to this consultation), there are large potential benefits to make better use of and integrate what is known:

- Contextualize scientific knowledge and understand reasons for successes and failures of past initiatives
- A better understanding of resource allocation and decision making processes/rationale/trade-offs by small-scale crop-livestock farmers in response to a range of drivers and constraints and its impact on livelihood and system sustainability, requesting to integrate bio-physical and socio-economic approaches at field, farm and landscape scales. Some examples of recent integrative research can be found in a recent special issue of the European Journal of Agronomy

http://www.sciencedirect.com/science?_ob=PublicationURL&_tokey=%23TOC%235023%232010%23999679998%231571291%23FLA%23&_cdi=5023&_pubType=J&_auth=y&_acct=C000001618&_version=1&_urlVersion=0&_userid=995675&md5=a5fe1fbc9e12b03c4fb52956f650a518 , especially the paper by Tittonell et al.

- Develop ex-ante tools to look at possible solutions
- Adaptive research is needed. No point to force-feed 'silver bullet' solutions to development practitioners, farmer communities and other stakeholders through projects. Building capacity of stakeholders for adaptive management should lead to better positive impact than 'blueprint' solutions.

Realistic and workable assumptions for scaling-out need to be developed

- Develop a dialogue and convey clearer messages to policy makers, foster institutional changes and integration of 'crop' and livestock related policies at local, national, regional and global levels (contributions so far on fragmentation of actors was striking)
- Explore the potential of reliable rural banking facilities (credits and savings) to intensify systems: giving the opportunity to farmers to access other forms of savings (in replacement of livestock) could lead, in many systems, to a smaller number of more productive animals (increase income, lower environmental impact, reduced vulnerability). This should be coupled with better market access.
- The need to be realistic and take into account socio-economic

local environments. In that respect, it would be useful to get clarifications on some potential technologies/packages such as CA. If I understood well John Landers' last week contribution in response to Steve Twomlow, no point of zero-tillage if you don't maintain near 100% residues in the field. This most probably implies a near zero chance of adoption in many mixed systems where crop residues significantly contribute to livestock diet: farmer will never give up significant short term benefits given by livestock for a 'difficult to grab' long term productivity increase unless there are other incentives created ... In the Indo-Gangetic plains, CIMMYT lead studies (Erenstein, FCR, 2009) showed disaggregation of CA packages by farmers, zero-tillage being adopted but almost no-legume rotation practiced and usually a significant amount of crop residues exported from the field. What does that mean in term of sustainability? Similar disaggregation was observed in Mexico (Erenstein PhD thesis, 1999). Other example, in Niger millet based system, weeding is mostly manual (hand hoe...), requiring 10 men day per ha twice during the rainy season, so leaving more residues on the field would increase labor requirements per unit area (and decrease grain yield as already not enough labor is available to timely weed all the field that were sown), so weeding technologies (mechanical or chemical) is a prerequisite to leaving more CR in the field (see also Giller et al., 2009 in FCR).

Contribution 16, from José R. Campero - ABDES, La Paz, Bolivia

-----Original Message-----

From: José Campero Marañón [\[mailto:jrcampero@hotmail.com\]](mailto:jrcampero@hotmail.com)

Sent: Wed 3/3/2010 9:57 PM

To: Crop-Livestock

Subject: Week 2. Contribution from José R. Campero - ABDES, La Paz, Bolivia

Dear All:

Some brief thoughts about crop-livestock systems in the Andean Region of Bolivia.

Best regards,

José R. Campero
DIRECTOR NACIONAL DE LA ALIANZA BOLIVIANA DE LA SOCIEDAD CIVIL
La Paz, Bolivia

§ There are integrated crop-livestock systems across a range of types (on-farm or area-wide) and scales in different agroecologies. Are there system-dependent input supply chain constraints (e.g. seeds of certain legumes, equipment and machinery for minimum soil disturbance and direct seeding, herbicides, livestock feed for specialized systems, etc.) that need to be addressed? Which are these and how have they been or might they be overcome?

