Contributions in Week 3 of the crop-livestock e-consultation

From the Moderators

-----Original Message-----
From: Crop-Livestock
Sent: Mon 2/15/2010 12:50 AM
To: Crop-Livestock-L@mailserv.fao.org
Subject: Welcome to Week 3 (February 15-19) of the e-consultation on Integrated Crop-Livestock System for Development

February 15, 2010

Dear Colleagues,

Thank you to all of you who provided input to Week 2 of our e-consultation on Integrated Crop-Livestock Systems for Development - The Way Forward for Sustainable Production Intensification.

In our first week of discussions, participants spoke to the importance of integrated crop-livestock systems and drew upon many examples of integrated crop-livestock systems that are being implemented at different scales around the world. Last week we delved into aspects of the input and output chains, the roles of different actors, and potential for some financial and technical incentives to promote these systems. We greatly appreciate the thoughtful responses that we have received to date.

This 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. We have – within previous interventions - touched on some of these but let's devote this week to digging deeper to articulate the institutional and policy constraints that need to be overcome and how to go about it. We also want to highlight those institutions and/or policies that enable integrated crop-livestock systems and what makes them work. As noted in the background paper, these constraints or enablers might be associated with sector-oriented policies, goals and strategies; strategic planning; infrastructure, credit, marketing (including agricultural market structures and market policies), insurance, land tenure etc; tactics for action, incentives, regulations (including those related to environment and pollution), and strategic directions for change in extensive and intensive crop-pasture-livestock systems, etc. If the commercial private sector has a substantial role in the production and/or marketing, what policy and regulatory measures are needed, and what processes work to ensure an effective and balance dialogue among stakeholders? Who can do what to make a difference?

Let's get started.

- 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?

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

- 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.)?

- 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?

- Please share any other thoughts on this topic that readers that will inform the discussion.

Please do keep in mind 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.

Week 2 summary will be posted on the website as well as a folder containing all the Week 2 contributions. The documents that came with the contributions during Week 2 will also be available on the website in the documents section.

Thank you again and we look forward to reading from you this week.

Best wishes,

The Moderators

Amir Kassam
Constance Neely
Theodor Friedrich
Eric Kueneman

E-mail: Crop-Livestock@fao.org

Contribution 1 from Lindsay Coulthard of the Manitoba Zero Tillage Research Association, Canada.

-----Original Message-----
From: mztra [mailto:mztra@mts.net]
Sent: Mon 2/15/2010 2:22 AM
To: Crop-Livestock
Subject: Week 3 contributions from Lindsay Coulthard of the Manitoba Zero Tillage Research Association, Canada

Dear All,

In western Canada we are fortunate to have access to most if not all of the system requirements to integrate crop/livestock production. We are able to access most seed types, herbicides, feed and equipment inputs. The technology is not complicated and is available to all farmers in western Canada.

I have attached a research publication assessing the economics of inclusion of alfalfa in a cropping rotation. This alfalfa production was used either as a dry hay production to be fed to livestock or as a grazed production with yearling cattle. There is increased risk with the alfalfa production system however there are also notable decreases in cost of production for grain crops produced in this system. There are also significant reductions in the requirement of fossil fuel based crop inputs when alfalfa is included in a rotation.

Having read the submissions from other parts of the world I now recognize that there are huge disparities between the farming systems we employ and those employed in a large part of the world. The research that we are doing in western Canada does demonstrate that a crop-livestock integrated production system is a practical and beneficial tool in most areas of our "modern" agricultural production.

There are not at this time significant incentives in Canada to encourage farmers to adopt crop-livestock integration. There are several proposals which would reward farmers for providing ecological goods and services which would apply when we use farming technologies which would leave the landscape in a more natural state and to keep the livestock out on the landscape for a higher percentage of their productive lives. There are also some innovative farmers who are developing markets for livestock produced on a forage fed diet but this is a limited market at this time.

The majority of the meat processing in Canada is done at large processing plants. A number of large enclosed livestock finishing units have been located within short distance of these processing plants and several of these are vertically integrated with the processing plants. This situation in Canada does provide a disincentive to adopt a new technology as the large packers do feel they need some control of the livestock coming to their plants to maintain their productivity and margins. We are beginning to see some innovative farmers and small packers working together to fit niche markets in Western Canada but this is still a relatively small part of the total industry.

Farmers in Canada have over the past 35 years increasingly followed the lead of the input providers in making a lot of the farm management decisions. We have been provided with off the shelf inputs to solve the production problems within modern agriculture and have come to rely on these off the shelf solutions. With the increase in size of the farming operations we see fewer cultural solutions being utilized in favor

of the commercial chemical and fertilizer solutions. We are seeing an increased interest mainly from the smaller livestock producers in more natural production techniques which may provide them with improved production without the additional costs. We are also seeing more influence from researchers and government extension encouraging farmers to adopt alternative production systems.

Increased energy costs should bring about a shift towards more local food production systems. We in Western Canada have always been an exporting area and have prided ourselves on our ability to supply the world with food. With the adoption of new food production techniques in other parts of the world and an increase in production levels in some nations which were net importers of food in the past we are going to have to assess the production systems that we have adopted to service these markets. The transportation costs will continue to reduce the profit margins for producers in Western Canada who continue to produce a low value unprocessed food product for export.

Lindsay Coulthard
Farm and Extension Manager,
Manitoba Zero Tillage Research Association
Brandon Office: 204-729-8838
Farm Office: 204-725-3939
Cellular: 204-825-7878
email: mztra@mts.net

Contribution 2, from J. Franzluebbers at USDA-ARS, Georgia, USA

-----Original Message-----
From: Franzluebbers, Alan [mailto:Alan.Franzluebbers@ARS.USDA.GOV]
Sent: 16 February 2010 16:15
To: Crop-Livestock
Subject: Week 3 contribution from Alan J. Franzluebbers at USDA-ARS, Georgia, USA

Dear Colleagues,

Thanks for the opportunity to share these thoughts with you from my perspective in the southeastern USA [a warm (15-20 °C mean annual temperature), moist (50-150 mm per month) environment with acidic, nutrient-poor soils (Ultisols)]

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?
From a cropping perspective, a major constraint to widespread adoption of integrated crop-livestock systems (ICLS) is the institutional view that any problem encountered with a specialized approach can be overcome with a chemical or quick-fix approach. Lack of information, social support networks, physical resources, and financial credit limit a producer's ability to change the system without undergoing enormous financial ramifications. Some producers may want to change from a specialized to a more integrated system, but there is little support structure to enable this. Some producers

simply are bolder than others and make the changes, oftentimes when circumstances indicate that farm survival cannot occur without such a change. From a livestock perspective, a major constraint for ICLS adoption is finding suitable alternative markets available in a reasonable distance from the farm to make a switch. Physical resources of proper equipment and suitable land can limit their choices as well.

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

Strong farmer-led organizations with educational support networks (e.g. extension and research teams working towards similar goals) could provide a great deal of technical and social support to encourage change to more resource-efficient and environmentally friendly farming systems. In our area, conservation-tillage farmer alliances have recognized the need for further development by integrating grazing animals. The Conservation Production Systems Training Conference sponsored by the University of Georgia has been helping to develop this approach.

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.)?

(1) Policies can affect the balance between production and environmental quality. Strategies should be considered that emphasize the long-term sustainability of a region by balancing production and environmental quality, not just focusing on the short-term needs of a selected portion of the population. (2) Farmer organizations could work together so that the agricultural systems of a region are diverse and vibrant, rather than manipulated by a dominant few at the expense of others. (3) Private agricultural industries could offer a suitable suite of alternative technologies to meet the diversity of needs within a region.

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?

Successful adoption of ICLS has occurred from the personal desires of individuals to reduce ecological stresses by adopting more resource-efficient agricultural systems that work for the unique conditions of the farm, its local and regional environment, and for the economic benefit of neighbors who can establish associated businesses (suppliers, retailers, tourism, etc.) to make the rural community thrive in a balanced, sustainable manner.

Alan

Alan J. Franzluebbers
USDA - Agricultural Research Service
1420 Experiment Station Road
Watkinsville GA 30677
Tel: 706-769-5631 ext 223

alan.franzluebbers@ars.usda.gov

Contribution 3, from Ahmed Alhasan Oshake, Federal Ministry of Animal Resources and Fisheries Khartoum, Sudan.

-----Original Message-----
From: Ahmed Alhasan Oshake [mailto:aeoshaik@yahoo.com]
Sent: 16 February 2010 22:43
To: Crop-Livestock
Subject: Week 3 contribution from Ahmed Alhassan Oshake, Federal Ministry of Animal Resources and Fisheries
Khartoum, Sudan.

Dear Colleagues

Thank you for the opportunities to share and discuss ideas and views on crop-livestock integration systems.

This is a very important issue as well in Sudan. Sudan lies in the north east of Africa and neighbours 8 countries, from the north and clockwise, Egypt, then Saudi Arabia eastwards across red sea, Eritrea, Ethiopia, Kenya, Uganda, Central African Republic, Chad and last Libya in the north west. The climate ranges from desert, semi-desert, poor and rich savannahs to humid equatorial climate in the south. Sudan generally is an open grassland separated by Nile River in the middle. My country is categorised as one of the countries expected to play a positive role in responding to increased demand for food.

Please find attached what I decided to say to my minister in the five minutes. (It is also pasted below).

Best regards.....

