Innovation Africa Symposium

20th - 23rd November 2006

Kampala, Uganda

Book of Abstracts

Background to Symposium

Understanding how to catalyse and support innovation is the key to success for agricultural research and development organisations. Valuable experiences are being generated across the world on how to translate research ideas and products into innovations that benefit thousands of resource-poor rural people. The institutional arrangements that encourage these processes recognise the need for multiple sources of innovation and stimulating synergy between innovation system actors. Innovation processes by rural people themselves play a key role. To be effective in agricultural research and development, it is crucial to stay in touch with these rapidly evolving ideas from all over the world and across other sectors, and to understand how these are applicable in Africa.

The *Innovation Africa Symposium* is convening a group of internationally recognised experts on innovation systems to share their latest thinking with agricultural researchers and development partners. The Symposium provides an opportunity for participants to share their achievements in enhancing innovation processes.

The symposium is organised in a format designed to maximise dynamic knowledge sharing by integrating formal plenary presentations, small group discussions, and reflection on practical experiences, including case studies. Mini-workshops are organised to offer an open space for information exchange amongst special interest groups around symposium themes. Sessions are designed to provide a balance between practice and theory. An innovation marketplace session will be used to share practical experiences on the ground.

This event is intended to catalyse the formation of "*Communities of Practice*" dedicated to highlighting and promoting successes with potential for innovation in African agriculture. The communities of practice will also recognise and support local peoples' own initiatives in experimentation and innovation. These are too often overlooked or underestimated as engines of change in promoting broad-based agricultural-led economic growth and development.

The objectives of the Symposium are:

- To enable researchers, social entrepreneurs, private sector and development practitioners to interact and share experiences on the latest research and initiatives on innovation systems and their impacts.
- To demonstrate the importance of building upon local peoples' initiatives in experimentation and innovation
- To understand the implications of an innovation systems perspective for agricultural research and development
- To identify policy options, organisational solutions and capacity needs, and the way forward to strengthen the potential for greater pro-poor innovation
- To catalyse new knowledge-sharing partnerships for developing south-south learning and networking of professionals working on innovation.

Symposium themes

Within the broader framework of agricultural research and development, the Symposium will focus on the following themes:

Theme 1: Conceptual and methodological developments in agricultural innovation systems.

This will include concepts, theories and principles related to innovation processes; methodological issues and challenges; and advances in theory and practice in the field of innovation systems, with a focus on the role of innovation systems in alleviating poverty.

Theme 2: Partnerships and other forms of social capital in agricultural innovation systems.
This will address approaches and challenges in building and managing multi-stakeholder partnerships for innovation, ways of integrating different disciplines and knowledge bases, roles of farmer organisations and other local groupings of stakeholders, and synergies between local and larger innovation systems. It will also look into different types of partnerships needed for effective research and development initiatives.

Theme 3: Institutional, policy and knowledge-sharing mechanisms to support agricultural innovation systems.
This will explore experiences in alternative institutional approaches to funding innovation; ways of engaging in policy dialogue to promote innovation systems; and ways of enhancing networking – particularly South-South – and using media to share information and to influence thinking about innovation systems. It will include attention to Intellectual Property Rights. It will also deal with different strategies and mechanisms for strengthening institutional learning and organisational change processes to enable innovation.

Theme 4: Enhancing local innovation processes.
This will look at how rural and urban communities manage local innovation processes in agriculture and NRM and what their strategies imply for the types of support needed from governments, civil society, the private sector and international agencies. How do local innovation processes relate to poverty alleviation? How does the generation of local innovations relate to concepts of diffusion and adoption of new technologies? What can be scaled up in terms of innovations and innovation processes, and how? Experiences with and lessons from efforts to enhance community learning and change processes will be explored.

Theme 5: Market-led innovation in agriculture.
This will address technological, social, institutional and policy issues that relate to innovation in response to market demands and opportunities: the roles of markets in catalysing innovation processes; lessons from experiences in enhancing entrepreneurship – including social entrepreneurship – and linking farmers and other entrepreneurs to domestic and international markets; strategies to cope with and benefit from globalisation; exploration of specialised market niches; and innovation in market institutions.

Theme 6: Building innovation capacity.
This will analyse innovative approaches and initiatives for strengthening capacities within and across all levels (farmers and their organisations, other entrepreneurs, civil society organisations, universities, and government and private sector organisations involved in agricultural research and development). It will also address strategies and experiences in integrating innovation-systems perspectives and approaches into institutions of higher learning and education at all levels.

PROGRAMME

Day One Tuesday 21st November 2006		
Session 1: Opening Ceremony and Key Note Speakers **Room: Meera Hall**		
8.00-9.00 AM	Registration of participants outside Meera Hall	Remarks
9.00-9.30AM	Welcome and Introductions: Pascal Sanginga Workshop programme, organization and logistics by organizing committee	
9.30-10.00	Opening Ceremony by Invited Guests: DDG NARO: NGO Representative: CIAT Africa Coordinator:	
Session 2: Key Note Address and Panel Discussion **Chair:** Susan Kaaria		
10.00 -11.00 AM	**Key Note Address**: Conceptual and methodological developments in innovation Systems: Professor Niels Röling	30 minutes of presentation 30 minutes for clarification questions
11.00 – 11:30 AM	Coffee Break	Setting up of market place
11.30-12.15 PM	**Panel Session:** Health sector - Joanna Chataway Educational sector - Norman Clark Agricultural sector - Ponniah Anandajayasekeram	15 minutes presentations
12.15- 13.15 PM	Plenary Discussion	
13.15 - 14.00 PM	Lunch	Setting up of market place

Session 3: Conceptual and Methodological developments in Innovation Systems **Chair:** Dannie Romney **Room: Meera Hall**		
	Theory and Methods / Linking Methods to Practice	**Open Space for side meetings** **Room: Regal**
14:15 – 14:30	Developing the art and science of innovation systems inquiry: alternative tools and methods and applications to sub-Saharan African agriculture. David Spielman, Kristin Davis & Javier Ekboir	
14:30 – 14:45	Towards a more integrated theoretical understanding of innovation sustaining networks in Africa. Mazur & Onzere	
14:45 – 15:00	Adequacy of the Agricultural Innovation Systems (AIS) and Agricultural Knowledge and Information Systems (AKIS) frameworks for studying grassroots innovation. Amanuel Assefa	
15:00 – 15:15	The evolution of national systems of innovation in agriculture and resulting prospects for sub-Sahara Africa: lessons learned Brüntrup, Michael & Nicole Rippin	
15:15 – 16:00	**Discussion**	
16:00 – 16:30	**Afternoon Tea Break**	

16:30 – 18:00	**Poster Presentations and Market Place :Theme 1 and 2**	
	Session 1 **Chair:** Chris Opondo	**Session 2** **Chair:** Ralph Roothaert
	1. Strengthening Partnerships for Enabling Rural Innovation in Africa: Achievements, Prospects and Challenges. Sanginga, et al. 2. Participatory evaluation of imperfections in interaction between potato stakeholders in Ethiopia, Kenya and Uganda. Gildemacher et al. 3. Public-private sector partnership in diversifying semi arid tropical (SAT) systems through medicinal and aromatic plants. Reddy Ch Ravinder, Gurava Reddy K, Thirupathy Reddy G, Ashok S Alur, and SP Wani 4. Concept and Process of "Community Empowerment and Networking Program". Daigo Makihara, Benedict Mtasiwa, Jane Kembo, Bernard Bazirake, Yasuyuki Morimoto, Patrick Maundu, and Patrick Kariuki 5. The transformation trajectory associated with adopting an innovation-system approach: experiences from a research team in Uganda. Opondo C, C Almekinders, J Hagmann, R Kanzikwera, P Kibwika, P Birungi, W Alum & B Margret	6. A multi-stakeholder approach to seed systems for food-feed crops for smallholder farmers in Nigeria. Roothaert et al 7. Water For The Thirsty: A Case Study Of Katulani Location Water Situation, Kitui District, Kenya. Onyango CA, Ambula M, Gitika PM, Mwanza RN, Mburugu GN, Mwaniki JM, Ngala S, Shiluli M 8. Innovative Research and Development Partnerships for the Pro-Poor Development of Livestock Marketing in Turkana. D. J. Watson 9. Experiences of VSF Belgium led livestock consortium in responding to chronic emergency facing the agropastoralist communities in Southern Sudan. Kamau et. al. 10. Participatory Methods for a Project's Life Cycle. Vivian Polar F., Edson Gandarillas M., Juan Fernandez y Walter Fuentes 11. Mainstreaming gender analysis in livestock research to increase participation of the marginalised in innovation systems. Roothaert, Ralph;Yeshi Chiche, and Maria Mulindi

16:30 – 18:00	**Poster Session and Market place: Theme 3**	
	Theme 3: Session 1 **Chair:** Vivian Polar	**Theme 3: Session 2** **Chair:** Rik Thijssen
	12. Towards accountability of National Agricultural Innovation Systems: strengthening human and social capital through PM&E. Polar F Vivian, Edson Gandarillas M, Juan Fernandez & Walter Fuentes 13. Phanda na Vhulimi: producing and using video films as tools for agricultural extension. Mphahlele CK, Lassalle TJ & Mollel NM 14. Continuity and change: resilience of innovative mechanisms of traditional leadership and systems (institutions) in agro-forestry resource management: a case study of Bizana, Eastern Cape, South Africa. Saruchera, Munyaradzi 15. The role of intellectual property system in innovations in developing countries. Georges Shemdoe	16. LEISA magazines as knowledge-sharing mechanisms to support agricultural innovation. Rik Thijssen 17. Modeling effects of determinants of Innovation Linkages between R&Ds –SMEs in developing countries. Mafunda, Dugushilu 18. From water committees to the emergence of water users association. Phaladi RE, Lassalle TJ & Mollel NM 19. Farmer-led documentation in sustainable agriculture / NRM. Emebet Wuhib and Richard Nguma 20. Village Information Centers (VICs) in Rwanda. Perez, Silvia and Amare Tegbaru
18:30 – 20:30	**Evening Cocktail**	