In Bolivia, the integrated crop-livestock systems have low efficiency; and, the following factors can be a part of its explanation:

- a) The crop-livestock systems are developed in conditions of smallholdings and in the majority of the situations they develop in conditions of high climatic risk (frosts, hailstones or droughts).
- b) The external inputs have high costs and in view of the climatic risk, its application in the production process not always results in an increase of the volume of the production.
- c) The farmers have only few economic resources. And, the option to use these economic resources in external inputs to improve the productivity of their systems is a crucial decision. The most frequent decision is the increase of the ruminants flock by buy of new units. The increasing of familiar flock constituted in a source of saving and social prestige. Additional, the major quantity of animals allows the farmer to have major quantity of manure, key in the definition of the surface to sowing in the next year. For the rural Andean people, a numerous flock is very important in cases of natural disasters with losses of the part of the flock. Because, always will be a sufficient number of ruminants for the recovery of the size of the flock in a certain period of time.

Therefore, the best options to improve the production of actual crop-livestock systems will be tied to development to the following technologies:

- a) To utilization of low external inputs;
- b) To improve the actual levels of reproduction and the reduction of the mortality;
- c) Nutritional Suplementación with character strategic and directed animals with high nutritional demands;
- d) To generate value added to the primary productions; and,

e) To promote the access to the market under communal modalities (way to increase the volume to commercializing), and the participation in markets that pay just prices. That mean, prices of sale that cover the costs of production and its organic quality.

§ Do integrated crop-livestock systems offer an advantage when it comes to incentives/rewards for good practice such as payment for environmental services or access to special markets? If so, what is your experience with these?

The crop-livestock systems can give a positive response to the application of technology. The principal condition for that one is that this one will be compatible with the needs of the whole system of production. This means, that the technologies to apply must consider the system of production to be an alone set. For example, if the technology to recommending is related to the increase of the rates of reproduction and reduction of the mortality; this technology must be associated to:

a) Production of additional forages,

b) Suplementación of mineral, energy and protein with strategic character.

c) Supply of the inputs with opportunity (vaccines, veterinary services, systems of communal marketing); and,

d) The techno package will be including improving the agricultural productions, because this component is very important in order to supply of products or by-products for the animal nutrition.

In the last years, with resources of the IFAD the government of Bolivia implemented the Project UNEPCA of support to the breeders of South Americans Camelids. The Project has to focus on the generation of added value and marketing product with added value. Though, the Project did not consider the improvement of the primary production, the results were satisfactory in terms of reduction of the poverty. Nevertheless, I must admit that in Bolivia, a project of support to integrated crop-livestock systems never was executed.

§ Are there market (local, national, international) dependent value chain constraints (e.g. lack of local processing facilities, food quality/safety regulations, market access, etc.) that need to be addressed? Which are these and how have they been or might they be overcome?

In Bolivia, there is important the standardization of the quality of crop and livestock products, and the research and opening to special niches of market for exotic products as meat or fiber of South Americans Camelids; on the other hand, also there is absent processes of marketing (national and international level) and the sale of agricultural or livestock products with regional etiquette. For example, meat of South American Camelids produced by indigenous Aymaras to 4,500 meters on the level of the sea.

Certainly, also it is necessary to develop processes of trazability to the productions of meat and fiber and develop infrastructure as slaughter houses and annexes.

The participation of the departmental and national governments will be crucial in the system implementation of integrated crop-livestock sustainable systems, some general ideas are:

- a) To establish a national system of investigation of participative character, that focuses, after checking the scientific and traditional knowledge documented in the past, to giving technical solution to the problems derived from the system application of crop-livestock from the perspective of the producers, considering his economic, social and cultural possibilities to implement the identify solutions to the problem.
- b) To establish a national system of transfer of technology
- c) To regulate the participation of the departmental, municipal governments and of the producers' organizations in the sustainability of the systems of investigation and technology transfer.
- d) To develop an efficient campaign of promotion of products derivate of crop-livestock systems in both: on the domestic and international markets.