Oshaik

Ahmed Alhassan Oshaik
General Directorate of Extension, Technology Transfer and Pastoral Development
Federal Ministry of Animal Resources and Fisheries
Khartoum
Sudan

Contribution 4, from Adrian Catrileo at INIA, Chile

-----Original Message-----
From: acatrile@inia.cl [mailto:acatrile@inia.cl]
Sent: Wed 2/17/2010 11:05 PM
To: Crop-Livestock-L@mailserv.fao.org
Subject: Week 3 contribution from Adrian Catrileo at INIA, Chile

---

Dear All,

I am writing from southern Chile (38ºSL 72º WL). Here there is a mixed agriculture where crops and livestock usually are present in an integrated way with different intensity of the crop rotation.

In general, farmers have access to every agricultural input they need (seeds, pesticides, credits, etc) and for commercial farmers the decision about what they are going to grow the next season relies on the market conditions. On the other hand, small-farmers do more integrated crop-livestock systems (ICLS) where they produce the amount of food they need and the excess of production is sold.

Question 1.

Institutionally, the banks not always facilitate enough credit to farmers. They usually claim lack of credit to overcome with their ICLS especially in the long term. Fruit projects with better economic perspective in the long term are preferred by the bank, limiting the presence of crops and livestock, in fact, many cow-calf systems which were a traditional activity have decreased dramatically in the last five years. The second constraint refers to a very weak association between the different components of the added value chain. In general, larger industries buy agricultural products without necessarily having a contract with the farmers which at the end disincentive any plan of ICLS.

Question 2.

A better communication, transparency and confidence are necessary between the producers and processors. Besides, market conditions like credit (amount and opportunity), production contract, economic incentives for quality, good agricultural practices, animal welfare, soil health, are also required. So, farmer's organizations and an appropriate political environment are key elements.

Question 3.

To the Minister: What is your planed strategy to maintain farmers on their landscape while increasing productivity in quality and quantity, without deteriorating the environment?

To the head of farmer's organization: In your opinion, what are the minimal conditions required to implement an ICLS? And secondly, which are the bottle necks you visualize on the system?

Question 4.

Universities, research institutions and agricultural government supporters should be sympathetic with the System Approach and its practical, economic and sustainable benefits. This topic should be taught and learned throughout the university studies.

In the last few years, in some areas where soils are very infertile, the inclusion of a legume crop (lupine) which is used early in the year as green manure in order to

increase the organic matter of that paddock/soil has been promoted in the crop sequence. This has been supported economically in part by the Minister of Agriculture and in part by the farmers, stimulating in some way to maintain also the ICLS.

Best Regards,

Adrian Catrileo PhD
Instituto de Investigaciones Agropecuarias (INIA) - the National Agricultural and Livestock Research. CHILE
Phone: 56-45-215706 (272)
Fax : 56-45-216112
acatrile@inia.cl

Contribution 5, from Parthasarathy Rao at ICRISAT, India

-----Original Message-----
From: ParthasarathyRao, P (ICRISAT-IN) [mailto:P.PARTHA@CGIAR.ORG]
Sent: 18 February 2010 10:56
To: Crop-Livestock
Subject: Week 3 contribution from Parthasarathy Rao at ICRISAT, India

To the Moderators

My brief answers to the questions raised are shown below in blue.

-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?

The compartmentalization of crop and livestock activities into separate entities by Government Departments, Extension Agencies, Researchers, is a major hurdle in integrating the system and bringing them under the ambit of new technologies that promote both sub-sectors.

A lack of understanding of the heterogeneity of crop livestock systems and the need for differential interventions in terms of technology delivery and development initiatives.

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

Bringing on one platform all the service providers related to crops and livestock on a single platform so there is appreciation of the system as a whole rather than looking at each sub-sector independently.

Constructing a typology of crop-livestock systems for each country for better targeting of technology and development initiatives.

Better coordination among researchers working on crops and livestock. Interaction between crop and animal scientists.

- 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.)?

Put an environment / pollution tax on industrial systems and provide incentives for mixed systems in peri-urban or hinterlands. Use the tax for building infrastructure to link hinterland producers with urban /demand centres.

Bulk supply of inputs to farmers through farmer association would save on cost of inputs. Bulk purchase of produce by processing industry again through farmers association would save on marketing and transaction costs.

-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?

A coalition approach where in all the potential stakeholders (players /actors) are brought on a common platform has a demonstrated effect on the uptake of new technology or program. The coalition would include both research and non-research stakeholders, public and private sector stakeholders, farmers, NGO's, bankers, market intermediaries, and industry.

A good example of this was the use of sorghum for poultry feed in Asia promoted through an institutional innovation / coalition approach. This coalition included crop scientists, poultry nutritionists, feed industry, credit agencies, input dealers (including seed), farmers, farmers' federation, poultry producers, poultry federation.

Under this approach each stakeholder / institution/organization would meet his sub-goal while meeting the overall common goal.

Regards

Parthasarathy Rao
ICRISAT
India

Contribution 6, from Alan Duncan at ILRI Addis Ababa

-----Original Message-----
From: Duncan, Alan (ILRI) [mailto:A.Duncan@cgiar.org]
Sent: 18 February 2010 14:20
To: Crop-Livestock
Subject: Week 3 contribution from Alan Duncan at ILRI Addis Ababa

Dear Moderators – here is my contribution for Week 3:

The first thing to say is that the lack of contributions to this e-forum during week 3 is significant. Compare the lack of activity we have seen in week 3 on policies and institutions with flurry of responses during weeks 1 and 2. Does this reflect the composition of the consultee group or is it that while we know a lot about the technical solutions, we know much less about how to turn these into reality on the ground – a big challenge. Now a few reflections in response to the questions posed.

- *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?*

I work in Ethiopia and am mainly interested in uptake of improved feeding systems for livestock but many issues related to change in practice at farm level are generic. In Ethiopia, one of the constraints to integration crops and livestock is the strong policy emphasis on improved cereal production with little policy attention given to livestock. A further constraint is the disjointed nature of the system of actors working in the rural setting. We are experimenting with the use of "innovation platforms" to bring the necessary actors together in the hope that it will accelerate changes at farm level - we have some promising results and some disappointments but I think there is a need to focus less on pushing technologies and more on addressing institutional barriers to change at farm level. Off the top of my head a few of the institutional barriers to change are: 1. lack of participatory approaches among extension staff 2. compartmentalization of local govt actors (crops, livestock, NRM) 3. poor linkages between research and extension 4. research mandates that are not examining things at the system level 5. Insufficient attention to linking farmers to market and coupling technologies with income-generating commodities.

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

We are using innovation platforms to bring diverse actors together for joint action. We have been struck by the limited extent to which key players in the livestock sector communicate and just getting them in the same room on a regular basis can lead to positive outcomes in terms of change at grass roots level - we need more of this kind of thing. There is a lot more on the whole “innovation system” perspective on the website of the Fodder Innovation Project (http://www.fodderinnovation.org/) and the project I lead, the Fodder Adoption Project recently started a blog (http://fodderadoption.wordpress.com/) where we will be posting on our experiences – subscribe if you want to be kept in touch.

- *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.)?*

I'd suggest that extension officers need more than technical skills - they are well placed to act as facilitators of innovation by bringing in private sector players, market

actors etc to stimulate innovation - but they need to be capacitated and mandated in this direction.

-Please share any other thoughts on this topic that readers that will inform the discussion.

In summary, I suggest that changes in practice at farmer level are a lot about getting the right actors together, providing forums for them to develop joint actions, building capacity among local actors to think at system level and to move beyond technical interventions to organization and institutional innovations.

Alan Duncan
ILRI
Addis Ababa
Ethiopia

Contribution 7, from Bruno Gerard at ILRI, Addis Ababa, Ethiopia

-----Original Message-----
From: Gerard, Bruno (ILRI) [mailto:B.Gerard@CGIAR.ORG]
Sent: 18 February 2010 16:22
To: Crop-Livestock
Subject: Publication on Innovation – Week 3 contribution from Bruno Gerard at ILRI, Addis Ababa, Ethiopia

Dear colleagues,

Following Alan Duncan's contribution find attached a publication related to a 'Fodder Innovation Project' implemented in India and Nigeria, pleading for changes in the way we work and proposing a framework to bring stakeholders together in agricultural development.

Bruno

Reframing Technical Change: Livestock Fodder Scarcity Revisited as Innovation Capacity Scarcity - A Conceptual Framework

by A. Hall, R. Sulaiman, and P. Bezkorowajnyj

Abstract

This document, divided into three sections, develops a conceptual framework for a project on livestock fodder innovation – the Fodder Innovation Project (FIP). Livestock is important to the livelihoods of poor people in many regions of the developing world. A generic problem found across this diverse range of production and marketing contexts is the shortage of fodder. This paper argues that to address this problem it is necessary to frame the question of fodder shortage not from the perspective of information and technological scarcity, but from the perspective of

capacity scarcity in relation to fodder innovation. To support this position the first section presents case studies of experience, from an earlier fodder innovation project, that suggest that while fodder technology is important, it is not enough. There is a large institutional dimension to bringing about innovation, particularly with respect to the effectiveness of networks and alliances needed to put technology into use. The second section begins by reviewing the evolving paradigms of agricultural research and innovation over the last 30 years or so and explains the emergence and relevance of the innovation systems concept to agricultural development. It then presents a framework for exploring fodder innovation capacity, with particular emphasis on the patterns of interaction needed for innovation and the policy and institutional settings needed to enable these processes. The third section reviews the wide range of existing tools available to investigate institutional change. It then recommends that an eclectic approach of mixing and matching tools to the emerging circumstances of the research is the best way forward.