Day 2: Wednesday 22nd November 2006		
Key Address and Plenary Sessions **Chair:** Amanuel Assefa **Room: Meera**		
8:30 – 9:20	**Key Note Address:** *Enhancing Innovation Processes: Lessons and experiences from Asia***". Prof. Anil K. Gupta**	20 minutes of presentation 30 minutes for clarification questions
Plenary Session 4. Strengthening partnerships and other forms of social capital in agricultural innovation systems		
9:20 – 9:40	**Lead Paper**: Agricultural innovation systems and partnership in practice: value chain successes in Ethiopia. Tsedeke Abate, Solomon Assefa, Juergen Hagmann, Seid Ahmed, Tesfaye Kumsa & Ann Stroud	20 minutes of presentation 10 minutes for clarification questions
9:40 – 10:10	**Lead Paper:** Strengthening the role of farmers' organisations in agricultural innovation systems: case studies from Benin, Rwanda and Tanzania. Wennink, Bertus; Willem Heemskerk & Suzanne Nederlof	20 minutes of presentation 10 minutes for clarification questions
10:10 – 10:30	Morning Tea Break	
PARALLEL SESSIONS		
	Research, Private Sector, Farmer Linkages **Chair:** Chris Opondo **Room: Majestic**	**Social Capital and Farmer Associations** **Chair:** Ronald Lutalo **Room: Regal**
10:30 – 10:45	From participation to partnerships: A novel way for researchers to accompany innovations processes : challenges and difficulties. Henri Hocdé, Bernard Triomphe, Michel Dulcire et Eduardo Chia	Smallholder Innovation in Ethiopia: Concepts, Tools, and Empirical Findings, Kristin Davis, David Spielman, Martha Negash, Gezahegn Ayele
10:45 – 11:00	Private-Public Partnerships to Improve Access to New Maize Technologies in East and Southern Africa. Spielman, David; Hugo De Groote	Innovative partnerships for farmer empowerment and linking farms to markets. Pascal G. Kaumbutho
11:00 – 11:15	Collaborative Research – A Way to Maximize the Potentials. Koyama, Osamu	Tracking outcomes of social and institutional innovations in natural resources management: Evidence from Southwestern Uganda. Sanginga, Pascal C; Rick Kamugisha, Annet Abenakyo and Robert Muzira
11:15 – 11:50	**Discussion**	**Discussion**

Plenary Session 5: Institutional arrangements, policy options, and knowledge-sharing mechanisms **Chair:** Jemimah Njuki **Room: MEERA**			
12:00 -12.30	**Lead Paper**: From Bright Spots to Bright Coverage: Role of knowledge sharing in improving research and outscaling of innovation systems. Nadia Manning, Sanjini de Silva, Iqbol Yusupova, Iskandar Abdullaev	20 minutes of presentation 10 minutes for clarification questions	
12:30 – 13:00	**Lead Paper**: Can the way of funding make a difference in local agricultural innovation systems? W. Heemskerk, N. Lema, B.Wennink, and H. Gotoechan-Hodounou	20 minutes of presentation 10 minutes for clarification questions	
13:00 – 14:00	**Lunch**		
PARALLEL SESSIONS			
	Information Systems, documentation and Knowledge Sharing in innovation systems **Chair:** Colletah Chitsike **Room: Majestic**	**Institutional Arrangements for promoting Innovation** **Chair:** Michael Njunie **Room: Meera**	**Alternative funding mechanisms to promote innovation** **Chair:** Richard Hawkins **Room: Regal**
14:00 – 14:15	From Web to Field to Web: Kyuso Farmers embrace ICTs for Pests Control and Management. Noah Lusaka and Maryleen Micheni; F. B. Rwehumbiza and O. Mhina	Doing things differently: Post-harvest innovation learning alliances in Tanzania and Zimbabwe. Brighton M. Mvumi, et. Al.	Farmer Access to Innovation Resources (FAIR): findings from an international review of experiences. Veldhuizen, Laurens van; Mariana Wongtschowski and Ann Waters-Bayer
14:15 – 14:30	The IK Bridge to Innovation. Jean T. GRADÉ and Patrick VAN DAMME	Innovative policy change to support urban farmers in Kampala: What influenced development of the new City Ordinances on urban agriculture? Hooton N, G, et. al	Context-specific strategies to promote innovation through development of Local Innovation Support Funds (LISFs). Anton Krone
14:30 – 14: 45	Role of Knowledge Sharing and Communication Strategy in Adoption of Water System Innovations in Makanya Catchment, Same District, Tanzania. Masuki KFG; M.C. Shetto; A. Z. Mattee, S.D. Tumbo	Changing the rules of the game: institutional innovation and change processes in organic agriculture. Hauser, Michael; Robert J Delve, Brian Ssebunya, Joseph Mulindwa & Stephen Byandala	
14:45 – 15:15	**Discussion**	**Discussion**	**Discussion**
15:15 – 15:30	Afternoon Tea Break		

Plenary Session 6 : Enhancing local innovation processes **Chair:** Roger Kirkby **Room: Meera**			
15.30-16.00	**Lead Paper**: Enhancing local innovation processes through strengthening local R&D partnerships Ann Waters-Bayer	20 minutes of presentation 10 minutes for clarification questions	
	Lead Paper: WHEN INNOVATIONS ARE NOT ENOUGH: Lessons in Facilitating Innovations from an R&D Perspective. Carlos S. Basilio, Lilibeth B. Laranang and Irene M. Adion	20 minutes of presentation 10 minutes for clarification questions	
	PARALLEL SESSIONS Theme 6		
	Farmer Driven Innovation Systems **Chair:** Nadia Manning **Room: Majestic**	**Enhancing innovation** **Chair:** Michael Hauser **Room: Meera**	**PID / PTD** **Chair:** Dorothy Masinde **Room Regal**
16.00-16.15	Farmer innovation in Uganda: aiding and abetting the land users. Critchley WRS, R Lutalo, HD Miiro & A Lwakuba	Participatory Methods Making the Process of Technology Innovation Viable in Bolivia. Polar F. Vivian , Edson Gandarillas M, Juan Fernandez, Walter Fuentes, INNOVA Project	Linking Child and Soil Nutrition: Social and Institutional Innovations in Malawi Lizzie Shumba, Rachel Bezner Kerr, Rodgers Msachi, Nyles Mhone,
16.15-16.30	From a strangler to a nourisher: The floating challenge that farmers changed to an opportunity. Geoffrey Kamau & Conny Almekinders	Farmers Field Schools for Rural Empowerment: from Experimentation and Learning in Integrated Nutrient Management to Platforms for Income Generation and Market Linkages; Experiences in Central and Eastern Kenya. De Jager, A., Onduru, D.D., Gachimibi, L.N., Muchena, F., Gachini, G., Van Beek, C.L.	Scale-up of Napier fodder a case of institutional innovation in small farmer dairying. Prasad VL, PG Bezkorowajnyj, K Gurava Reddy, VK Mahesh & D Romney
16.30-16.45	Why do some local innovations die and others flourish? Insights from the introduction of rye in barley cropping systems of Ethiopia. Elias Zerfu, Shenkut Ayele, and Kiflu Bedane	Change agents facilitate cross-border diffusion of collective action innovations among pastoral women. Coppock, D Layne; Seyoum Tezerra, Solomon Desta, Getachew Gebru & Chachu Tadecha	Mechanisms for scaling-up tree domestication: how grassroots organisations become agents of change. Ann Degrande, et al
16:45 – 17:00			Innovation in Quinoa Cultivation in Bolivia: Effects of social interaction and absorptive capabilities of small producers. Jose Luis Soto
17.00-18:00	**Discussion**	**Discussion**	**Discussion**

Day 3: Thursday 23rd November 2006		
Plenary Session 7: Market-led innovation in agriculture **Chair:** Rahab Ngumba **Room: Sheena**		
8.30-9.00 AM	**Lead Paper**: Enabling rural innovation in Africa: an approach for empowering farmers to exploit market opportunities and improve livelihood. Susan Kaaria et al.	20 minutes of presentation 10 minutes for clarification questions
9:00 – 9:30	**Lead Paper:** "Give Us… Our Markets!" Facilitating Transactions and Retaining Added Value Locally Case study from a farmers organisation managed half bulk rural markets, Tanzania. Lassalle TJ & Ruvuga SR	20 minutes of presentation 10 minutes for clarification questions
PARALLEL SESSIONS		
	Organizing for market innovations **Chair:** Willem Heemskerk **Room: Regal**	**Enhancing market innovations** **Chair:** Ralph Roothaert **Room: Majestic**
9:35 – 9:50	Partnerships for enhancing Market-led Innovation processes – Sustaining gari marketing enterprise for rural livelihood: farmers' indigenous innovations in south eastern Nigeria. Ekwe, Kenneth Chikwado	Rural market imperfections and the role of institutions for collective action to improve markets for the poor. Bekele A Shiferaw, Gideon A Obare & Geoffrey Muricho
9:50 – 10:05	Success factors for organising smallholder producers for certified organic production and marketing. Experiences from Uganda. Florence Nagawa, Alastair Taylor and Bo van Elzakker	Experiences and Lessons from IPMS Ethiopia Puskur, Ranjitha; Ponniah Anandajayasekeram, Kahsay Berhe and Dirk Hoekstra
10:05 – 10:20	BOOM OR BUST: Strategies to exploit market opportunities for Kabale apples in southwest Uganda. Gard Turyamureeba, George Cheminingw'a, Imelda Kashaija and Richard Hawkins	Maginata verde and pine-apple in Costa Rica : How can farmers face the market needs for production standardisation and take into account the diversity of agricultural practices? Guy Faure, Henri Hocdé, and Eduardo Chia
10.20 -10.50	**Discussion**	**Discussion**
10.50-11.15	Morning Tea Break	

	Poster Session and Market Place; Theme 4		
11:15 – 13:00	**Theme 4: Session 1** **Chair:** Fernando Hincapie	**Theme 4: Session 2** **Chair:** H.M. Saha	**Theme 4: Session 3** **Chair:** Firew Mekbib
	21. PM&E and the empowerment of producers' organizations. Fernandez R, Juan & Edson Gandarillas 22. Enhancing community empowerment through community driven Participatory Monitoring and Evaluation systems. Lewa KK, J Ndungu, J Njuki, MN Njunie, S Bimbuzi, A Mzingirwa, BM Muli & S Kaaria 23. Facilitating Farmer-to-Farmer Learning and Innovation for Enhanced Food, Nutrition and Income Security in Kamuli District, Uganda. Mazur, Robert, Haroon Sseguya, Dorothy Masinde, Joseph Bbemba, and Grace Babirye 24. Assessing the Social and Human Capital Impacts of Participatory Research Processes: A case study of Local Agricultural Research Committees (CIALs). Hincapie, Fernando; Viviana Sandoval and Susan Kaaria 25. Impacts of Traditional Soil And Water Conservation Methods On Agricultural Production In Marginal Areas: Analysis Of Best Practices In Sub-Saharan Africa. Riziki S.Shemdoe, Idris S. Kikula and Patrick van Damme	26. Innovative methods for linking farmers to inputs markets through farmer field school networks for increased production and food security. Muli MB, HM Saha, AM Mzingirwa & KK Lewa 27. Scaling out benefits of technologies through Farmer Field School networks: a case study of integrated nutrient management. Saha HM, MB Muli, AM Mzingirwa, JM Ndungu & KK Lewa 28. Co-building of socio-technical and organisational innovations in fish farming systems in Cameroon. Pouomogne, Victor; Olivier Mikolasek 29. Facilitating Empowered Communities to use their Indigenous Knowledge to Enhance Sustainable Grazing and Wetland Management to sustain healthy livelihoods: Sustainable Grazing Management based on Indigenous Shona Practices Prior to Introduction of Western Ideas in Zimbabwe. Mugweni 30. Farmer innovation systems: a gateway for higher adoption of water system innovations in Makanya watershed, Tanzania. Masuki KFG, AZ Mattee, SD Tumbo, G Myombe & FB Rwehumbiza	31. Farmers' experiences in testing forage legume innovations in smallholder crop/livestock production systems in Uganda. Kabirizi, J.; Mpairwe, D. and Mutetikka, D. 32. The system of rice intensification initiative in Zambia, southern Africa Ngimbu 33. Fodder tree development and farmers innovative ideas to balance multiple household objectives in the Ethiopian highlands. Mekoya A, SJ Oosting, S Fernandez-Rivera & AJ Vander Zijpp 34. Dairy goats keeping in rural communities: an innovation development beyond a transfer of technology. Letsoalo EM 35. Enhancing farmer innovations in sorghum breeding for food security in centre of diversity, Ethiopia. Firew Mekbib 36. Gender and crop genetic resources management: the role of women farmers in conserving the genetic resources of jugo beans and cowpeas in KwaNgwanase, KwaZulu Natal, South Africa. Saruchera, Munyaradzi