This one must be one of the responsibilities of the commercial attachés of the Embassies of Bolivia in the Exterior and it should possess the international organizations' support as the FAO or IFAD.

§ Who are the input supply chain and output value chain actors and how do they inter-relate? Who drives the chains (farmers, input providers, markets, government, etc)? How equitable are the benefits to different actors along the input supply chain and output value chain? Are there examples of input chain and output value chain actors working together to gain more competitiveness and sustainability or stability?

In absence of a governmental system, the supply of inputs is a personal responsibility of every producer, and the costs of the inputs turn out to be very high under this modality. A solution considered in the past, was the participation of the producers' organizations for the purchase of inputs and them sale to the associate producers.

§ Might we see a shift toward greater local/national sustainable markets in light of decreasing availability and increasing costs of transport fuel, climate change, food insecurity, etc.?

Certainly, opposite to the problems of food insecurity that tend to be major in the measure that the negative effects of the climatic change are major; the modernization of the current crop-livestock's systems is, between others, a solution to reduce the poverty.

Contribution 17, from Andrew MacMillan, ex-FAO, Italy

-----Original Message-----

From: Andrew MacMillan [mailto:andrew.macmillan@alice.it]

Sent: 04 March 2010 17:53

To: Kassam, Amir (AGPM)

Subject: Crop-Livestock Integration: Further Reflections – Week 4 contribution from Andrew MacMillan, ex-FAO, Italy

Dear Amir,

After reading the material which has been submitted over the past 4 weeks, I am left with the uncomfortable feeling, not for the first time, that the various parties that shape the directions of agricultural development have succeeded in driving it down the wrong roads – and that in this case it has gone so far in the wrong direction that it won't be easy to get it back on track.

Many contributors have extolled the virtues of integrating crop and livestock production in lots of different ways. They have pointed to the inherent efficiencies of these systems, especially in relation to nutrient recycling; the advantages of their diversity in terms of risk reduction, income stability and nutrition; and especially their sustainability. They have also noted the importance to small-scale farmers of their relatively low dependence on purchased inputs. Surprisingly, however, few contributors have highlighted the extremely important role of animal traction in enabling small-scale farmers to keep a much larger area under cultivation than is possible when they are dependent solely on manual tools (an advantage that may diminish as inversion tillage is progressively replaced by “conservation agriculture”).

But what has also emerged very clearly that, in spite of their virtues, these systems are disappearing very rapidly in developed countries and beginning to follow the same route in developing countries. This seems to be because market forces (relating to both inputs and products) and the policies and services put in place by governments are all pushing towards greater scale and specialization in farming. The first move in specialization seems to be towards either crops or livestock, which immediately leads to a loss in the benefits that arise from the complementarities that are a feature of integrated systems. So we now see, for instance, massive livestock operations faced with manure disposal problems, while large-scale arable farmers, spurred by subsidies, lament the rising costs of fertilizers and the progressive decline in the organic matter content of their soils.

One of the reasons for things moving in these directions is that no one - other than future generations - has to pay for the negative externalities associated with much of the technology on which this “modernization” has been based. These include the “costs” of cleaning up ground-water resources polluted by pesticides and nitrates; of reversing progressive losses of soil organic matter, leading to fertility decline; of combating massive outbreaks of diseases and pests of both farm animals and crops; or of compensating through social security programmes for the low wages for which farm

workers are expected to work, that fail to meet their most basic needs, even for food; and so on. While there have been many references to the potential carbon sequestration benefits of certain farming systems, surprisingly little has been said about the idea that food pricing policies should ensure that farmers and ultimately consumers pay “in real time” for the negative externalities associated with specific production systems, rather than focus on the over-riding aim of keeping food prices low for consumers, regardless of the damaging environmental and social side effects. This would probably shift the balance back in favour of integrated systems that are regarded as relatively sustainable and offer better prospects for small-scale farmers to stay in business by improving their competitiveness vis-à-vis larger specialized producers.