Contribution 8, from Tilahun Amede at ILRI Addis Ababa

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

From: Amede, Tilahun (ILRI-IWMI) [mailto:T.Amede@CGIAR.ORG]
Sent: 18 February 2010 17:00
To: Crop-Livestock
Subject: Week 3 contribution from Tilahun Amede at ILRI Addis Ababa

Dear Moderators,

I would like to add few bullets on how institutions and policies affect uptake of interventions in CLS.

Technology flow and adoption cannot easily be predicted by studying the individual behaviour of agents, or the efficacy of some single innovation; and that long-term prediction of how interventions emerge will be subject to considerable uncertainty. It is also possible that farm level CLS will be patterned rather than random, and that these patterns will have arisen out of the interactions of local sets of practices, capacity, agents, strategies and artefacts in response to their environments. It is our contention that as innovation occurs, emergent behaviours arise, and these represent changes to social institutions. You may wish to share the model below (paper attached), emerged from our work on Livestock-water-land productivity in CLS in East Africa.

Thank you,

Tilahun

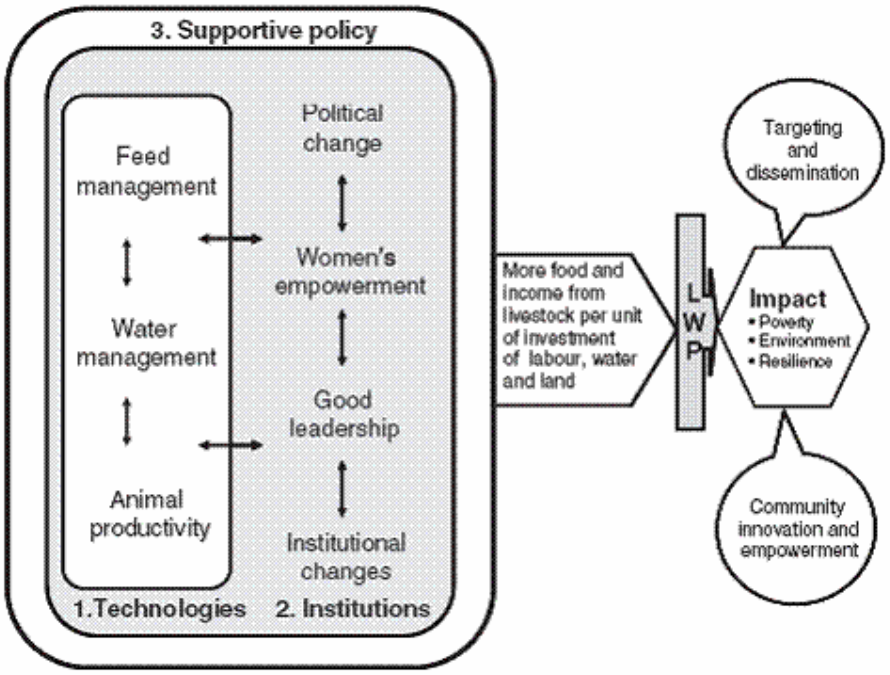

Fig. 1. Components of innovation systems to address poverty, environmental degradation and resilience through improved livestock–water productivity interventions.

==========

Tilahun Amede, PhD
Scientist, Livestock water and nutrient productivity
International Livestock Research Institute (ILRI) / International Water Management Institute (IWMI), P.O.Box 5689, Addis Ababa, Ethiopia
Bus: +251 116463215
Mobile: +251 911 230135
Bus Fax: +251 116461252
E-mail: T.Amede@CGIAR.ORG
Web Page: http://www.iwmi.org/ http://www.ilri.org

Contribution 9, from Jill Lenne, Scotland, UK

-----Original Message-----
From: Jillian Lenne [mailto:jillian.lenne@btopenworld.com]
Sent: 18 February 2010 18:15
To: Crop-Livestock
Subject: Key issues raised -- Contribution from Jill Lenne, Scotland, UK

Dear Contributors

I strongly agree with today's contributions by Parthasarathy Rao and Alan Duncan (copied below) to the e-consultation on crop-livestock systems. My general contribution in Week 1 (paper on crop-livestock integration in SSA) also highlights both issues.

Best wishes
Jill Lenne

From Parthasarathy Rao: The compartmentalization of crop and livestock activities into separate entities by Government Departments, Extension Agencies, Researchers, is a major hurdle in integrating the system and bringing them under the ambit of new technologies that promote both sub-sectors.

A coalition approach where in all the potential stakeholders (players/actors) are brought on a common platform has a demonstrated effect on the uptake of new technology or program. The coalition would include both research and non-research stakeholders, public and private sector stakeholders, farmers, NGO's, bankers, market intermediaries, and industry. A good example of this was the use of sorghum for poultry feed in Asia promoted through an institutional innovation / coalition approach. This coalition included crop scientists, poultry nutritionists, feed industry, credit agencies, input dealers (including seed), farmers, farmers' federation, poultry producers, poultry federation.

From Alan Duncan: A further constraint is the disjointed nature of the system of actors working in the rural setting. We are experimenting with the use of "innovation platforms" to bring the necessary actors together in the hope that it will accelerate changes at farm level - we have some promising results and some disappointments but I think there is a need to focus less on pushing technologies and more on addressing institutional barriers to change at farm level. Off the top of my head a few of the institutional barriers to change are: 1. lack of participatory approaches among extension staff 2. compartmentalization of local govt actors (crops, livestock, NRM) 3. poor linkages between research and extension 4. research mandates that are not examining things at the system level 5. Insufficient attention to linking farmers to market and coupling technologies with income-generating commodities.

Contribution 10, from Eric Vall at CIRAD

-----Original Message-----
From: Eric Vall [mailto:eric.vall@cirad.fr]
Sent: 19 February 2010 11:04
To: Crop-Livestock
Subject: Week 3 contribution from Eric Vall at CIRAD.

Bonjour,

Je vous prie de trouver ci-après une contribution portant sur les systèmes agro-sylvo-pastoraux très répandus en Afrique de l'Ouest dans les zones cotonnières et en particulier au Burkina Faso en zone sub-humide.

1) 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?

Une première contrainte me parait être liée à la séparation des Ministères de l'Agriculture et de l'Elevage, situation très courante en Afrique subsaharienne. Au Burkina Faso, dans la zone de savanes subhumide, les activités agricoles et pastorales sont conduites sur les mêmes espaces et au sein des mêmes exploitations. Toute mesure appliquée sur une activité a un impact sur l'autre. Sur le terrain les agents des 2 ministères travaillent souvent ensemble, néanmoins les logiques sectorielles l'emportent parfois sur celles de l'intégration de l'agriculture et de l'élevage. Une seconde contrainte concernent la faiblesse des organisations d'éleveurs par rapport aux organisation d'agriculteurs (comme les OP coton bien structurées et bien soutenues par les bailleurs de fonds) toujours dans les mêmes zones. Dans les actions de dvpt local, conduites par exemple par les communes rurales, cela conduit à une faible prise en compte de l'élevage

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

Au niveau local (village, commune), des cadres de concertation regroupant les représentants des OP d'agriculteurs et des OP d'éleveurs permettent d'activer les échanges entre agriculteurs et éleveurs. Souvent ces cadres de concertation manquent, ce qui fait qu'il n'y a pas de lieux où parler ensemble des problèmes générés par les activités réciproques et pour rechercher des solutions. Parfois des cadres de concertation existent et sont prévus dans les politiques de décentralisation mais sont insuffisamment actifs. Les méthodes de recherche action, qu'y s'appuient, sur des forums hybrides réunissant praticiens et scientifiques, permettent de redynamiser les échanges au sein de communautés agropastorales. Lorsque le dialogue s'établit entre agriculteurs, éleveurs, acteurs de terrains et scientifiques, un travail d'analyse des pbs et de recherche de solution se met en place et on constate un apaisement des tensions.

Au niveau national, on pourrait suggérer la mise en place de plateformes nationales d'échanges sur la question du dévpt agro-sylvo-pastoral à l'image de ce qui peut être fait au niveau local.

3) 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.)?

Dans les zones de savanes subhumides de l'Afrique de l'Ouest, on aurait tout à gagner en renforçant encore plus l'intégration de l'agriculture et de l'élevage. L'agriculture

bénéficie de la présence de l'élevage à travers la traction animale, la fumure organique, l'épargne/trésorerie sur pieds et l'élevage bénéficie de l'agriculture à travers les résidus de cultures (ressource fourragère de saison sèche), le recul de certaines maladies comme la trypanosomose....

Cordialement,
Eric Vall
Cirad

Contribution 11, from Natali KOSSOUMNA LIBA'A at the Université de Maroua, Cameroun

-----Original Message-----
From: Kossoumna Libaa Natali [mailto:kolibaa@yahoo.fr]
Sent: 19 February 2010 11:17
To: crop-livestock-L@mailserv.fao.org
Subject: Week 3 contribution from Natali KOSSOUMNA LIBA'A at the Université de Maroua, Cameroun

Dear colleagues,

Please find enclosed my contribution (also pasted below).

Conditions for a good organization and management of rural area between breeding and agriculture

As geographer, my intervention relates to the problems involved in the organization and management of rural areas between breeding and agriculture. Recent observations show the exacerbation of the constraints which weigh on the traditional model of management and organization of pastorals activities in the North of Cameroon. With land insecurity which means safeguarding the spaces of pasture and tracking for cattle and supporting a mining or extensive agriculture, physical insecurity with the taking of hostage and the payment of strong ransoms by stockbreeders have come to be added. The latter try to implement new practices in order to adapt or at least attenuate such constraints. Geographical and sociological analyses of these problems were carried out between 2005 and 2008 within the framework of a thesis of doctorate in geography.