11.15 - 13.00	**Poster Session and Market Place: Theme 5** **Chair:** Elly Kaganzi	**Poster Session and Market Place: Theme 6** **Chair:** SA Igbatayo
	37. How rural poor households value and access poultry: a study of village poultry keeping in Ethiopia using participatory and survey based approaches. Aklilu Hailemichael, Henk Udo & Conny Almekinders 38. Linking Ugandan farmers to markets – The contract farming approach. Engoru P, Ferris S and Kaganzi E 39. Organic and contract farming: market-led innovations in vegetable farming in Tanzania. Mutayoba, Venance 40. Farmer participation in market research to identify income-generating opportunities; analysis pf critical success factors for agroenterprise development. Kaganzi, Elly; Shaun Ferris, Flavia Asiimwe, Julius Barigye and Jemimah Njuki 41. Linking Farmer Field Schools to Markets. A Participatory business planning process to Agro enterprise development in Eastern Uganda. Asiimwe, Flavia **42.** Sustaining Smallholder farmer Linkages to High Value Markets: The Role of Internal Savings and Credit Institutions. J. Barigye , H. Ahimbisibwe, E. Kaganzi , J. Njuki and S. Kaaria	43. Participatory Technology development and Partnership in Agricultural Sustainability in Southern Cameroon: Lessons learnt from a decade of experimentation. William Mala Armand and Jean Tonye 44. Grow more food with less water: Experiences in Promoting Drip irrigation technology in the Eastern Africa Drylands. Noah Lusaka 45. Mainstreaming farmer innovativeness in WAD goat genetic improvement schemes in the development of sustainable goat production systems in Southwestern Nigeria. Oseni SO, BA Ajayi & M Ishola 46. Integration of community based PM&E within FFS curricula. Njunie MN, KK Lewa, J Ndungu, FN Muniu, J Njuki & B Mweri 47. Impact of Regional Capacity Building Networks in meeting Africa's Socio-economic Development Objectives. Ochieng'-Odero JPR 48. Combating food security In sub-Saharan Africa: the emergerce of NERICA rice varieties. Igbatayo SA & Okada PB
13.00-14.00	Lunch	

Plenary Session 8: Building Capacity for Innovation Systems **Chair:** Ponniah Anandajayasekeram **Room: Sheena**		
14.00-14.30	**Lead Paper**: Building inter-institutional capacity for rural innovation: Experience from Uganda, Kenya and South Africa. Richard Hawkins, Robert Booth, Colletah Chitsike; Emily Twinamasiko; Moses Tenywa; George Karanja, Thembi Ngcobo and Aart-Jan Verschoor	20 minutes of presentation 10 minutes for clarification questions
14:30 – 15:00	**Lead paper**: Developing systemic skills to foster innovations in African universities: the Personal Mastery / Soft Skills Experiment at Makerere University. Hagmann, Jürgen; Paul Kibwika & Adipala Ekwamu	20 minutes of presentation 10 minutes for clarification questions
15:00 – 15:30	**Afternoon Tea Break**	

	PARALLEL SESSIONS		
	Capacity building within Agricultural Research and Extension Systems **Chair:** Anton Krone **Room: Majestic**	**Capacity building within Institutions of Higher Learning and partner organizations** **Chair:** Robert Delve **Room: Sheena**	**Open Space for Side Meetings** **Room: Regal**
15:30 – 15:45	Building competencies for innovation in agricultural research. Akullo D, Harro M, Kashaija I & Ayo G	Agricultural Research for Development (ARD) as approach to collective innovation in the resource poor agricultural sector: Describing ARD practise in the South African Tertiary Education, Research and Development system. Verschoor, Aart-Jan; Thembi Ngcobo, Lindie Botha, Richard Hawkins, Colletah Chitsike, Driek Enserink and Juan Ceballos	
15:45 – 16:00	Competence challenges of agricultural innovation systems in sub-Saharan Africa: experiences of demand-led agricultural research and extension in Uganda. Kibwika, Paul; Arjen EJ Wals & Maria Goretti Nassuna-Musoke	Encouraging university teachers and students to promote local innovation Mitiku Haile and Fetien Abay	
16:00 – 16:15	Integrating stakeholder Perspectives in Monitoring and Evaluation Systems of Formal Research and Development Organizations: Strengthening Capacity for Participatory Monitoring and Evaluation. Njuki, Jemimah, Susan Kaaria, Colletah Chitsike, Pascal Sanginga and Festus Murithi	Innovation Response Capacity for Livestock Sector in Ethiopia. Ekin Keskin	
16:15 – 16:30	'Developing facilitation competence of extension officers as a strategy for scaling up participatory extension approach towards community emancipation'. Ngwenya and Hagmann	Forging links with existing research and development institutions in order to institutionalize PID approaches: a mechanism adopted by Prolinnova South Africa. Letty, Brigid, Monique Salomon & Tebogo Serapelwane	
16:30 – 17:00	**Discussion**	**Discussion**	
17:00 – 18:00	**Symposium Closing: Ponniah Anandajayasekeram**		

PAPER ABSTRACTS

THEME 1: CONCEPTUAL AND METHODOLOGICAL DEVELOPMENTS IN INNOVATION SYSTEMS

Developing the Art and Science of Innovation Systems Inquiry: Alternative Tools and Methods and Applications to Sub-Saharan African Agriculture

David Spielman, Kristin Davis, Javier Ekboir

Agricultural education, research, and extension are well-established means of enhancing agricultural production and reducing rural poverty in the many parts of the developing world. However, evidence suggests that the approach is falling short in responding to new opportunities and constraints in regions such as sub-Saharan Africa, where agriculture continues as the region's primary source of livelihood. The entry of new actors, technologies, and market forces, when combined with new economic and demographic pressures, suggests the need for more innovative and less linear approaches. Recent attention to these issues have focused on the wider "innovation system," an increasingly popular concept in the study of how societies generate, exchange, and use knowledge. An innovation systems framework emphasizes the study of complex adaptive systems where the interactions of diverse agents are conditioned by numerous formal and informal socioeconomic institutions. The framework captures not only the influences of market forces, but also the influences of organizational learning and behavioral change, non-market institutions, public policy, and socioeconomic transformations. Most importantly, the innovation systems framework shifts the analytical emphasis from a very conventional and linear model of unidirectional knowledge transfers to a more complex process-based systems approach. This shift is appropriate for the study of agriculture in Sub-Saharan Africa given that the sector's growth and development is becoming increasingly influenced by complex interactions among public, private, and civil society actors while knowledge flows within the system are being conditioned by a variety of rapidly changing institutions. But early applications of the framework suggest opportunities for more intensive and extensive analysis. There is ample scope for empirical studies to employ more diverse methodologies, both qualitative and quantitative, than are being used at present. Further, there is room to improve the relevance of empirical studies to the analysis of poverty reduction and economic growth. This paper explores methodologies that can help improve the study of agricultural innovation in Sub-Saharan Africa. The paper examines methods that address three specific issues in this context: (a) how agents interact in the production, exchange, and use of knowledge and information within a system; (b) how agents respond individually and collectively to technological, institutional, or organizational opportunities and constraints; and (c) how policy changes can enhance the welfare effects of these interactions and responses. Potential methodologies may be grouped into three categories: relational analysis, comparative analysis, and policy process analysis. When combined, these methodologies provide not only a valid, rigorous, and replicable toolkit, but also possess the ability to influence decision-making on key issues in agriculture and rural development—enhancing productivity, increasing food security and nutrition, diversifying rural livelihoods, and reducing poverty. And while several of these methods are data-intensive, others rely on combinations of qualitative and quantitative tools that make them viable even in light of the limited data availability or access limitations that are common to many countries in sub-Saharan Africa.

Towards a More Integrated Theoretical Understanding of Innovation Sustaining Networks in Africa

Robert E. Mazur, Sheila Navalia Onzere

The quality of social networks often affects the value and utility of other resources that are crucial to innovation processes of adoption, adaptation and diffusion. The two leading ways of conceptualizing social networks are the social capitalist and institutionalist perspectives. Social capitalist conceptualizations emphasize internal structural elements, functions, and effectiveness

of social networks to innovation. They draw attention to internal dynamics that determine the functions and effectiveness of actors. While this offers critical insights into the way that social networks interact in time and space, they often do not adequately explain meso and macro contexts within which social networks and innovation processes are embedded. Frequently, this leads to simplistic and rigid ontological conceptualizations of social networks. In Africa, for instance, a key feature of social capitalist perspectives has been an emphasis on the effectiveness of social networks for innovation processes outside the framework of the state, leading to an under-theorization of how the character of these networks has been shaped by structural changes. Institutionalist perspectives address issues connected to history, power and institutional processes and how they affect social networks. They provide fundamental insights regarding the institutional practices within which social networks are embedded and how particular innovation processes are shaped by these institutional practices. They also provide us with a lens regarding the complex institutional processes that embed and disembed actors in social networks and how networks are used, reconstructed and created within certain institutional realities. But institutionalist perspectives overemphasize the roles that structural elements play in the formation and maintenance of social networks, neglecting actors' agency. Using data collected from case studies in Luwero and Kamuli districts in Uganda, this paper merges aspects of social institutionalist and social capitalist perspectives to form a more coherent approach to understanding social networks. The study examines how a set of innovations adopted from an NGO has affected processes in social networks for small-scale farmers in both districts. We find that institutional contexts strongly shape the type of innovations adopted and trust relationships among farmers. However, once innovations have been adopted, processes of innovation adaptation and maintenance change how actors conceptualize institutional barriers creating a new reality. This highlights the iterative nature of internal aspects and external influences on social networks. In suggesting a reconfiguration of social capitalist and social institutionalist perspectives, this paper addresses the potential and limitations of social networks to innovation processes as well as development more broadly defined.