But a second reason for what, on the face of it, would seem to be an undesirable development trajectory, is the now almost universal separation of “livestock” from “agronomy” in training, research and extension. I recall a time in the early 1980s when the Director General of ILCA was censored by members of his board for increasing the Centre’s work on crop rotations and improved animal traction systems - on the grounds that this was straying too far into the crops arena for a livestock research institution!. And many contributors have made references to similar situations. FAO itself has had the greatest difficulty in bridging the livestock-crops divide internally, even though the two relevant divisions fall within the same department.

So we are now left with a situation in which the principal guardians of the kinds of integrated crop-livestock systems that we would like to see expanded are farmers who, for one reason or another, have resisted the pressures to abandon them, and who have taken it upon themselves to experiment, innovate and, in some countries, become successful promoters of improved systems.. If there is a consensus that this is the case, perhaps one of the best things that FAO can now do is to support the emergence of strong associations of crop-livestock farmers around the world, helping them to make the case, nationally and globally, for policies and programmes that favour the expansion of integrated systems and encourage the sharing of experiences and innovations. As was the case in the follow-up to last year’s workshop on Conservation Agriculture – in which most of the innovations have also come from farmers - a first step in this direction could be the incubation of a Community of Practice that would ultimately emerge as a self-sustaining institution run by its members.

Many thanks for the opportunity to participate in this exchange.

Andrew

Contribution 18, from Luiz Balbino, Paulo Galerani, and Pedro Machado, Embrapa, Brazil

-----Original Message-----

From: Pedro Machado [<mailto:pmachado@cnpaf.embrapa.br>]

Sent: Thu 3/4/2010 8:54 PM

To: Crop-Livestock
Cc: Luiz Carlos Balbino; galerani@sede.embrapa.br
Subject: Week 4 - Contribution from Luiz Balbino, Paulo Galerani, and Pedro Machado, Embrapa, Brazil

Dear Sir or Madam

Please find below our comments on the three topics listed in Week 3:

a.. From your perspective and in the context in which you are working, what are the top one-two (1-2) institutional and/or political constraints that undermine the uptake, implementation or spread of integrated crop-livestock systems?

In Brazil, the top institutional constraint is the fragile extension service, both governmental and private lacking on skillful technicians. The top political constraint is the lack of support to the official extension system as well as adequate political will to provide credit availability for long term (4-5 years at least) planning. Financing should be available at a specific time when crop or livestock demands. There is, also, need for a flexible insurance system in order to encourage adoption of the Integration Crop-Livestock-Forest (ICLS+Forest) system. For example, currently there is no difference of insurance costs for farms implementing conservation agriculture including best management practices and farms with any conservation agriculture.

- What can/might be done to address these constraints and who (or who together) can make that happen?

There is need to improve the extension service system in both government and private organizations such as the extension system linked to the farmer's cooperatives.

- If you had 5 minutes with a/your Minister of Agriculture (or Livestock, Finance, etc), what message would you want to deliver? What about 5 minutes with the head of national or international farmers' organizations? Any thoughts to share with a relevant private sector representative (inputs, processors, buyers, etc.)?

Dear Minister of Agriculture and Minister of Finance of Brazil, the time now is to increase food supply with simultaneous conservation of environmental services such as climate change mitigation, efficient water use, and preservation of biodiversity. Considering that, in Brazil, there are 180 million ha under low productive degraded pasture system, in which 50 million ha can be converted into high yield efficient agriculture, (we would appreciate if enough) there is increasing demand for credit (is offered) with incentives to promote those products originated from crop-livestock and forestry systems under zero tillage. Payments for environmental services should be implemented as ICLS systems enable aquifer recharge, less soil water erosion leading to a low carbon technology. The forest component in

ICLS+Forest may compensate greenhouse gas emissions by ruminants for ICLS+both meat and dairy production.