I will give my contribution by following the guidelines questions:

- 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?

The recent analysis enabled us to consider breeding and agriculture which are registered on the various territories occupied and exploited by the stockbreeders (base

territory and territory of activity) as a whole and in their interrelationships. The various shapes of organization of these territories were characterized (cultures, spaces of pasture, tracks with cattle and of service road, dwellings...). This enabled us to understand and brainstorm on the various organizations, exploitations and territorial managements, to identify the structures of these territories, spaces of membership, the principal dynamics. This characterization also made it possible to specify the functional relations between the various actors (contracts, exchanges and complementarities...), the stakes and the concrete methods of territorial integration by matching organization and operation (rights, rules and access modes, authorities of management, conflicts, arrangements...). Thus, the interferences between the various activities (breeding and agriculture) in and beyond these territories, the new practices of the stockbreeders, the new individual and collective levels of organization around the herd and of the cultures were defined. The combination of these territorial transformations made it possible to clarify the needs expressed by the stockbreeders for the exercise for their activities and their survival. This led us at the end of the thesis to conceive and to organize proposals for an action to answer the territorial stakes for a good safeguarding of the environment (conditions of maintenance of mobility, complementarities agriculture and breeding), a social peace (avoidance of conflict situations, securing goods and people) and a sustainable economic development (safeguarding the incomes of the stockbreeders to avoid their impoverishment and to feed a growing population).

In spite of many exchanges between the communities of stockbreeders and farmers (work, material, etc), the improvement of productivity and management of the delimited courses of small surface and large courses were not successful. This lack of collaboration is partly explained by the unequal weight that breeding has within the two communities. The farmers initially seek to increase their cultivable surface without for example planning to develop the surplus of animal manure produced by animals of the stockbreeders at the time of parking on the space of pasture. On the other hand the stockbreeders want to preserve a vast space of course, able at least to accommodate all the year part of the herd for milk production. The boards of management set up by the projects of development for the maintenance of the protected courses do not seem a device of stable management, effective and confirmed in the medium and long term. This shows that the pastoral situation cannot improve with subsidiary rules created by development projects in spite of their engagement and their effectiveness apart from the legislative framework. Considering the weakness of the surfaces of the secured courses in question and the technical and social difficulties to improve the productivity of it, transhumance appears indispensable for the stockbreeders of this area and more particularly of the two territories under study.

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

We are actually in front of the settlement and integration of the stockbreeder's transhumant in the dominating socio-economic system. The results show that the settlement of the systems of bovine breeding of Mbororo and thus the abandonment of the transhumance, recommended by the authorities in order to reduce tensions between the farmers and the stockbreeders could be viable only if the following three

major conditions are fulfilled:
- (i) delimitation of great spaces, (much larger than those currently limited) near the villages of stockbreeders
- (ii) A good and concerted management of available pastoral resources and, if possible in a complementary way;
- (iii) A fodder revolution in the base territory which the technicians and the stockbreeders have of the evil to design and to implement. In addition this fodder revolution containing crop plants (herbaceous and raised) should use to much space order not to compromise the food safety of the populations of this area which remains fragile.

Today the conditions necessary for a total settlement of the activities of breeding are not effective. As result of this, the practice of transhumance must be preserved and integrated in the regional diagrams of development.

- 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.)?

The prospects for the evolution of the systems of breeding in the North of Cameroon must be considered through certain elements which constitute the determinants of them:

1. The requirement for the maintenance of the mobility of the animals

Faced with the pressure on space and with the number of animals involved, transhumance seems to be a guarantee for (i) the sustainability of the agro-pastoral systems of the Mbororo stockbreeders and thus (ii) the supply of livestock products to urban consumers, whose needs increases each year. This mobility makes it possible to develop in the course of years a diversity of the agro-climatic situations and natural courses. In order to be sustainable, however, these systems based on mobility must be better managed.

Resorting to paid shepherds further complicates this management; for example, the latter feels concerned only by the control of the herds and very little by the management of the consumable vegetation by the cattle. But, the major stake today for the stockbreeders is the maintenance of the large courses dispersed in various zones of the North Cameroon region and which are essential to the maintenance of transhumance. These courses are indeed threatened by the extension of the cultures and the neglect of the authorities in charge of their control (official services, traditional authorities).

Sustainability based on the maintenance of transhumance relates today to the resolution of the problem of insecurity of goods and people on the one hand and that of the capacity of the stockbreeders to organize themselves collectively in order to be given sufficient spaces by ensuring the pastoral natural stock management on the other hand. The issue of sustainable development was tackled here from the point of

view of the stockbreeders, thus on their territory and scale of the unit of production which they mobilize. The same question should also apply to the scale of the soudano-sahelian zone. This requires different methodological choices and the installation of multi-field teams in the definition of indicators of agro-ecological, economic and social performances being able to lead to adequate political choices. It requires decision makers, especially the State, to become aware of the place of mobility in animal feeding and the protection of the environment by taking strong decisions aiming at maintaining the state of spaces of usual courses and tracks for cattle. For the moment, in the absence of a collective reflexion for the organization and the space management, the practices implemented tend to constitute a heterogeneous mosaic of territories on the scale of each group of actors and even of each individual (stockbreeders and farmers) and whose results are undergone by each one. It is imperative to ensure the practice of agriculture and the preservation of pastoral spaces in territories where land pressure of agricultural and extra-agricultural origin (drives out, tourism...) is strong.

The disappearance of the stockbreeders or the reduction in the breeding will have a consequence on the milk and meat consumption in the area. It is also imperative to maintain the activity of breeding and the maintenance of pastoral spaces. In view of this, all the actors should mobilize their capacities of comprehension of the stakes in progress and define rules in a participative way, and adapt their rights and duties. This supposes a responsabilization of the State and a strong implication of the public services in the installation of a policy of viable and equitable territorial governance for space management.

2. Citizens living together on the same territory: a challenge for the State

Citizens, whatever their activities, their origin, their level of education occupy the same territory. The constitution of the various countries stipulates that all the citizens must have access to the same rights, conferred by the fact that they reside on the same territory. So the concept of citizenship can be linked to that of territorial governance seen as the greatest participation of citizens in the management of the territory. As a result of this, we conceive that all the citizens, whosoever, and whatever the activity which they practice and the portion of the territory that they occupy must all have the means to take an active part in the construction of this territory, to contribute to define and to carry out the project by which all can live together on the territory. However, the report is clear: exclusion and hatred which stockbreeders and their principal activity are victims of started in the past. The claims raised by the territorial governance causes in relation to the place of the space of pasture and the safeguarding of the way of life of the stockbreeders remain topical. Indeed, coordination between the various types of actors (the farmers, the stockbreeders, managers of the zones of interest hunting and hunting, communes, traditional authorities) and the various activities (Agriculture - cotton and corn-, breeding, activity of hunting and tourist...) can be developed only if the State, which has the means of enforcing the law is ready to play its role, i.e., to monitor, defend the contradictory interests and to arrange the territory. It thus poses the problem of the territorial governance in the centre of which the State, democracy and the citizenship are. The State must thus work out, apply, respect and enforce the law, and ensure the land safety for stockbreeders and their equitable access to the natural resources. The practice of pastoralism as a socio-

economic activity and way of life must be guaranteed. This passes through the sensitization and the popularization of the laws and regulations for the determination of the status of spaces of pasture and the tracks of cattle and the promotion of a policy of regional planning. Stockbreeders must take part in decision-making relating to land.

- 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 Northern Cameroon, human population growth leads to increased competition for the same natural resources between nomadic livestock breeders (pastoralists) and crop farmers. While decision-makers would prefer pastoralists to settle and give up nomadism and transhumance, what is observed is a partial settling process with permanent dwellings and crop fields but with the persistence of seasonal practices of transhumance for a large part of the animals. The main reason behind this semi-settlement process is of both a social and economic nature: Pastoralists villages are given an official status by the authorities, thus engendering requests for public infrastructures such as schools and boreholes as well as claims for tenure rights. Seasonal transhumance for part of the herds renders possible sustainable temporal and spatial use of fodder resources and solves land availability problems. Individual strategies by breeders to gain access to diminishing grazing land have become the rule. A decrease in collective decisions can consequently be expected in the near future. Simultaneously, breeders have started to employ paid shepherds because of changes in seasonal grazing strategies brought by the new cropping practices.
From the economic point of view, this situation opens market opportunities for pastoralists. Cereal and milk yields are good and the access to local markets contributes to the good performance of those semi-settled production systems. The main reasons behind this semi-settling of Mbororo farmers are thus mainly economic but also have an important social component: breeders villages are officially registered by local authorities and social infrastructures such as schools and wells can be obtained.

Transhumance is a key factor in their sustainability and is conditioned by the availability of grazing lands beyond settling areas. Consequently, seasonal mobility is the only way to manage fodder resources in a sustainable manner. The perpetuation of this semi-transhumant way of life also depends on security measures against crime being implemented along remote routes utilized by herds and shepherds. A strong Government involvement in terms of policy is a prerequisite for that.

- Please share any other thoughts on this topic that readers that will inform the discussion.