Adequacy of the Agricultural Innovation Systems (AIS) and Agricultural Knowledge and Information Systems (AKIS) frameworks for studying grassroots innovation
Amanuel Assefa, and Ann Waters-Bayer

The Innovation Systems perspective has become an increasingly important approach in explaining how innovation takes place and how and by whom benefits are gained out of complex technological and institutional change processes. The theoretical framework of Innovation Systems was first used to explain processes in the "developed" world, which are highly governed by the rules of a free market economy and more or less democratic governance systems. Industrial innovation is characterised by technology change in manufacturing, with emphasis on market opportunities and institutional changes. Lessons from applying the Innovations Systems perspective in the industrialised world have been used to conceptualise the Agricultural Innovation Systems (AIS) perspective. This has added value to the conventional, linear perspective on agricultural research and development, by providing a framework for the analysis of complex relationships and innovative processes that occur among multiple agents, social and economic institutions, and endogenously determined technological and institutional opportunities (Spielman 2005). Given its industrial origin, current studies of AIS place much emphasis on the market and other institutional forces that affect innovation processes in agriculture. Commercially important agricultural commodities that have high value in national and global markets have attracted the attention of many authors working in developing countries. The analytical framework used by AIS is indeed helpful to study how innovation systems emerge, are coordinated and function, and how innovation performances are influenced by market and non-market forces in the context of market-led economic systems. The strong emphasis of AIS on the private sector, markets and institutional attributes of the innovation processes bring new values into the Agricultural Knowledge and Information Systems (AKIS) perspective. This is a diagnostic framework that helps to discern the organisational forms that enable or constrain knowledge processes such as generation, transformation and use of knowledge and information (Engel

1990). The AKIS perspective has been frequently applied in studying grassroots innovation processes in smallholder farming systems, but paying relatively little attention to market forces and links with the private sector. The AIS and AKIS frameworks are complementary, but each also has its own strengths and limitations when used to study innovation in smallholder and pastoral systems, which are often oriented primarily to subsistence and are located in market-remote areas with high natural resource challenges. This paper analyses the relevance of the two diagnostic frameworks to study grassroots innovation systems of smallholder farmers and pastoralists in developing countries. Theoretical discourses on AIS and AKIS and empirical evidence for both frameworks are discussed on the basis of the work of other authors in relation to the nature of exo-endogenous innovation in farming and pastoral communities. The literature study examines 1) the adequacy or inadequacy of the two frameworks to describe grassroots innovation systems; 2) how the two frameworks help stimulate and facilitate innovation systems; 3) the interconnection of innovation with issues of sustainability and community empowerment; and 4) the epistemological, ontological and methodological complementarities and differences of the two frameworks.

The evolution of national systems of innovation in agriculture and resulting prospects for Sub-Sahara Africa: Lessons learned
Michael Brüntrup and Nicole Rippin

Despite the identified great potential of agricultural research for Africa, especially Sub-Sahara Africa (SSA), government spending is astonishing low, significantly under the target recommended by the World Bank. This is at least partly due to the long-used Top-Down Model which has proven to be inapplicable for SSA. As a result, SSA's National Agricultural Research Institutes (NARI) struggle to survive financially, reflected in poor salaries, lack of training, skilled staff and information and communication technologies. A current reform debate is addicted to the issue of how to enhance the performance of National Agricultural Research Systems (NARS) – including the suggestion to utilise the broader concept of National Systems of Innovation (NSI) which provides a more complete picture of the agricultural innovation process, covering all participants and their interactions. The various lessons learned can be clustered into five major issues: Redefinition of the role of government, decentralisation, stakeholder participation, emerging funding instruments, strengthening of system linkages. Those issues are not new, yet little has been achieved to implement them on a broader level. However, success stories of projects having implemented at least some of the core lessons do exist. Two recent ones have been analysed in this paper: AGRAN, a project of the German Technical Cooperation (GTZ) supporting the Management of national agricultural research especially in mobilising sustainable research funding and inventorying and editing research results for consultation, and DUNAVANT, a private sector training and empowerment project of the German Investment and Development Company (DEG), establishing a functioning extension system to transfer an innovation package to up to 128,000 small-scale farmers. Both projects show how sub-systems of an agricultural NSI have successfully applied core lessons learned. Using the general literature and case study experiences, this paper develops an integrated model approach as one possibility to convert the core lessons learned on a broader level. The strategic idea is to set up centres of excellence for the different agro-ecological zones which should - considering the threats of scarce resources - build up strong linkages to those centres in neighbouring countries responsible for the same agro-ecological zone. Above the centres a national centre of excellence has to be established the so called Apex body, which has to be quite strong to avoid that the whole NSI will fragment into various isolated entities. Additionally, a consortium of policy makers comprised by the extensive concept of agricultural NSI should be established which should meet with the respective national Apex body on a regular base to discuss research relevant issues like research funding, priority setting, implementation and the introduction of laws and regulations (e.g. intellectual property rights). Because of its strong inter-sectoral and regional linkages this concept transcends the concept of NSI and should thus be referred to as Regional Systems of Innovation (RSI).

THEME 2: STRENGTHENING PARTNERSHIPS AND OTHER FORMS OF SOCIAL CAPITAL IN AGRICULTURAL INNOVATION SYSTEMS

Agricultural Innovation Systems and Partnership in Practice: Value Chain Successes in Ethiopia

Tsedeke Abate, *Solomon Assefa, Juergen Hagmann, Seid Ahmed, Tesfaye Kumsa Ann Stroud*

Past efforts of agricultural research in Ethiopia have produced substantial information and knowledge but this has not been able to bring about the breakthroughs needed to transform Ethiopian agriculture and the wider economy: Some of the reasons for the failure were related to the persistent disconnect between research, extension, and smallholders, and to poor market access and commercialization incentives among smallholders. In an effort to address these issues, EIAR has embarked on partnership-based pilot projects to develop innovation systems around commodities and value chains and to scale up proven agricultural technologies, with specific emphasis on high-value commodities such as pulses, oilseeds, wheat, and potatoes. A group of sector and research centre directors and scientists has been taken through a sequence of workshops and iterative practical experimentation with an innovation system approach in an action learning / research mode. The learning process was to open up the mind-set of the disciplinary researchers and managers and enable them to conceptually understand and develop the practical skills to facilitate and implement a down-to-earth functional model of innovation systems and value chain approaches. Besides the practical implementation of partnerships between key actors in these value chains—farmers, extension, input suppliers, local administration, food industry, and export firms, institutional issues to support and manage alternative approaches were addressed and the required changes managed. These experiences have been very promising on the side of the impacts on farmers' livelihoods and on the side of the researchers who have managed to work in an innovation system way, partly as facilitators and partly as initiators of such processes which were led by other actors then. Within 2 years, researchers and partners have been able to actively involve 7500 farmers in these activities and the target for the coming year is 15000 farmers. The success was largely triggered by the emerging commitment and entrepreneurship of the researchers to make things happen at farmer level together with all required actors – which has become the driver of their work. The successes have demonstrated that technological and commercial transformations can raise smallholder incomes, improve food and nutritional security, help them escape from persistent poverty traps, and strengthen their ability to make long-term investments in their land and livelihoods. At the national level, these experiences have demonstrated the vast potential in agriculture, the need for stronger linkages between agriculture and various stakeholders, the viability of alternatives to traditional exports like coffee, and the need for devising new approaches of technology dissemination.

Strengthening the Role of Farmers' Organisations in Agricultural Innovation Systems : Case Studies from Benin, Rwanda and Tanzania

Bertus Wennink, Willem Heemskerk and Suzanne Nederlof

Different types of Farmers' Organisations (FOs) have different opportunities to relate with agricultural services. This article investigates options these organisations explore to improve their innovative capacities through linking with agricultural service providers. Agriculture services (research and extension) contribute to improving farmer-led innovation systems. However, innovation is often defined by conditions other than simple access to and use of knowledge; it also requires appropriate institutional and organizational settings. The agricultural innovation systems concept integrates links between actors, interactive learning processes, and the policy and institutional contexts. Research and extension organizations increasingly work with FOs. Case studies were conducted, together with FOs, in Benin, Rwanda and Tanzania. They highlight

a number of best practices and lessons learned. Research findings allowed for identifying key issues for strengthening the role of FOs in agricultural innovation. The case studies show that FOs operate in an increasingly pluralist service provision sector. The ways in which FOs seize the opportunities within this emerging context and the focus of innovation (technological, organisational or institutional) are determined by the organisation's origin and history. Three types of FOs are distinguished: (i) the 'old' commodity-based FOs; (ii) the 'new' market-oriented FOs; and (iii) service-system-oriented and network FOs. FOs currently access various sources to gain knowledge and use those that are most appropriate to them. In all cases, "private goods", such as agricultural inputs, and related knowledge services, are increasingly seen as private-sector business. This compels public-sector organizations to redefine their role in relation to the private sector; the latter often only serves part of the farming community. All FOs contribute to the so-called support functions within the innovation system, e.g. credit and savings schemes, and marketing of products. Farmers consider these services to be crucial for (technological) innovation. FOs' contributions to knowledge services vary according to the type of FO involved. Commodity-based and market-oriented organizations studied consider research and extension as belonging to other institutes from both the public and private sectors. These institutes are important drivers behind innovation, even though the financial resources of these FOs could have allowed them to orient services towards the needs of their members. Service-system-oriented and network FOs play a much more active role in agricultural services, but in turn lack resources to set the services' agendas. The case studies allowed for identifying best practices and lesson learned for farmer-led innovation systems, in several areas, such as: (i) farmer experience-based policy-making; (ii) sharing knowledge-for-innovation; (iii) guiding the innovation process; and (iv) coordinating complementary (support) services. Experiences indicate that FOs can play an important role in sharing knowledge by initiating multi-actor platforms for interactive learning and by implementing joint activity programmes with services on a cost-sharing basis. Several challenges emerged from the case studies with respect to empowering farmers. Agricultural innovation could be seen in the wider context and accepted as such by other actors in the system. This allows FOs to identify key services, besides research and extension, necessary to achieve successful innovation. FOs are also increasingly being solicited to participate in planning for service provision, but the mission statements formulated by FOs and the specific skills of their representatives need to be developed further for effective participation. Knowledge management within FOs remains another challenge. Furthermore, participation in services needs to include monitoring and assessment of services provided. Effective participation of farmers in decision-making processes remains crucial when designing service systems and learning platforms. This evokes the challenge of enlarging the resource and power base of FOs to make them less dependant on external funding. More important than identifying technological innovation issues is the orientation of the innovation process itself: the final objective, the drivers and the innovation triggers, plus the key actors that need to be involved. This calls for developing capacities of FOs in areas such as: (i) formulating comprehensive strategies for innovation; (ii) designing multi-actor institutions for interactive learning; and (iii) participatory and evidence-based policy-making. Finally, equitable representation and social inclusion within FOs remain recurring issues for which strong community-based farmers' groups remain an essential prerequisite.