- What policy or institutional support or changes have you witnessed or read about that led to demonstrated success in the uptake, implementation or spread of integrated crop-livestock systems? Are there successes in other fields that might be applied in this situation?

In Minas Gerais State, the local government is presently promoting the conversion of small degraded agricultural areas into ICLS+Forest exploration organized by the State Agricultural Secretary including Emater MG (the state extension system), EPAMIG (the state agricultural research corporation) , local universities, and EMBRAPA . This is the consequence of tremendous efforts on continuous training and capacity building of the extension service staff.

Kind regards,

Luiz Carlos BALBINO, Paulo GALERANI, and Pedro Luiz Oliveira Almeida MACHADO

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Contribution 19, from Jamir Luís Silva da Silva and Jaime Airton Wunsch, Embrapa, Brazil

-----Original Message-----

From: Jamir [<mailto:jamir@cpact.embrapa.br>]

Sent: Fri 3/5/2010 11:11 PM

To: Crop-Livestock

Subject: Weeke 4 contribution from Jamir Luís Silva da Silva and Jaime Airton Wunsch, Embrapa, Brazil

Dear moderator

We are sending some comments on proposed topics. Please consider this contribution from myself and from Dr. Jaime Airton Wunsch.

Our contribution is on the integrated crop-livestock systems (ICLS) in the area of low lands of Brazilian Pampa, which possesses one of the integration systems older of the south of Brazil that is it of the integration of rice irrigated with the beef cattle. This ecosystem occupies an area of 178.243 km², equivalent to 63% of the state of Rio

Grande do Sul, which presents great diversity of species of grassy (450), legumes (150), birds (385) and mammals (90). The territorial extension extends to Argentina and Uruguay. In this Bioma it is located great part of the watery Guaraní, larger spring of fresh water of the world.

Around 60.000 km² this ecosystem it is occupied by the low lands, in which 10.000 km² are cultivated with rice irrigated annually. The current situation of the ICLS is still quite precarious, presenting low productivity and profitability.

In the current condition, the rice is the component of the system prioritized by the farmer by use the technologies more advanced (new cultivate, systemization of the soil, establishment with direct planting, irrigation, more effective control of the harmful plants, among others), which provided increase of productivity with values of 10.000 t.ha⁻¹. However these techniques almost always implicate in the increase of the production costs and they reduce the profitability.

On the other hand, the livestock has been relegated to a secondary plan with the absence of investments in management of soils, little technical training, the lack of adjustment of the forage offer in the pastures and little use of administration techniques and planning of the property. These aspects have been leading to low productivity (50-90 kg.ha⁻¹ of earnings of a live weight).

To use the ICLS on these soils of low lands is indispensable, for good establishment of the species winter forages and return of the native species, that happens good drainage of the soils, correction of the acidity and recovery of the natural fertility. Another important aspect is the leveling of the land, seeking auxiliary in the drainage and to facilitate the traffic of machines and equipments.

One of the great problems in the use of those areas is that more than 60% of the areas of irrigated rice are cultivated by tenants that don't worry about the maintainable handling of the soil and of the native vegetation that will return. Besides cultivating many years in the same area, when that is producing little these farmers occupy other areas.

Some producers that use ILPF in these low lands have been reaching levels of animal productivity around 600 to 1000 kg.ha⁻¹ of alive weight and of rice above 8.000 kg.ha⁻¹.

To conclude we would like to mention that the integration rice and pasture is indispensable for reduction of costs of the farming and better efficiency in the use of the soil with the direct planting of both components, culture and pastures.

Kind regards,

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Contribution 20, from John Landers in Brazil

-----Original Message-----

From: John Landers [<mailto:john.landiers@uol.com.br>]

Sent: Sat 3/6/2010 10:29 AM

To: Crop-Livestock

Subject: Week 4 contribution from John Landers in Brazil

Gentlemen,

I apologize for this late submission, I have been embroiled in selling my property here in Brasilia to augment my one minimum salary pension and have been overworked. I beg that it may be included.