Stockbreeders holding their future

In the same way, stockbreeders have to invent new forms of social and professional organization in order to have the capacity to defend their interests, to communicate with the authorities, the better organized communities of farmers and organizations

working for development. For the moment, the stockbreeders are seen as "weak actors" insofar as they have few assets in the negotiations. By strongly getting involved in the local political life, stockbreeders could thus take part in the implementation of the legislative, regulatory choices and in the policies of regional planning relating to the concerns of sustainable development and to better assert their rights.

The adaptation of the stockbreeders and their activities of breeding to the new needs generated by the settlement pass through the diversification of the functions of the breeding. What may matter for the stockbreeders is implementing models of production based on the fattening (bovine, ovine) and in the dairy production. For that, a strategy of access to the crop waste products, the cotton oil cakes, corn chaff and fodder trees... in particular through various relations between city dwellers and farmers of neighbouring villages, appears essential. There is also a need for Cultural Revolution because the food used for the fattening and the dairy production can neither be entirely provided by the current pastoral resources nor can they partly be bought given their cost and the low rate of offer on the markets. The stockbreeder will thus have to ensure the production of part of the food of these systems of intensified breeding. Trying to buy all is risky and expensive, especially as there is a risk on the access to the oil cake, more so when fall of the production of cotton is confirmed.

Natali KOSSOUMNA LIBA'A, PHD
Département de Géographie
Université de Maroua
B.P 55 Maroua - Cameroun
Tel: +237 77 84 48 22
Email: kolibaa@yahoo.fr

Contribution 12, from A K Misra , DRWA, Bhubaneswar, India

-----Original Message-----
From: Arun Mishra [mailto:mishraak17@yahoo.com]
Sent: 19 February 2010 11:42
To: Crop-Livestock
Subject: Week 3 Contribution from A K Misra , DRWA, Bhubaneswar, India

To
The Moderator,

Dear Sir

Please find below the replies to the questions raised for discussions.

Q - 1: 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?

Lack of system perspective/approach in research and development.
Lack of political will/support from top leaders may be due to lack of awareness and understanding of importance of integrated crop-livestock systems in enhancing the livelihood of resource poor farmers.
Lack of credit, insurance and marketing support to the poor farmers in adoption of CLS innovations.

Q - 2: What can/might be done to address these constraints and who (or who together) can make that happen?

Need to work in consortium mode and sensitize all the stakeholders involved in up scaling of crop-livestock innovations (Policy Makers, Scientists and Extension Agent's including NGOs, Panchayati Raj Institutions (PRIS), State Development and Extension Departments and Financial Institutions) about the importance of system approach.

Partnerships need to be built among the stakeholders for that better coordination and communication is prerequisite. Good, honest and visionary leadership can bring this change to happen.

Q - 3: 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.)?

Assured market for small and marginal farmers, Credit Card for taking loan from banks for purchase of inputs required for integrated crop-livestock innovations to landless and poor people. Promote agro-processing and input delivery at cluster level through SHGs/CBOs.

Link integrated crop-livestock system with Food for Work programme.

Q - 4: -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?

Indian Council of Agricultural Research (ICAR) is experimenting institutional innovations under National Agricultural Innovation Project (NATP) for enhancing the livelihood security of rural poor so that it (ICAR) becomes a dynamic innovation system capable of responding to the present as well as the future needs of agriculture research and development.

Major emphasis of the project is on Improving and developing the most suitable integrated farming system models in the less favourable environments and regions and groups through action research so that the livelihood of the rural poor improves through assured food, nutrition, employment and income.

Several technologies refined under Institute Village linkage programme of NATP (such as backyard poultry rearing, integrated farming systems, strategic feed supplementation, etc) are up scaled at sate level through Agricultural Technology Management Agency (ATMA) far wider and faster impact.

With regards

Dr A K Misra
Principal Scientist
Livestock Production & Management
Directorate of Research on Women in Agriculture
Baramunda P.O., Bhubnaeswar 751 003, Orissa, India

Contribution 13, from Antonio Rota at IFAD in Rome

-----Original Message-----
From: Rota, Antonio [mailto:a.rota@ifad.org]
Sent: 19 February 2010 13:14
To: Crop-Livestock
Cc: Mathur, Shantanu; Cleveringa, Rudolph; Sperandini, Silvia; Calvosa, Chiara
Subject: Week 3 contribution from Antonio Rota at IFAD in Rome

Dear Moderator,

I would like to share the attached document "Integration of crop and livestock production in conservation agriculture: guidelines for project design" with the participants to this interesting e-consultation.

This Thematic Paper is an attempt to draw some lessons from key subject documents and develop some principles to guide project design. Aspects, which are particularly important for an institutions like the International Fund for Agriculture Development (IFAD) which finance an average of 35 investment projects per year on agriculture development for a total value of more than USD600 million (2008 figures for loans and grants).

We are looking for contributions to this "live/on progress" document. Each contributor will be acknowledged and the final version will be posted on the Community of Practice for Pro-poor Development as public good for mutual knowledge and learning (CoP-PPLD at www.cop-ppld.net).

Best regards

Antonio Rota
IFAD, Senior Technical Adviser
Livestock and Farming Systems
Technical Advisory Division - PT
Via Paolo di Dono 44

00142 Rome, Italy
Tel. +39 06 5459 2680
Fax + 39 06 5459 3680

Contribution 14, from Sara Scherr at Ecoagriculture Partners, Washington DC

-----Original Message-----
From: Sara Scherr [mailto:sscherr@ecoagriculture.org]
Sent: 19 February 2010 14:58
To: Crop-Livestock
Cc: 'Louise Buck';'Constance Neely'
Subject: Week 3 contribution from Sara Scherr at Ecoagriculture Partners, Washington DC

Dear Colleagues,

This e-conference has been very rich. I would just like to add my voice to those who have emphasized the landscape/territorial governance issues among multiple stakeholders. There are still many technical challenges, but the biggest constraint now is institutional and policy silos between producers (different groups), conservation organizations, agricultural NGO, private sector investors, district and national government agencies, etc. In particular, there appear to be great opportunities to raise political support and financing for integrated crop-livestock strategies where these also contribute to resolving larger ecosystem-level challenges and opportunities, like watershed restoration, habitat restoration for threatened biodiversity, and carbon sequestration.

Now would be an opportune time for a systematic review of the various models that are being experimented with for multi-stakeholder innovation and action platforms, and lessons learned about their development and management (and financing). Through the Landscape Measures Initiative (www.landscapemeasures.org), Ecoagriculture Partners and numerous partners have begun compiling and further developing tools and methods for analyzing, planning, design and monitoring of such participatory landscape initiatives. Perhaps an outcome of this e-conference could be to pull together the methods being used in crop-livestock integration programs at landscape scale, and make them more widely available through diverse platforms, including the Landscape Measures Resource Centre.

Best wishes,

Sara J. Scherr, President
Ecoagriculture Partners
www.ecoagriculture.org

Contribution 15, from Luiz Carlos BALBINO and Paulo GALERANI at Embrapa, Brazil

-----Original Message-----
From: Luiz Balbino [mailto:luizcarlos.balbino@embrapa.br]

Sent: Fri 2/19/2010 7:43 PM
To: Crop-Livestock
Subject: Week 3 contribution from Luiz Carlos BALBINO and Paulo GALERANI at Embrapa, Brazil

Dear Colleagues,

Under the topic of the third week of discussions on crop-livestock integration, we would like to share the information on the program being developed by EMBRAPA and partners called CLFIS – Crop-Livestock and Forest Integrated Systems.

First, it is important to define the conceptual background involving the system. The CLFIS is a strategy of sustainable agricultural production which integrates crop, livestock and forest activities on a same area, applying agricultural techniques such as crop rotation, succession, double cropping, and intercropping, searching for synergistic effects among the components of the agroecosystems, contemplating environment aspects, human value, and economical viability.

The projects allow the combination of four categories of systems which have been tested in different agroecological zones in Brazil. The systems are:

1 - Crop-livestock Integration – this system integrates the components of crop and livestock exploration such as intercropping, double cropping, rotation, in the same area, and in the same season. A livestock operation may use rotation between grain and pasture to improve grass quality or even recuperate degraded pasture. On the other hand, a grain producer may use this system to improve grain yield.

Pasture and grain crops in rotation are very efficient for residue production, which is essential for success of the no-tillage management.

2 - Crop-livestock-forest integration – this combination integrates crop, livestock and forest explorations planted in rotation, or intercropped and or in succession, in the same area.

3 - Livestock-forest integration – in this system, pasture is intercropped on forest. Production of timber and other forest products are the objective besides animal production in the same area.

4 - Crop-forest integration – it combines crops and forest activities, intercropping crops with tree species (annual or perennial).

CLFIS may be considered the next step on development conservation agriculture. It will improve practices such as no-tillage, crop rotation and cover crops. Soil and crop management as well as pasture, forest and animal management are also expected to reach high performance, resulting in more stable agricultural production and advances on the environmental aspects.

The economical viability of the system is connected with the optimization of land and machinery use. Stable economical return is linked also with the synergy among the vegetable, forest and animal production and with the diversification of income (grain,

meat, milk, biofuel, fiber and timber). In the same line, the lower requirement of fertilizer and better use of farm infra structure are expected as the system is adopted.

The CLFIS however, is not a panacea. It allows the harmonization of the system allowing synergy among the biotic and abiotic components. These systems do not replace possible different alternatives of farming practices and are not the solutions of all the problems in the agricultural property. It permits, however, the utilization of the available resources on the entire farm system.