From participation to partnerships: A novel way for researchers to accompany innovations processes: challenges and difficulties

Henri Hocdé, Bernard Triomphe, Michel Dulcire et Eduardo Chia

Many researchers today are willing to collaborate with farmers and farmers' organizations or other stakeholders to accompany and strengthen local innovation processes. Whereas they find it rather comfortable to enter into participatory research approaches, they have more difficulties in devising true partnerships with local actors, and to modify their research accordingly. In the context of a CIRAD-led project on Action-Research (AR) in Partnership, a study was launched to systematize and compare past and on-going experiences in which research, not formally labeled and designed according to AR principles, was or is being conducted with local actors (such as farmers, farmers' organizations, extension staff, governments private sector, etc.). The main objective is to draw lessons in terms of research approaches, modalities, methods and tools, and

to propose guidelines to design and conduct in a rigorous and efficient manner research projects focusing on the conception of innovations in partnership among multiple stakeholders. The dozen or so selected case studies are being analyzed with the help of a analytical framework focusing on 3 fundamental aspects: (1) the balance reached among problem resolution, knowledge generation and increased autonomy of local actors, (2) the formalization of partnerships and (iii) the modalities adopted for steering activities and for partnership gouvernance. Contrasts among case studies include the degree and mode of implication of the various actors in the conception of innovations, as well as the type of innovation (germplasm screening and creation, development of future scenarios for smallholder agriculture, design of a supply chain for export of quality products, etc.) Preliminary results confirm that each experience is more than anything the result of an encounter among individuals, who purposefully broke away from conventional locally or institutionally reigning paradigms for effecting change. Compared to AR principles, a major difference lies in the absence of formalization of mutual commitments among actors (such as through an ethical chart). This void explains partely the difficulty in building a common language and a common representation of problems and solutions. Also, deficiencies in the instruments for governance affect the efficiency of the projects and the sustainaibility of the mechanisms put in place. Also, it is clear that partnerships are not a starting point but a result of an iterative process which develops gradually over time. Finally, all projects show difficulties in organizing collectively spaces and times for critical self-assessment, which would allow gradual readjustements in objectives and dispositifs. The distance between team practices and what could be calle an ideal AR process constitutes the heart of this article, which also discusses the complementarities between these type of approaches and those in the line of Participatory Technology and Innovation Development.

Collaborative Research – A Way to Maximize the Potentials
Osamu Koyama

The paper describes the unique activities of JIRCAS in the field of agricultural technology development. Targeting Africa and other developing regions, JIRCAS tries to enhance innovation capacity through conducting equal-footing collaborative research projects with NARS, universities and international agricultural research centers. JIRCAS is one of the advanced research institutes affiliated by the Japanese government, and contributes mainly to the developing regions. In the bilateral aiding programs, in general, new technologies are transferred to the recipient countries in an efficient manner. However, the technologies sometimes do not settle down among local users in the long run due to the lack of capacities to handle with those technologies. Collaborative research projects involve not only local researchers but also local administrators and potential users. Although the projects often require longer time and larger effort before realizing the results as they are processed by mutual actions, they gradually enrich the mutual understanding and eventually the practical research capacity of the involved people from both sides. The experiences in Africa have not sufficiently been accumulated, and JIRCAS finds that the collaboration with local institutions is not as easy as in other regions. However, there is a strong will that JIRCAS strengthen the activities in Africa in coming years. The paper tries to show the concepts and effects of the collaboration by introducing several cases JIRCAS has experienced so far in Africa and other regions.

Private-Public Partnerships to Improve Access to New Maize Technologies in East and Southern Africa
David Spielman, Hugo De Groote, Marianne Banziger, Alpha Diallo

Maize is the major staple food and an important commercial crop for many low-income households in Southern and Eastern Africa. But with yields stagnating and per capita output declining throughout the region, there is an urgent need to reinvigorate maize production and expand the technological opportunities available to small-scale, resource poor farmers. The challenge posed here extends beyond the well-documented importance of promoting the application of modern inputs, improved maize varieties, or natural resource management

techniques. Rather, it is about moving technologies off the shelf and into smallholder fields—a challenge that has been of persistent concern to a wide range of stakeholders. International experience shows that the private sector can play a key role in this process, particularly with respect to maize and maize seed. And in Southern and Eastern Africa, there is sufficient demand for maize seed to support the development of a vibrant and diverse maize seed sector. However, there has been limited evidence to suggest that this has been the experience in Southern and Eastern Africa. Despite the liberalization of agricultural markets in many countries in the late 1980s and early 1990s, confounding (and country-specific) factors have held back private sector growth in the region's maize seed markets. Factors include the continued market advantage given to parastatal or quasi-parastatal maize seed companies, inflexible state pricing policies, high regulatory costs and non-cost barriers, inaccessible financing from the formal banking sector, and crowding out by donor- or state-funded seed distribution systems. This paper examines how innovative organizational and institutional approaches in maize research and the seed sector are making new maize seed-based technologies more rapidly available to smallholders in sub-Saharan Africa. Emphasis is placed on the partnerships developed to disseminate these technologies, as well as the roles, dynamics, and outcomes of interactions among partners; and the organizational, institutional, and policy options needed to replicate similar approaches. The paper contributes to the growing literature on public-private partnerships in agricultural research and innovation, an area where many lessons learned have yet to be fully documented or incorporated into practice. The paper also contributes to the literature by introducing research methods that balance the use of quantitative analysis (agronomic/socioeconomic survey data) with qualitative analysis (semi-structured interviews with key informants) to examine key issues in partnerships. Results suggest that partnership approaches to the dissemination of new maize technologies are efficient and effective, although closer attention must be given to strengthening regulatory policies that promote the dissemination of these technologies, and improving the quality of interactions among diverse partners.

Smallholder Innovation in Ethiopia: Concepts, Tools, and Empirical Findings
Kristin Davis, David Spielman, Martha Negash, Gezahegn Ayele

Agriculture in Ethiopia is increasingly characterized by new players, relationships, and policies that influence the ways in which knowledge is used by smallholders. This growing complexity suggests opportunities and challenges for smallholders throughout the country. But too little is known about how technological, organizational, and institutional innovations affect rural livelihoods and poverty reduction in Ethiopia. Part of the problem lies in the near absence of robust tools and methods with which to study how the small-scale, resource-poor farmer innovates, i.e., how he or she generates, obtains, and uses new and existing knowledge in his or her livelihood system. To develop keener insight into the smallholder innovation process, this paper examines the topic by looking beyond the traditional unit of analysis—the smallholder household—to encompass the wider innovation system—the set of interrelated agents, their interactions, and the institutions that condition their behavior with respect to the process of innovation. The paper introduces tools and methods from a variety of disciplines to isolate and analyze components and linkages within local innovation systems in Ethiopia. Participatory data gathering methods are used for their insight into smallholder livelihoods and behaviors, and the ways in which they make the smallholder's voice audible within the research. Social network analysis is used to map and measure the depth and complexity of local innovation systems. Econometric techniques are introduced to make inferences into the rural population from representative household survey data. The data used in this study are based semi-structured interviews with key informants in public, private, and civil society organizations; rural household surveys; and focus group interviews with smallholders and other rural innovation agents. Findings suggest the following. First, the combination of quantitative and qualitative analytical methods provides robust insight into the technological, organizational, and institutional innovations occurring in Ethiopian agriculture. These methods are particularly effective where local innovation systems are comprised of a diverse set of players (public, private, and civil society), complex relationships between players, and changing administrative behaviors, institutional structures,

technological opportunities, and public policies. Second, while local innovation systems in Ethiopia characterized by increasingly dense networks of heterogeneous actors, the extent of participation in these networks differs significantly between innovative and non-innovative households, as such terms are defined in the paper. Third, participation in these networks—and the livelihood improvements attainable through these networks—is typically determined by smallholders' proximity to a small number of tightly-linked nodes. These findings suggest that the configuration of these social networks significantly affects the smallholder's ability to access inputs, knowledge, credit, and markets, and thus livelihood improvements. The proximity and concentration of key nodes further suggests that the smallholder has limited alternatives in accessing factors critical to improving their livelihoods. This suggests the need for further diversification in the role of both market and non-market actors in Ethiopian agriculture, and forward-looking policy options to promote such diversification.

Innovative partnerships for farmer empowerment and linking farms to markets
Pascal Kaumbutho

KENDAT has been working in crop post-harvest research and marketing. A coalition of partners has developed a robust *Community Parliament* model of technology transfer for enhanced rural transport and marketing services. With a catalytic role of bridging the gap between the supply and demand sides of rural transport and marketing services, smallholder farmers have gained a voice and advanced to farming of higher value crops. The model has proved itself even further, as it helped the introduction of intermediate means of transport (IMT). This paper brings out the Kenyan experience with a community empowerment process ranging from group formation for knowledge and information sharing, development activity prioritization for advances in community infrastructure, institutional evolution, village bank micro-finance for IMT introduction and farming of higher value crops through public – private sector contractual arrangements. Through community parliaments the KENDAT-led coalition of community groups and their supporters, Practical Action (former ITDG), ILO-ASIST (Advisory Support Information Services and Training for employment intensive infrastructure), Ministry of Agriculture – Horticultural Crops Development Authority, East Africa Growers Association, Zuzuka Ltd, Horticulture Development Centre (HDC) and the International Forum for Rural Transport and Development (IFRTD) is making the difference. Clear in-roads to sustained fight against poverty have been developed and stakeholder meetings under the Poverty Watch programme and theme are continuing as a robust way towards policy and other national and regional level, intervention support. A clear contribution to the Millennium Development Goals is gaining ground.