I appreciated very much Andrew MacMillan's wise observations and would like to expound a bit on policy questions on which I seem to be having insufficient success in changing paradigms.

For some years now I have been focusing on Land Use Intensification as a key issue and the policy options for supporting this, as a means to mitigate de-forestation via incentives to LUI, especially with integrated crop-livestock systems with Zero Tillage (ICLZT). I firmly believe that these will not be sustainable in the long run of an intensive agriculture without Zero Tillage.

The problem with politics is that something takes centre stage and everyone is riveted by that option. In this case it is REDD, which is quite a useful tool if it can be afforded on the scale necessary to make a significant impact. However, it is severely limited in controlling leakage because it does not attack the three main drivers of de-forestation (in Brazil, probably most everywhere else too). These are:

1. expansion of the demand for cattle products;
2. expansion of the cattle herd and concomitant pasture degradation;
3. Land grabbers taking possession of public lands for speculative profits.

The farm lobby and agricultural economists need to focus on quantified studies to show the benefits which accrue to ICLZT, including erosion control, whose off farm benefits are huge, biodiversity preservation and carbon sequestration and these benefits need to be used politically to justify incorporating levies on agricultural production which are transferred from consumers to the farmers for their environmental services.

In Brazil, land use intensification and Zero Tillage adoption need to be mandatory and should be a qualifying condition for receiving the environmental services payments. The fact that land use intensification has only an indirect impact on de-forestation is society's

problem, government needs to enforce controls on land clearing in order to potentialize LUI. The fact that an alternative is being offered to slash-and-burn would facilitate general acceptance of strict controls on, or, zero de-forestation. However, a huge extension, credit and marketing effort is needed here to ensure that the small actors don't suffer unemployment and starvation. An important part of this would be a tropical timbers futures market to convert slash-and-burn farmers to profitable timber plantation on wide spacings with pasture in between and annual crops in the first years. This could harvest corporate finance on the scale necessary to solve the problem of re-training these small farmers and the risks should be born by government, in their own interests, with carbon credits as guarantee. One parting shot, small farms are extremely complicated systems and they need THE BEST EXTENSIONS, not the dross. Intensive training of extensionists, with top salaries, and a marketing effort to give them society's recognition, pride and self-respect for the huge social contribution they are making.

JNL

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Contribution 21, from Giovana Maciel, Hoston e Marcos, Embrapa, Brazil

-----Original Message-----

From: Giovana Maciel [<mailto:giovana@cpamn.embrapa.br>]

Sent: Sun 3/7/2010 5:52 PM

To: Crop-Livestock

Subject: Week 4 contribution from Giovana Maciel, Hoston e Marcos, Embrapa, Brazil

Colleagues,

In Brazil's Mid-North, a region of bioclimatic transition between caatinga, savanna, and the pre-amazonia, ICLS has been gaining pace in the Savannas of Piauí and Maranhão, where large farmers predominate. However, ICLS have also been empirically adopted by family farmers in the region.

Problems associated with the existing harsh climatic conditions, such as the short rainy season, have often been faced by these farmers. Moreover, the soil of the region also deserves a special attention since, for the most part, little resilience is observed.

Equally important is the lack of well-qualified workforce. Funds and research efforts

should be focused to studies of drought-tolerance mechanisms in plants of short-cycle (early), and soil quality improvement, as well as aspects related to the emission of greenhouse gases.

Using technologies to promote a sustainable production of food, particularly in the Mid-North, is essential to maintain the people from the region in their own rural communities with good life quality. Increasing food production through ICLS to meet current and future demands will guarantee both food security and a direct/indirect source of employment in rural and urban areas.

PS. some abstracts attached confirm the potential of the Mid-North region.

Kind regards,

Giovana A. Maciel, Hoston Nascimento and Marcos Teixeira

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