The system has to be planned before adoption, considering the socio-economic and environmental aspects. Many other agricultural aspects related with the entire production chain of the crops, livestock and forest involved on the system should be considered beforehand. The adoption of the system is dependent, therefore, on the objectives and infrastructure available for each producer. It is worthy to say, also, that the system may be adapted to any size of farm operation.

There are two types of projects on CLFIS under coordination of Embrapa and with participation of partners (universities, official and private extension services, research institutes, farmers' cooperatives). The project "TECHNOLOGY TRANSFER FOR CROP LIVESTOCK AND FOREST INTEGRATION SYSTEMS" deals mainly with the process of technology transfer including training of extension agents, farmers and other actors. The project includes the establishment of TRU – Technological Reference Units which are field demonstrations and observations planted in different agroecological zones, to absorb the peculiarities of each biome.

Brazil has five different biomes, with large differences on rain fall distribution, chemical and physical soil characteristics, topography, among other agricultural aspects. As far as rain fall is concerned, it may vary from around 2500-3500 mm in the Amazon region, down to an average of 500 mm in the semi arid zones. In the Brazilian savannah, the Cerrado biome, the rain fall is around 1500mm per year. With a so diverse reality, the TRU are used also to test the performance of the agricultural practices of CLFIS to be adapted to each location.

The other project "CROP–LIVESTOCK INTEGRATION: A PROPOSAL FOR SUSTAINABLE PRODUCTION IN THE CERRADO REGION AND INTERRELATED AREAS" has also the characteristics of partners' involvement and focus more on the research aspects related with CLFIS. The research involving integrated systems such as CLFIS requires evaluation of the interrelationship among its components. It may need development of new varieties, and specific recommendations for those systems such as fertilizer and lime, plant population, row spacing, tree species, nutrient cycling, irrigation, IPM (integrated pest management, including weeds, insects and diseases), animal management among others. The energetic balance and emission of green house effects gases and carbon sequestration are also parameters being evaluated.

In conclusion, the CLFIS under study in Brazil is expected to contribute with the maintenance and reconstitution of forests, with promotion and generation of jobs and income, with good agricultural practices, and may contribute with restoration of physical, chemical and biological aspects of degraded agricultural areas. As the degraded areas are recovered, it is expected that the pressure for opening new areas

for agricultural purposes in the Amazon and Cerrado (Brazilian Savanna) biomes will decrease. It is estimated that 67.8 million ha are available for CLFIS in the different biomes in Brazil, which are suitable for adoption of the system without expansion on to new areas. Actually, a different degree of adaptation of CLFIS has been adopted in about 1.6 million ha in Brazil. The increasing acceptance of the system by farmers on the last five years is evidence that this strategy of CLFIS will result in development of the agricultural sector and environmental preservation in the country.

Best regards,

Luiz Carlos BALBINO and Paulo R. GALERANI

_____

Luiz Carlos BALBINO
Líder do Projeto TT-iLPF
Gerência de Planejamento e Negócios
Embrapa Transferência de Tecnologia
PqEB - Av. W3 Norte (final)
Caixa postal 040315
70.770-901 Brasília, DF
Fone: (00) (55) 61 3448 4570
Fax : (00) (55) 61 3347-9668 / 3273 6136
Skype: snt.gpn.ilpf

Contribution 16, from Anibal de Moraes and Paulo César de Faccio Carvalho in Brazil

-----Original Message-----
From: Paulo Cesar de Faccio Carvalho [mailto:paulocfc@ufrgs.br]
Sent: Fri 2/19/2010 8:02 PM
To: Crop-Livestock
Cc: 'Anibal de Moraes'
Subject: Week 3 contribution from Anibal de Moraes and Paulo César de Faccio Carvalho in Brazil

Dear Moderator,

Here below some comments on proposed topics for this third week. Please consider this contribution once again from Dr. Anibal de Moraes (Universidade Federal do Parana) and myself.

_ 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?

From our point of view there are no public initiatives to foster technical expertise aiming to assist integrated systems. In Brazil there is more than 150 Faculties of Agronomy, and in only 4-5 this “discipline” exists at curriculum level (and 3-4 at post-graduation level). Thus, the majority of technical expertise actually working in

Brazil comes from agricultural or livestock specialists, but not "system specialists", contributing to bad experiences which constrains ILCS spreading.

A second important point is the lack of easy access to financial resources, which is necessary to implement the required infrastructure to ICLS. Whilst those resources exist in Brazil, stakeholders have no effective access to it. Bank managers have "doubts" about ILCS, since proposed performance in projects are much higher than conventional systems (particularly livestock performance). The financial agents have no knowledge about ICLS potentialities, both in economical and environmental context.

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

We need a curricular change to face the lack of professional expertise and thus enhance the knowledge necessary to spread ICLS. This educational basis could reach technical supporters who work to bank managers.

_ 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.)?

Considering the Brazilian situation, the message would be the economical and environmental benefits of ICLS (with examples and case studies including those with political benefits…), and tell them dissemination depends on long-term investments in technical knowledge/assistance and financial access/stimulus.

_ 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?

At regional level we consider the COAMO's experience (Cooperativa Agropecuária Mourãoense Ltda – Campo Mourão – Paraná) where in 5 years have reached an adoption level of 1980 stakeholders working with ICLS. Its success was based on field demonstrations and knowledge spread by 200 agronomists, trained by a partnership with Universidade Federal do Paraná (UFPR) and IAPAR (Instituto Agronômico do Paraná), and supported by private enterprises as well.

Another outstanding success in the implementation of ICLS initiatives to be mentioned is a project called PISA (Produção Integrada de Sistemas Agropecuários em Microbacias Hidrográficas). It aims to promote sustainable agricultural development having ICLS as one of its main pillars. The "Microbacia Hidrográfica" is the focused level to reach proposed transformations from conventional productive process to technological, sustainable, traceable and certificated processes. The project has the political Coordination of MAPA (Ministério da Agricultura, Pecuária e Abastecimento) and technical Coordination of UFPR, funds being provided by government (MAPA) and managed by Conselho Nacional de Desenvolvimento

Científico e Tecnológico–CNPq. In each region a local Managerial Committee - MC, represented by the main community sectors, manages one or more "Comparative Units-CU" in which a pilot system is built. The majority of CU is built at farm level to serve as reference to technical dissemination at local, regional and national levels. The participation at PISA project is volunteer at all levels. As mentioned earlier, ICLS is the main pillar of the proposed initiative, but no-till, organic agriculture, good farm practices, and animal welfare are also tools of desired processes encompassed by PISA, aiming to land sustainability and diversification. In its third year PISA has experienced the participation of more than 3000 stakeholders and 340 public and private partnerships with 14 MC involving 22 municipalities and 7 states in Brazil.

Paulo César de Faccio Carvalho
Departamento de Plantas Forrageiras e Agrometeorologia
Faculdade de Agronomia - UFRGS
Av. Bento Gonçalves 7712 Cx Postal 776
CEP 91501-970 Porto Alegre, RS, Brasil
+51 3308 7402 ; +51 9919 7196
Grupo de Pesquisa em Ecologia do Pastejo

Contribution 17, from José Campero in Bolivia

-----Original Message-----
From: José Campero Marañon [mailto:jrcampero@hotmail.com]
Sent: Fri 2/19/2010 9:02 PM
To: Crop-Livestock
Subject: Week 3 contribution from José Campero in Bolivia

Dear Colleagues:

This is my contribution:

- 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 Bolivia, the principal political constraint for the development of integrated sustainable systems is the existence of big large agricultural lands. In these large scale and unproductive agricultural lands there are realized extensive livestock activities. In the year 2000, 87 % of the lands agriculturalist (28 million hectares) belonged to 7 % of owners of agricultural lands; the rural people had only 4 millions of hectares (13 %), of which they were cultivating 1.1 million hectares.

In the Andean zone of Bolivia, the situation of land tenure is hallmarked by the effects of the Agrarian reform of 1953 (the redistribution of property) and the subsequent perpetual fragmentation of the land (through inheritance). This condition carrying out that the smallholding has been sharpened coming to an average of 16,000 new smallholdings per year, aggravating the situation of poverty in the rural area. Parallel, in the last 25 years there was consolidated the unproductive big large agricultural

lands (more than 81 % of the lands is without working). These owners of large big unproductive agricultural lands prosecute speculative purposes, and, the agricultural lands is them sell to foreign businessmen when the State benefits this lands with ways and productive infrastructure.

In this context, both principal limitations for the development of agricultural integrated sustainable systems are:

a) The policies of lands that allowed the development and the consolidation of big large unproductive agricultural lands, base of the extensive livestock systems in low lands of Bolivia.
b) The lack of capacity of the State to regulate the processes of increasing of the agricultural border. Condition that determines the expansion of the extensive activities of production and consolidation of the large agricultural lands.

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

From the perspective of the sustainable national development, the reversion of the big large and unproductive agricultural lands is the most important strategy to reduce the poverty and to guaranty the environmental sustainability. This strategy will allow the intensification of the land use and, in the medium term the development of crop-livestock integrated systems of production.

1. The New lands Politics establishes the elimination of traditional big large unproductive agricultural lands (where practices are reproduced servidumbrales forms of work) and modern (based on the concentration of big large and unproductive lands of lands and forests). The land must fulfil an Economic and Social Function (FES). If the FES is not present in the land management, the recovery of lands for the nation have established by way of expropriation. But, noting is easy, because the Bolivian Estate in low lands do not have the capacity for implement the law.