Tracking outcomes of social and institutional innovations in natural resources management: Evidence from Southwestern Uganda
Pascal C. Sanginga, Rick Kamugisha, Annet Abenakyo and Robert Muzira

This paper reports results of a participatory learning and action research that aimed at strengthening social capital and local institutions to support the integration of participatory approaches to policy decision-making and formulation and implementation of byelaws and local policies for accelerating wider-scale adoption and dissemination of more innovative natural resource management (NRM) technologies in the south-western highlands of Uganda. The participatory policy process action research framework involved the establishment and facilitation of functioning policy taskforces at the village, local government and district levels. These policy task forces championed the review, formulation and implementation of community byelaws initiatives, and become mechanisms for linking communities to local government structures and other rural service providers. One year after completion of this five-year learning and action research project, a tracking study was initiated to monitor and document the outcomes of these social, institutional and policy innovations as a result of strengthened social capital and collective decision-making in natural resources management. A major finding of this study is that the main outcome of increased social capital is generally the production of more social capital. Results

show evidence that the community byelaw initiative has strengthened the four key dimensions of social capital: bonding, structural, bridging, and linking; social capital. Mature social capital has increased the ability of local communities to effectively participate in mutually beneficial collective action, increased cooperation and compliance to byelaws, networking and liking with the local government structures and other rural service providers. These results suggest that with appropriate catalysation, social capital can not only be productive, but also persistent and robust over time, creating long-term vision in rural communities. Although, results generally show that the outcomes of social capital have largely been positive, there are also some important downsides. These include increased conflicts, divisions and hearted within communities, households and between the decentralized local government structure at the village level. Many of the collective action events often have a high social cost for local communities, especially to women and other vulnerable groups, who end up taking the burden of paying fines and other forms of social exclusion and coercion. The paper cautions against the danger of appearing too optimistic about the capacity of social capital mechanisms to bring about positive lasting change in most equitable ways. Social capital mechanisms alone do not possess the resources needed to promote broad-based and sustainable NRM. Rather, complementarities and synergies between social capital and local policies are required to improve NRM. The paper makes ten generic findings that contribute to make the construct of social capital operational and to the development of a more robust framework for monitoring and evaluating potential impacts of strengthening social capital.

THEME 3: INSTITUTIONAL ARRANGEMENTS, POLICY OPTIONS, AND KNOWLEDGE-SHARING MECHANISMS TO SUPPORT AGRICULTURAL INNOVATION SYSTEMS

From Bright Spots to Bright Coverage: Role of knowledge sharing in improving research and outscaling of innovation systems, A case of knowledge sharing and innovation in Central Asia

Nadia Manning Sanjini de Silva, Iqbol Yusupova, Iskandar Abdullaev

Overexploitation of water and soil resources is occurring within the Central Asia region resulting in serious economic, social and environmental consequences. Declining agronomic productivity associated with salinization and elevated water tables have consequently contributed to the development of endemic poverty in rural agrarian based communities in the region. Whilst the region faces enormous challenges in preventing, mitigating and reversing the processes of soil and water resources degradation, there is cause for optimism. There are individuals, small communities and households that have adopted innovative practices and strategies to reverse resources degradation in a sustainable manner whilst maintaining or enhancing food security and income generation in the region. These so-called 'Bright Spots' are areas where land degradation and low productivity have been successfully reversed through soil remediation technologies and best practices. These practices combined with innovative coping strategies to enhance cash flow, have resulted in higher crop yields, increased profitability, and improvement in resource conditions on farm. The International Water Management Institute (IWMI) is leading an ADB funded project entitled "Enabling farming communities in the Aral Sea basin to reverse water and land degradation by the creation of 'Bright Spots'". This project promotes and supports community based innovations whilst increasing profits at farm level. In addition, the Knowledge Sharing in Research Pilot Project of IWMI and the Challenge Program on Water and Food (CPWF) is also working closely with the 'Bright Spots' project to introduce and integrate knowledge sharing approaches into the research process. The aim is to improve the effectiveness of the research towards greater uptake of research results, outscaling of best practices both 'home-grown' and externally induced, and to support these innovations towards wider positive impact. An institutionalising of a knowledge sharing culture and use of specific and appropriate knowledge sharing approaches and tools, are targeted at supporting the aims of the overall project focused on enabling innovations. Currently a strategy for use and integration of

knowledge sharing has been developed and adopted for the project, and a number of approaches already tested within the innovation framework. The project continues to use knowledge sharing approaches for better identification of 'Bright spots', improvement of the mutual learning process between farmers and researchers, and facilitation of better ways of sharing vital knowledge and experiences towards an outscaling of practices aimed at reversing land degradation. The project has been testing a range of Knowledge sharing approaches within its various activities. The potential of implementation of targeted knowledge sharing approaches and activities is that it can support improved learning, understanding and uptake of the final output of the Bright Spots Project. While this work is ongoing, some key lessons have already been learned about the role of knowledge sharing in supporting innovation on the ground both by researchers and farming communities.

Can the way of funding make a difference in local agricultural innovation systems?
W. Heemskerk , B.Wennink, N. Lema and H. Gotoechan-Hodounou

Agricultural development for poverty reduction in Sub-Saharan Africa requires much technological, organisational and institutional innovation. Emphasis on the demand side for knowledge services for innovation and the call for a separation of responsibilities for policy making, funding and implementation has resulted in innovative funding mechanisms at national and local level. The new arrangements aim at enhancing resource control by research clients and the end-users of agricultural production and processing technology, while expected to combine efficiency in resource management with effectiveness in innovation development. The emphasis on stakeholder involvement and client empowerment has led to a deconcentration of funding mechanisms to local level innovation systems or to funding mechanisms for particular agricultural chains. In this study, different experiences describing the performance of stakeholder-controlled funding mechanisms such as competitive grants and public-private sector matching funds were examined and an overview prepared. Specific case studies from Tanzania and Benin were developed by the stakeholders involved, discussed at local workshops and proceedings drafted. The overview and the specific cases were further analysed and through a SWOT analysis, a synthesis of main findings was distilled, which resulted in widely distributed publication. Local research and development funding schemes contributed to financial diversification for R&D with a greater contribution by research clients. However, actual empowerment of farmers and their organisations in controlling the financial resources for adaptive research is still a long way off. Downward accountability improved, but real client control of funds stagnated, in part due to the unwillingness of the researchers and farmers organization's (FOs) capacity. Farmer representation on the management teams of R&D Competitive Funds remains weak. Simultaneously, some stakeholders shy away from supporting local funds (where they loose direct control) in favour of independent "contracts", this also applies to contributions from the private sector. This threatens not only local ownership of such funds, but also their sustainability, although they still represent a vehicle for local multi-stakeholder resource control of (mostly public) funds. Decentralized local R&D funds were found to be more successful and had advantages over other funding mechanisms as a result of: (i) the competitive element which enhanced the quality of research; (ii) the sense of ownership by farmers; and, (iii) actual resource control by clients. Concerns were however, raised in relation to: (i) awareness of R&D funds: (ii) client representation and focus; (iii) inclusiveness of the fund; and, (iv) the level of contributions by truly local stakeholders. As a consequence, except for Tanzania the local (zonal) funds have not been mainstreamed in agricultural research funding and remained relatively marginal in relation to overall R&D funding.

From Web to Field to Web: Kyuso Farmers embrace ICTs for Pests Control and Management

Noah Lusaka and Maryleen Micheni

This paper highlights an on going partnership project initiated in 2005 that involves use of information accessed using ICTs to control and manage pests in Kenya using non- chemical alternative methods. The paper highlights the innovative partnerships to implement a development project between International agencies, regional networks, government departments, local Ngos, Community Based Organisations (CBOs) and farmer groups. The innovation address the challenges small-scale farmers face in achieving increased food production in a sustainable manner while conserving the natural resource base. The innovation also unveils successes and efforts made in bridging the digital divide in terms of community access to Agricultural information resources. In 2004, Pesticide Action Network Germany (PAN German) developed and launched an online information service for non-chemical pest control in the tropics, OISAT Info (www.oisat.org) targeting trainers, extension workers and farmers. OISAT Info offers practical information on preventive and curative methods and how to minimise pest damage in a safer, affordable, effective and ecologically sound way. The main aim is to increase food production at household level while reducing the use of synthetic chemical pesticides that are harzadous to human, water resources and the environment. ALIN-EA partnered with PAN-Germany, PELUM, Kenya, the Ministry of Agriculture Mwingi District and Kyuso farming community to pilot and prepare large-scale dissemination of OISAT Info among smallholder farmers, Agricultural training and extension networks in Africa. Through the Pilot Project, a 'Farmers Resource Centre' (FRC) was established at Kyuso. Powered by solar energy, farmers access Internet and other info resources from the resource centre which they fondly refer to as 'Kyuso Info Supermaket'. The centre is equipped with a computer, CD-ROMS, worldspace Radio, printer and a mobile phone. A local farmer with information technology skills helps farmers to download information, translate to local language and train them on use of ICTs. To enhance sharing of local knowledge and Agricultural practices widely, ALIN-EA installed the Open Knowledge Network (OKN) software. The OKN is an offline communications channel that offers an excellent information management system for local content generation and easy retrieval and dissemination to wider audiences, using appropriate and complimentary ICTs like the worldspace technology, rural radio etc. The project has started to bear fruits to the local farming community, extension team and neighboring educational institutions. Some of the results and impact include: Farmers, extension staff, teachers, students and local leaders accessing appropriate, practical and up to date info resources from the FRC. The local farmers control and manage pests cheaply reducing costs of production and producing more healthy food. In addition, there is an increased farmer and extension team capacity on use of appropriate ICTs and improved communication skills. There is increased team spirit and confidence among farmers, NGOs, government departments in use of alternative pest control methods and exchange of indigenous knowledge.

The IK Bridge to Innovation

Jean T. GRADÉ and Patrick VAN DAMME

The Karamojong region is located in the arid-semi-arid-lands of northeastern Uganda where its transhumant cluster spills into Kenya, Sudan and Ethiopia. In order to preserve, promote and protect their abundant local veterinary knowledge, an ethnoveterinary (EVK) information network and two Traditional Livestock Healers Associations (TLHA) were formed. The associations of the Pian and Bokora sub-tribes of Karamoja are registered at the national level and partner with government, local and international organizations. They have spearheaded efforts to raise medicinal trees. Agro-forestry is not a component of the local culture, 'God provides tress, it is not for *us* to plant'. The Karamojong traditional livestock healers (THs) have taken steps farther: to use medicinal and fodder plants for living fences, to establish backyard pharmacies to prevent local degradation providing a ready treatment supply, and to collect seeds of local slow growing medicinal plants, and to supplement their agro-forestry scheme with exotic, fast growing seedlings. They have established nursery lots in order to sell seedlings. These local seedlings

create production woodlots. These woodlots will provide sufficient raw materials for the concurrent development of value-added local medicine in a tested, marketable form. These innovations have yet to bring about any real economic changes for the TH. Their interactions, however, with other non-TH appear to have encouraged them also to preserve, promote and protect local indigenous knowledge. This has increased the respect and dialogue between antagonistic groups, within families, clans, tribes and cross border neighbors. The IK bridge facilitates peace and reconciliation efforts as well as potential technological advances in local medicine product development. These concur with field trails that increase potential for local income generating activities.