2. The Political Constitution of the State prohibits the big large and unproductive agricultural lands. Because this situation is opposite to the collective interest and reduces and limits the rural development. The maximum surface that the low permit is 5.000 hectares.

3. The excessive fragmentation of the agricultural property is principally the result of the transfer for hereditary succession. There are not many analyses on which they might be the possible routes of solution for the smallholding. A possible solution to the smallholding might be the promotion of the integrated systems crop – livestock to increase the productivity and the income of the producers; though the efficiency of this policy is high, but its costs also are high, and risks of market exist.

- 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.)?

a) Minister of Agriculture

In Bolivia, the incentives to deforest are major that those to preserve, and only the legislation can do little to help to stop the intensive expansion of forest destroy. This condition limits the intensification of the systems of production, and obviously, limits the development of agricultural systems more friendly with the rural development and the preservation of our lands forest. Many systems are now appropriated to intensification of land production. But, the integrated crop-livestock systems are one of them that have the major efficiency in the utilization of the factors of production, and it may have important potential to increasing the food national safety.

A change in the parameters of measurement of the Economic and Social Function of the land (FES) must incorporate the productivity of agricultural or livestock activities. And this may be the route for the break of the extensive unproductive systems and give step to more efficient systems in the use of the agricultural or livestock factors of production. The smallholding and the unproductive big large agricultural lands have given place to the stagnation of the development of the crop-livestock integrated systems of production. Moreover, that condition was the principal topics for the irrationality management of our natural resources, stimulated the degradation of soils and permitted the increasing of illegal market of lands. In the other hand, these conditions was the principal roots of our social tensions and was the principal limiting to access to the food national safety.

b) National farmer's organization

In Bolivia, the rate of national livestock extraction has a range among 12 to 14 %, the first one is proper of South American camels, and the second is representative of meat bovine production. This value is together of Paraguay's value the lowest in the world. It is lower than the world average of 20 %, than that of the CAN of 16 %, than that of the MERCOSUR of 18 % or than that of the EU 15 of 36 %. In other hand, the performance or yield of the canal, this is minor to 52 % and the sacrifice age, product of slow rates of growth, is near to 4 years. Certainly, to improve these parameters of production should be one of the policies of the sector; the low production performance has a linear relation with the equitable access to the land and with two tied factors: the reduction of the poverty and the environmental sustainability.

The livestock production systems have an average of productivity of 16 kg of corporal mass per hectare. This low production is determined by the application of a system of extensive managing that is reflected in degradation of forage recourses, capacity of carrying low and equal to 0.2 UA bovine per hectare. With this low productivity, the strategy is to access large lands. And, the most important are to access lands of low cost or zero cost. Only in this condition the livestock systems offers utilities.

- 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 order to develop sustainability ecological crop- livestock productions is necessary to participate in the markets of just prices. For it will be necessary:

a) The prohibition of the use of transgenic seeds
b) The prohibition of the production of agro bio fuels
c) To satisfy, as the first priority, the necessity of internal market, and newly later to satisfy the external demand.

There exist a set of policies that must be started by the intention of advancing towards a model of integrated crop-livestock systems. At first, it is necessary to develop effective regulations in order that the producers advance towards a sustainable ecological agriculture. Also, it is necessary to offer to the farmers the experience of alternative models of crop-livestock integrated, so much for small producers as for that median scale.

Topics related to the clean bio technology must be stimulated. Nevertheless, this aspect must develop with the major care, because is important for us not creating technological dependence, and the most important is preserved our genetic diversity.

-Please share any other thoughts on this topic that readers that will inform the discussion.

In Bolivia, policies with focus in topics related to the water and the forest coverage exist; nevertheless, explicit policies with regard to how to avoid and to correct process of soil desertification do not exist. We have to emphasize in policies directed the recovery of soils and forest landscapes already degraded by the human intervention and stimulate the most intensive use of the soils, guaranteeing an integral management of the water resources.

These politics have the purpose of maximizing the agricultural productivity of the soils and of guaranteeing the provision of goods and environmental services (as clean water, and sequestration carbon). With this, we help to improve the "Vivir Bien" (this option instead to be more rich) of the Bolivian people who depend in some degree of agricultural, livestock and forest resources and to encourage the conservation of the nature promoting a mosaic of different uses of the soil.

Best regards,

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

Contribution 18, from Lindsay Coulthard at the Manitoba Zero Tillage Research Association, Manitoba, Canada

-----Original Message-----
From: mztra [mailto:mztra@mts.net]
Sent: Sat 2/20/2010 5:59 AM
To: Crop-Livestock
Subject: Week 3 contribution from Lindsay Coulthard at the Manitoba Zero Tillage

Research Association, Manitoba, Canada

Hello

These are the perspectives from the Manitoba Zero Tillage Research Association in Manitoba, Canada

- 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?

A- The top restraint to the spread of an integrated crop-livestock system in western Canada is the resistance to change from the participants in our production system. Our production system has built itself on the basis of cheap energy and expensive labour. The industry has specialized to a large extent so that the producers can manage their farms with less labour. Our farms have become highly capitalized. The benefits of an integrated farming system have not been demonstrated to these farmers well enough to cause them to look at changing their management.

The second restraint that we see to slow down the spread of crop-livestock integration is the financial support system that is in place in Canada (and in other countries in the world). These programs conceal the true economics of agriculture. There are numerous financial support programs paid for in a large part with taxpayer funds which will cushion the economic effects of bad farm management. These programs allow farmers to continue their business without having to make better management decisions and doing a good assessment of alternative cropping/livestock systems.

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

A- Better education and more extension of farmers to demonstrate the benefits of integrating crop/livestock systems and cutting the support programs that encourage farm managers to maintain the status quo with their farming operation.

- 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.)?

A- A message to the Minister of Agriculture would be to put additional funding into research, education and extension on conservation agriculture and low input crop production systems. We as agricultural producers have been encouraged for years to rely on chemistry to provide solutions to our production practices and we have paid a huge price for this method of production. If government support programs were designed more to support beneficial innovation in our production practices and our public research and extension dollars should be directed at conservation agriculture and integrated pest and fertility management techniques. The message would be similar for the farm organization leadership.

- 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?

We haven't seen a significant uptake in the crop-livestock integration in Western Canada at this time. The innovative farmers that are beginning to use this strategy are the farmers that we see at tours and meetings looking for an innovation that they can take home and adapt on their farms. They are normally the farmers that will try new things and decide if the technology will work for them. Normally then we will see others take up the technology and it will expand from their. We are at the early adopter stage in western Canada.

- Please share any other thoughts on this topic that readers that will inform the discussion.

Please do keep in mind 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.

Lindsay Coulthard

Farm and Extension Manager,
Manitoba Zero Tillage Research Association
Brandon Office: 204-729-8838
Farm Office: 204-725-3939
Cellular: 204-825-7878
email: <mailto:mztra@mts.net> mztra@mts.net

Contribution 19, from Farhad Mirzaei, Iran

-----Original Message-----
From: Farhad Mirzaei [mailto:farmir2005@gmail.com]
Sent: Sat 2/20/2010 8:39 AM
To: Crop-Livestock
Subject: Week 3 contribution from Farhad Mirzaei, Iran

From my point of view there are no public initiatives to foster technical expertise aiming to assist integrated systems. In Iran there is more than 100 Faculties of Agronomy, and in only a few of them are working on this discipline. Thus, the majority of technical expertise actually working in Iran comes from agricultural or livestock specialists, but not “system specialists” on integrated livestock -crop system.

A second important point is the lack of easy access to financial resources, which is

necessary to implement the required infrastructure to integrated livestock-crop system. Whilst those resources exist in Iran stakeholders have no effective access to it. Bank managers have less knowledge about integrated livestock -crop system, since proposed performance in projects are much higher than conventional systems (particularly livestock performance). The financial agents have limited knowledge about integrated livestock -crop system potentialities, both in economical and environmental context.

Kind regards,

Farhad

Contribution 20, from Stephen Twomlow at UNEP, Nairibi, Kenya

-----Original Message-----
From: Stephen Twomlow [mailto:Stephen.Twomlow@unep.org]
Sent: Sat 2/20/2010 3:30 PM
To: Crop-Livestock
Cc: crop-livestock-L@mailserv.fao.org
Subject: Week 3 contribution from Stephen Twomlow at UNEP, Nairibi, Kenya

In reply to Antonio Rota (contribution 13), I would like to share with all of the participants a guide we developed for project developers in Zimbabwe with a specific focus on Conservation Agriculture - but many of the key principles hold when it comes to the the all important numbers games

Best

Steve

Stephen Twomlow PhD
Senior Program Officer Biodiversity and Land Degradation
Division of GEF Coordination
United Nations Environmental Program (UNEP)
PO Box 30552 (00100)
Nairobi
Kenya

Direct line: +254 20 7625076
Work Cell Phone: +254 728604550 (International Roaming)
Private Cell phone: +254 726593285 (Kenya only)
skype: steve.twomlow
e-mail: stephen.twomlow@unep.org
web site: www.unep.org

Contribution 21, from John Landers at APDC, Brazil

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

From: John Landers [mailto:john.landers@uol.com.br]
Sent: Sun 2/21/2010 9:01 AM
To: Crop-Livestock
Subject: Week 3 contribution from John Landers at APDC, Brazil

Amir,

A response to Steve Twomlow's contribution 20.

Dear Stephen,

From our experience in Brazil and what I have seen in my visits to Zimbabwe, I think you are whistling in the wind if you don´t go for as near 100% soil cover as possible with ZERO tillage.