Role of Knowledge Sharing and Communication Strategy in Adoption of Water System Innovations in Makanya Catchment, Same District, Tanzania

Masuki, K. F. G.; M.C. Shetto; A. Z. Mattee, S.D. Tumbo; F. B. Rwehumbiza and O. Mhina

The main challenge of researchers in natural resources management is to turn knowledge generated into practice and achieve tangible results and outcomes to improve livelihoods of the farmers. In response to the challenge, this paper examines the role of enhanced knowledge sharing and communication strategies to ensure research findings are well communicated to the key stakeholders in order to influence decision-making and resource allocation, to enhance utilisation of improved technologies. The case of the Smallholder Systems Innovations (SSI) program in the Makanya sub-catchment in Same District, Tanzania is used to demonstrate the impact of communicating research findings during research process. The main objective of the knowledge sharing and communication strategy in this program is to have an effect on the knowledge and attitudes of smallholder farmers on water resource management in the Catchment. The main concerns are: (i) to ensure that the research is integrated – both between scientific disciplines, between stakeholders and scales – and driven by real needs on the ground. (ii) to ensure that the results of the research are fed into policy and development, not only in the locations of study, but also to other locations and stakeholder arenas. (iii) to design an approach to systematically and experientially learn from initiatives on the ground. Different methods and approaches for knowledge sharing are used that provide opportunity for feedback to researchers, extension workers, decision/policy makers and farming community. The approaches/methods used include: farmers' workshops, action research, exchange visits, farmer field schools, demonstrations, farmer field days, audio visual (video) and River basin game (RBG). The implementation of the communication strategy involved active participation of the District Council to ensure continuity. Lessons learnt are that: (i) Adoption of water system innovations depend on the combination of different promotion methods. Farmers learn by seeing and doing. Interactive methods complemented by other methods and media of communication like audio-visual and printed materials are more effective. (ii) Improvement of technologies which are already practiced in the area are readily accepted by farmers than newly introduced technologies, especially when involve use of materials that are not locally available.

Doing things differently: Post-Harvest Innovation Learning Alliances in Tanzania and Zimbabwe

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Conventional approaches to technology transfer within small-scale farming systems have frequently failed. Household food security remains precarious for many people in the rural areas and food production levels show little or no increase. Hitherto, post-harvest service provision and research have focused on technology development, with less attention being given to understanding delivery system constraints, distinguishing between the needs and priorities of different households, or exploring farmers' own research capabilities. Recent approaches to

scaling-up technologies – products and processes – point to its dependence on the activities and interactions of a diversity of key players and organisations, and place emphasis on doing things differently to overcome institutional constraints. Knowledge is viewed as a process of learning, characterised in the innovation system context, by effective relationship and communication to overcome institutional barriers. In Tanzania and Zimbabwe, key post-harvest stakeholders from all sectors - public, private, voluntary - were invited to become members of Post-Harvest Innovation Learning Alliances (PHILA). The overall objective of the alliances was to effect better mobilisation of the respective national innovation system to sustain the uptake and adoption of post-harvest knowledge for the benefit of poor farmers, but the specific, more immediate objective, was that of exploring better ways of working and learning together. Core activities of the two in-country alliances were: collaborative research initiatives; internal information-sharing and; engagement with other influential players in the post-harvest system. Case studies critically examining current service-provision practices, farmer-demand mechanisms, and the bearing of current policies, their formulation and implementation dynamics, on post-harvest situations, were commissioned in the two countries. Insights from the learning alliances (LA) process and the case studies are currently being used to generate practical guidelines and policy recommendations for wider in-country post-harvest knowledge management. Inception workshops were used to promote and launch the two alliances, and final review workshops provided opportunities for further engagement, sharing of the case study findings, and consolidating learning. By commissioning diverse members to implement pivotal collaborative research, and through more general collaboration or participation in these studies, PHILA sought to raise awareness and extend the individual and organisational capacity of its members. The research case studies also involved and benefited other potential end-users who were not necessarily PHILA members.

PHILA achievements to-date include:

- provided a safe and effective space for diverse key stakeholders from multiple organisations within the respective national innovation systems to work and learn together, and improve inter-organisational relationships;
- promoted recognition of the diversity of rural circumstances and livelihoods, to ensure that service provision is more responsive in meeting the needs and priorities of different groups, including poorer individuals and households;
- actively sought to share all its findings on enhancing post-harvest performance at the interface of supply and utilisation with key players in the national innovation systems;
- has a more realistic understanding of the essential inputs, costs and challenges associated with the establishment of a multi-stakeholder, multi-levelled LA; and
- provides a living legacy to continue and consolidate this work through its expanding membership, and the PHILA website <http://www.nri.org/PHILA/>.

Innovative policy change to support urban farmers in Kampala: What influenced development of the new City Ordinances on urban agriculture?

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In May 2005, the Mayor of Kampala assented to a new set of innovative laws to cover the practice of urban agriculture and marketing in the city. These new City Ordinances represented a significant shift in policy, moving away from a historically very negative approach to farming in the city, towards a much more supportive approach which recognised the huge economic importance of urban farming for poor households, especially women, whilst dealing with the real concerns over public health, nuisance and environmental impacts. This paper presents the findings of a case study into the process of this policy change, and the influences that caused it. This complements other case studies being done in different contexts, as part of a project aimed at drawing lessons on how different actors can more effectively engage in activities that result in pro-poor policy change outcomes. The approach used combines three validated methodologies that focus on key actors and changes in their behaviour, and use both forward and backward tracking of the policy process. A diverse set of influences led to this change in Kampala. The

activities of the farmers themselves in continuing to farm in the adverse policy environment, NGO-supported development activities and lobbying, and some highly influential seminal research done back in the early 1990s set the scene for changed mind-sets. Critically important was the decentralisation process which brought farmers and elected politicians much closer together and brought effective accountability. Innovative and highly motivated individuals within the city council technical staff collaborated with farmers and civil society, and in turn influenced the same elected politicians through an effective internal reporting system. Collaborative research provided the evidence on both the social need for change and on technical approaches to quantify and deal with issues of concern. A key factor that led to change in Kampala was the coordinated and collaborative activities of motivated actors from local and central government, civil society organisations and research institutions, both local and international, all working closely with the farmers themselves, as well as a key role played by 'champions' at various levels. Some important lessons emerge from this case study on ways of working to achieve policy change outcomes that support the livelihoods of poor farmers. These in particular relate to effective partnerships, institutional mechanisms and knowledge sharing.

Changing the rules of the game: institutional innovation and change processes in organic agriculture

Michael Hauser, Robert J. Delve, Brian Ssebunya, Joseph Mulindwa and Stephen Byandala

Early 2006 the number of certified organic farms in Uganda exceeded 40.000. Much of the organic sector expansion is market-led. If international markets continue their projected growth rate, the increasing demand for organic commodities will provide new market and income opportunities for small farmers. However, the classical institutional setup of certified organic agriculture perceives farmers as passive producers rather than active and creative organic agriculturalists. Power relations favour traders and exporters, production decisions are made on behalf of farmers and the use of research products play a minor role. We argue that the current 'rules of the game' within the organic sector are likely to become a main barrier to the further development of organic agriculture in Uganda. Linking demand to the production of organic produce requires a sustained, collective capacity of farmers for generating site-adapted farm management strategies. In the long run, the competitiveness of the organic sector will be as strong as its weakest system component; there are signs that this will be at the production side. Against this background, a novel approach to strengthen the competitiveness of organic agriculture is being tested. The purpose of a four years' action research project has been the development of means to support farmers to transition from subsistence / traditional to commercial / organic agriculture. A central methodological element of this approach is the 'Enabling Rural Innovation' (ERI) process which seeks multi-stakeholder partnerships between organic farmers, non-governmental organisation, exporters and research. Such partnerships become the basis for an institutional innovation and change process that support farmers in (i) making informed and autonomous production decisions (rather than being told what to grow), (ii) testing and adapting new organic farm management practices (rather than adopt blanket recommendations), and (iii) negotiating long term contracts with exporters (rather than passively accept or reject buyers' offers). The project is implemented in two pilot sites in Mukono and Hoima district in central and western Uganda. In each site an ERI based research and development process supports farmers in establishing linkages with organic markets and subsequently produce for organic markets. Lessons from both pilot sites suggest that the ERI approach enables farmers to access new market information (e.g. prices, quantities, quality) and new research products (e.g. disease resistant germplasm, variety evaluation for export, etc.) on critical aspects of production. It can be shown that the approach helps farmers to develop competitive organic enterprises for home consumption and export. Moreover, it can be demonstrated that building farmers' capacities to learn about the ecological, economical and institutional complexity of the organic sector using participatory approaches is a critical empowerment strategy. The paper discusses first experiences with the application of the ERI approach to organic agriculture and concludes that changing the rules of the game (and hence institutional setups) is critical for the future development of the organic sector.

Farmer Access to Innovation Resources (FAIR): findings from an international review of experiences

Laurens van Veldhuizen, Mariana Wongtschowski and Ann Waters-Bayer

The PROLINNOVA Global Partnership Programme to promote local innovation in ecologically-oriented agriculture and natural resource management (NRM) has embarked on an multi-country action-research project to create and institutionalise new institutional mechanisms to give innovative farmers, groups or communities direct access to funds to speed up their innovation processes. The Local Innovation Support Funds (LISFs) are intended to be co-owned by local stakeholders. As a first step in this process, an international review of experiences with support funds for farmer-led research and development was undertaken. This paper provides an overview of these various experiences. The review focused on selected funds related to agriculture and NRM in Africa, Asia and Latin America. In addition, two special cases were included: an innovation fund for horticulture in the Netherlands and a fund for urban community development, as these bring valuable lessons on decentralised design and community involvement in local funds. The cases are analysed according to important considerations in the design and implementation of pilot LISFs under the FAIR (Farmer Access to Innovation Resources) project. Following this analysis, some strategic choices are outlined to assist in design of the pilot LISFs. Themes explored include:

- Farmer-owned funds versus institutionally-based funds
- Level of decentralisation
- The time horizon
- Target groups in relation to levels of poverty and vulnerability
- Individuals versus group applications for support
- Other priority setting and selection criteria
- Administrative and support issues
- Institutional arrangements and governance
- Monitoring and evaluation.

The paper highlights aspects that should be taken into account when designing an LISF and makes suggestions based on the lessons arising from the comparative analysis of the case studies.