And to go through intermediate reduced tillage systems to get to Zero Tillage has also proved an illusion here. I doubt that Zimbabwe will be much different, but of course, you are on the ground there and must have extenuating reasons for citing the American min-till definition of 30% cover.

Yours truly,

JNL

John N. Landers, OBE
Relações Internacionais / Novos Projetos
Associação de Plantio Direto no Cerrado - APDC
Fone: 55 (61) 3366-5307 / 3366-1984
Fax: 55 (61) 3366-5307
E-mail: john.landers@uol.com.br
End: SMDB - Conjunto 9 - Lote 5
Lago Sul - CEP: 71680-090
Brasília - DF

Contribution 22, from Awuma at the University of Cape Coast, Ghana

-----Original Message-----
From: KOSI AWUMA [mailto:k_awuma@hotmail.com]
Sent: Sun 2/21/2010 8:36 AM
To: Crop-Livestock
Subject: Week 3 contribution from Kosi Awuma at the University of Cape Coast, Ghana

Hi Moderator,

I hereby forward to you the attached information (also pasted below) on experiences in Ghana in addition to comments on week three

Thanks

Yours

Kosi Awuma Ph.D
President, Ghana Society of Animal Production
Snr. Lecturer
Department of Animal Science
School of Agriculture
University of Cape Coast, Ghana
+233 24 327 8719

Integrated Crop-Livestock System for Development - The Way forward for Sustainable Production Intensification

Before addressing the issues for the week, I will need to set the stage by giving some information on crop-livestock integration systems in Ghana.

Two main integration systems could be identified. The Traditional system and the plantation tree crop-livestock system.

The traditional system is the oldest system and found operating in most rural communities in the three northern regions of Ghana namely the Northern, Upper East and Upper West regions. In these areas, where compound farming is practiced, homesteads are far apart enabling households to put the land immediately around their home to crops such as cereals (maize, sorghum and millet) and vegetables production. In these communities, livestock (local domestic fowls including Guinea fowls and ruminants (sheep, goats, cattle etc) keeping is part and parcel of the people and therefore an integral part of rural livelihood (MoFA/DFID, 2002). The animals serve several important functions such financial security, where animals' serve as a "walking bank", insurance against food deficit, social functions such as used in paying bride prices and in religious as well as being used for animal traction in land cultivation and as a means of transportation. Thus in these communities, the animals especially sheep and goats are keep indoors or secured during the cropping season to avoid destruction of the cultivated crops. After crop harvest in case of cereals the sheep and goats are released to glean on the cereal stubbles left on the field while the animal return the dropping/manure onto the field. During the cropping season animal droppings could be hipped outside the homestead to be spread manually on the field surrounding the homestead. These practices definitely return the needed organic plant nutrient to the crop land while the crop stubbles serve as useful feed though of relatively poor quality to the small ruminants. As a means of improving on the quality of stover and straws available to the ruminants during the dry season farmers have been taught and advised to conserve some crop residues especially legume based ones such cowpea and groundnut vines after pods have been harvested to supplement the poor quality roughage from the straws and stover. This had caught on well with farmers to extent that a thriving forage market has developed in Bolgatanga, the regional capital of the Upper East region.

In the case of large ruminants such as cattle, they are herded to grazing on rangeland of mostly unimproved vegetation and crop residues such as rice straw and stover. Within the integrated system while the crop residues become available maintenance diet for the animals during the dry season ranging from 5 to 7 months of the year the animals gleaning on crop fields return the needed nutrients in organic form to the soil.

Plantation Tree crop-Livestock Integration System

The ruminant livestock (cattle, sheep and goats) under plantation crops such as oil palm, citrus, coconut and rubber have been practised in the country for a considerable number of years, The Agricultural Research Station of the University of Ghana at Kade in the Eastern region has researched into and practised this production system for not less than 40 years. The then Department of Animal Husbandry of the Ministry of Food and Agriculture also created a demonstration farm at Juaso, in the Ashanti region, with sheep under oil palm plantation in the 1980 as a means of extension services to sell the idea to potential farmers.

The production system caught on well with farmers in plantation crop production especially in the humid zones of the country. Some large plantation crop companies such as Twifo Oil Palm plantation (TOPP), Central region and Benso Oil Palm plantations (BOPP), western region introduced cattle into their mature plantations. A survey conducted in the Western region in1991 showed highest integration of 46% in oil palm and livestock (cattle) followed by coconut and livestock (cattle) 37%. Sheep has been used under oil palm and citrus successfully as well.. Livestock in rubber plantation was not very successful since the animals' were knocking off the latex collection cups which tended to an economic disincentive to the rubber production. The introduction of livestock into tree crops was successful and beneficial when the tree crops were more than 6 years old. The benefits have been numerous in terms reduction in labour costs in clearing the undergrowth of the plantation, nutrient recycling and higher offtake in animals leading to additional income.

Plans for further Crop-Livestock Integration:

Currently in Ghana, purely private non-Governmental Organizations (NGO) have started a baseline study on an integrated aquaculture-agriculture (IAA) project in the northern Ghana. This project being supported by the Agricultural Institute of Canada (AIC) basically entails the possibility of introducing aquaculture into two of its on-going projects in northern Ghana. Already, AIC is supporting two societies involved in agricultural development in Ghana. AIC is supporting the Ghana Society of Animal Production (GSAP) through the Canadian Society of Animal Science (CSAS) to improve upon small ruminant and poultry production in selected communities in the northern regions of Ghana. Similarly AIC is supporting the Ghana Institute of Horticulturalist (GhIH) through the Canadian Society of Horticultural Science (CSHS) to work towards the improvement vegetable crop production in selected communities of the northern Ghana. All these projects are geared towards poverty alleviation of the vulnerable groups especially women in the target communities. Now Fish for Africa (FfA) funded by Fish for Africa Fund of Quebec, Canadian based NGO is twinning with AIC in an International Partnership Programme (ITPP) to develop a coupling of aquaculture with vegetables and animal production in the

selected communities in the Northern and Upper West region. This project is likely to run for the next 5 years.

This is crops-livestock integration beyond the current thinking with tremendous potential benefits to the communities and the nation at large thus should be supported in every form to succeed. Some of the benefits would include, manure from animal sources for the vegetable production as well as for growing planktons for fish feeding while crop residues from the vegetable farm serve as feed for the ruminant, some discarded grains become available for feeding the local poultry. The additional benefits come in the form of increase in protein supply for human consumption from fish and animals. Finally income levels will rise from the diverse income sources such as vegetables, grains, fish and animals (poultry, sheep and goats).

Challenges will definitely be encountered in the implementation of any of the above programmes but the challenges will be assessed during the baseline study and addressed where possible for smooth implementation of the project.

-- Institutional or Political constraints that undermine the uptake, implementation or spread of integrated crop-livestock system:

The Government of Ghana and its national agricultural policy direction will influence the implementation and spread of integrated crop-livestock system. Furthermore, the implementing agencies at the national and district and community levels will be paramount in the success of the programme. In the case of Ghana, the Ministry of Food and Agriculture (MoFA) through the staff of its technical departments such Animal Production, Crop Services, Veterinary Services and Extension services will be important in its successful implementation and spread. NGOs in agriculture are equally crucial to the successful implementation the spread of the system.

Constraints that are likely to undermine the uptake and implementation of the system will depend on whether such a programme is high on the Government's Agricultural policy agenda and the added financial resource constraints which could affect uptake and implementation.

The crop-livestock integration is not a new concept to Ghana's agriculture as animal production scientists with at least 15 to 20 years experience in the industry cab attest to however, with time policy direction and focus might have shifted from small scale crop-livestock integration to large scale mono-crop and -animal production.

The government of Ghana has recognized livestock as a means of poverty reduction strategy as stated in the Food and Agriculture Sector Development Strategy (FASDEP) I & II which is a working document articulating the contributions of the MoFA towards the overall objective of the Government of Ghana to achieve equitable growth and poverty reduction. The crop-livestock integration fit very well into at least two of the main thrust such as enhancement of food supply and reduction of hunger and the sustainable development of livestock, fisheries and forestry resources among others.

Other related problems to the implementation could be that of population growth leading to pressure on land, urbanization and land tenure system since these are likely

to reduce land size available for the compound farming in areas it is practiced and the inability to keep animals in heavily populated areas.

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

One major thing will be prioritization of Government's agricultural policy in terms of crop-livestock integration and making sufficient budgetary resource allocating or securing the necessary funds from either domestic mobilization or donor assistance to fund the programme. MoFA, through its identified departments could then be adequately funded directed and monitored to carry out the programme. Research institutions and identified farmer based organizations (FBO) devoid of political manipulations could be vital in implementing the programme. Luckily, Ghana has in place a good research-extension- farmer linkage in the form of Research Extension Liaison Committees (RELCs) creating a good channel for information flow from research through extension to the farmers and vice versa.

-- 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' organization? Any thoughts to share with a relevant private sector representative (inputs, processors, buyers etc)?

I will brief him/her on the importance of the crop-livestock integration as a way forward to environmentally friendly and sustainable agricultural system which should be promoted, made top priority of Government's agricultural policy and cause MoFA and its technical departments to provide position papers for consideration. I should provide him/her with justifiable documents for his/her consideration.

To the head of national/international farmer based organizations I will convince on the idea and benefits of the crop-livestock integration and encouraged hin/her to organize meetings/workshop of their members where experts including myself could address the larger group on the crop-livestock system set up, implementation and benefits. From there they could be a pressure / advocacy group for government's support for the programme.