Context-specific strategies to promote innovation through development of Local Innovation Support Funds (LISFs)

Amanuel Assefa, Anton Krone, Ann Waters-Bayer, Laurens van Veldhuizen and Mariana Wongtschowski

The paper compares and contrasts various strategies to design and introduce Local Innovation Support Funds (LISFs) and related interventions in resource-poor areas in four countries: Ethiopia, South Africa, Uganda and Cambodia. The Farmer Access to Innovation Resources (FAIR) Project funded by the French Government is an action-research initiative of the PROLINNOVA (Promoting Local Innovation) Global Partnership Programme. The FAIR project emerged from dialogue and experiences of PROLINNOVA partners who want to explore mechanisms to stimulate Participatory Innovation Development (PID) processes that enhance local initiatives of resource-poor rural and urban farmers and natural resource users to improve their livelihoods. FAIR seeks to test the relevance of locally-owned and -managed funds in supporting local innovation processes and farmer-led participatory research that builds on local innovation. FAIR partners include non-governmental and governmental organisations in the four PROLINNOVA Country Programme, in close communication with the NGO coordinating PROLINNOVA-Nepal, which already started to work with LISFs before FAIR began. The intention of the FAIR project is to build up a body of pilot experiences and lessons that can be shared amongst stakeholders interested in developing models and methodologies for securing

sustainable PID processes at a local level in a variety of contexts. As a first step, an overview was made of international experiences with funds to support local research and development activities. This gave the background to four country-level studies to explore how best to establish LISFs co-owned by local farmers and other stakeholders in the different social, economic and historical contexts. The studies in Ethiopia, South Africa, Uganda and Cambodia involved assessments of the local institutional environment and the experiences in local innovation and participatory research and development in the specific regions that each of the four PROLINNOVA Country Programmes had identified for piloting LISFs. The conclusions of each analysis were translated into recommendations for the design of institutional arrangements for piloting LISFs, including identification of important complementary interventions necessary to enhance local innovation potential. The paper summarises the country-level studies' main conclusions on:

- local conditions in the selected pilot sites
- current activities of various local actors in promoting local innovation
- main recommendations for the design of relevant arrangements for establishing LISFs.

The respective contexts of and emphases in design of the pilots are discussed and compared to show how the conditions and interests of the histories and actors in each situation shape the environment for setting up LISFs. It is this mix that suggests what is appropriate and possible for each local partnership from a strategic and project-design point of view. The different strategies proposed for setting up LISFs are assessed in terms of their method and focus, as well as their different emphases with respect to types of local innovation (social, economic, environmental or agricultural) that the funds will support. Against this backdrop, some observations are made about the extent to which successful outcomes in the pilot areas could help reduce poverty and vulnerability.

Forging links with existing research and development institutions in order to institutionalize PID approaches: a mechanism adopted by PROLINNOVA South Africa
Brigid Letty, Monique Salomon and Tebogo Serapelwane

PROLINNOVA South Africa was launched in 2004 and since then efforts have been made to forge linkages with institutions involved in research and development in order to fast-track the institutionalization of participatory innovation development (PID) approaches and to instill an appreciation of local innovation. A number of sharing and learning PID workshops have been held in three provinces in South Africa, namely KwaZulu-Natal, Limpopo and Mpumalanga. These workshops have been attended by farmers as well as representatives of research institutions, provincial departments of agriculture, universities and non-governmental organizations.Programmes that share PROLINNOVA's focus on farmer-led research and development have been identified and synergies with these programmes have been established. This relates in particular to the Agricultural Research for Development (ARD) Programme of the Agricultural Research Council, which is driven by their Sustainable Rural Livelihoods Division. This paper shares some of the outcomes of the sharing and learning workshops, especially the identification of innovations to be taken further through partnerships focused on PID. It also explores the issue of institutionalization of such approaches within existing organizations in terms of the challenges encountered and the changes (including both attitudinal and policy changes) that need to be encouraged.

THEME 4: ENHANCING LOCAL INNOVATION PROCESSES

When innovations are not enough: Lessons in Facilitating Innovations from an R&D Perspective
Carlos S. Basilio, Lilibeth B. Laranang and Irene M. Adion

CIP-UPWARD supported the use of participatory R&D approaches to facilitate experimentation and innovation for improving livelihood systems in Central Luzon, Philippines. Multi-agency partnerships implemented community appraisals, agricultural systems analysis, farmer field schools and farmer participatory researches. Technical and socio-economic evaluations were

conducted to determine the contribution of the projects in local people's livelihood systems. The results indicated the role of participatory approaches in facilitating project outputs and outcomes. PR&D approaches intensify awareness of research and development institutions about livelihood problems and opportunities and the potential of some innovations in solving them. Local government units, national government agencies, regional and provincial colleges and farmers' cooperatives provided their own resources to so that their constituents will benefit from the technology. They build infrastructures, finance capacity building efforts and mobilize communities. Unfortunately, a number of technical, socio-economic and policy issues limited more widespread use and greater contributions of innovations in improving livelihood systems of households in the region. CIP-UPWARD initiatives on the development and dissemination of clean planting materials and on the use of sweet potato residues for improving backyard cattle fattening illustrated these experiences. Lessons from these experiences prompted CIP-UPWARD to downplay it's role in assessing and facilitating technical innovations and oriented it's goals towards strengthening partnerships, influencing markets and policy-making, and understanding impact areas beyond adoption rates.

Farmer Innovation in Uganda: Aiding and Abetting the Land Users
WRS Critchley, R. Lutalo, H.D. Miiro and A. Lwakuba

Over the last decade Uganda has embraced a series of projects and programmes to promote farmer innovation that is perhaps unrivalled in Africa. This paper presents the background, methodology and accomplishments of the four main innovation projects – 'Conserve Water to Save Soil and the Environment', 'Promoting Farmer Innovation', PROLINNOVA ('Promoting Local Innovation') and 'Stimulating Community Initiatives in Sustainable Land Management' (SCI-SLM). We trace the genesis and evolution of the programmes – through the first two which have now completed their activities, to PROLINNOVA which is currently active country-wide and finally to SCI-SLM which is in its inception phase. An example is given of an innovator and an innovation, in the field of land husbandry/ sustainable land management under each project. We present Evas Gakyalo with her trash lines and manure management in Kabale, Ali Alias with his mulching and water harvesting in Katakwi, George Lubega from Nakasongola with his pasture rehabilitation system, and finally the RECPA community with their hillside reforestation programme in Ntungamo. We argue that improved natural resource management in 'difficult' and marginal areas is most likely to be solved when the ideas of innovative land are appreciated and supported by researchers, and the process stimulated and facilitated by extension agents.

From a strangler to a nourisher: The floating challenge that farmers changed to an opportunity
Geoffrey Kamau and Conny Almekinders

A study done in recently established rice fields in Kirinyaga district of Kenya showed how farmers developed innovations around an invasive and aggressive floating water weed Azolla spp. The weed which the farmers named ''*kaukimwi*'' (little AIDS) owing to its strangling effects on newly transplanted rice caused huge losses and discouraged the farmers. However, innovatively, farmers were not only able to avoid losses but further converted it into nutrient rich compost, moisture retaining soil cover and even control of other floating weeds. This was rapidly up scaled and used by affected farmers in the rice growing area and thus enhanced crop growth and provided farmers with an alternative to costly mineral fertilizers. The study traces how this and other locally generated innovations were exchanged between farmers in their local groups through various actors. These included brokers, volunteer labour, and early morning meetings. The case provides support for the argument that farmers' flexibility and the practical nature of their innovation processes are aspects that should be given place in the formal innovation system. The discussion provides ideas on how this could be achieved, the likely challenges and suggestions on possible solutions.

Why do some local innovations die and others flourish? Insights from the introduction of rye in barley cropping systems of Ethiopia

Elias Zerfu, Shenkut Ayele, and Kiflu Bedane

Rye (*Secale cereale* L.) is almost unknown as a cultivated crop in Ethiopia, and there is no recorded formal research or extension work carried out on the crop. Evidence suggests that its introduction in the country came about when a Swedish missionary began cultivating rye in his kitchen garden some 40 years ago in the Assela region. But that is the limit of our formal knowledge on rye in Ethiopia. Nonetheless, farmers began cultivating the crop in the late 1990s in a *woreda* (district) physically removed from Assela. Furthermore, the cultivation area of rye grew quite rapidly in the Jeldu *woreda*. This event occurred without the notice or support of formal extension or research agencies as the national or sub-national levels. It was, in fact, a local innovation. This study investigates the diffusion route, the reasons for dissemination, farmers' perceptions about attributes of the crop, and the significance of this local innovation to Jeldu area. The study is based on data collected in 2002 from *kebeles* (peasant associations) in Jeldu *woreda* that had been cultivating rye for three consecutive years. Using a snowball interview sampling method, farmers were asked to give the name and location of the farmer who first gave them the seed. The procedure was repeated with each new farmer identified in the interview until no new names were mentioned. This was followed by a SWOT (strengths, weaknesses, opportunities, and threats) analysis aimed at understanding the perceived attributes, both positive and negative, of the crop. Findings suggest that several factors facilitated the introduction of the crop. One relates to the crop's physical characteristics including a peculiar morphology (long stature and bluish-green color during maturity), which made it easily observable by the passers-by. Another relates to the natural calamities (specifically, the 1984.and 1998 droughts), which left farmers without seed for more popular crops and forced them to find alternative seeds and seed sources. In addition to these factors, several of the crop's unique characteristics made it attractive to farmers, particularly its tolerance for the area's increasingly deteriorated natural resource base (water-logged soil, frost, and declining soil fertility). The study also reveals several unique features of the local innovation process that brought rye to Jeldu *woreda*, including the complexity of social networks among farmers, the value of indigenous knowledge and local preferences, and the unintended impacts of population movement. Furthermore, the paper reports implications of the study to future efforts that could be made to enhance local innovations.

Participatory Methods: Making the Process of Technology Innovation Viable in Bolivia

Vivian Polar F., Edson Gandarillas M., Juan Fernandez y Walter Fuentes

For over three years the FOCAM project in Bolivia worked on participatory methods within the framework of Applied Technological Innovation Projects financed by the Bolivian Agricultural and Livestock Technology System (SIBTA), and other actors involved in innovation processes. One of the purposes was to identify gaps in the system and then create, test and implement participatory methods to fill in the gaps and optimize intervention results. Once created and adapted, the methods were tested on different projects throughout Bolivia. Methods aimed at filling gaps identified along projects life cycles. Such methods are "In-depth study of demands", Participatory adjustment of proposals", "Participatory Mid-term evaluation" and "Participatory Final evaluation". The new methods generated were well accepted both within and outside SIBTA. Some of the applications were implemented directly by the FOCAM-INNOVA team while others were being done directly by the actors involved in the process. Furthermore, partner institutions that participated in the process that range from Government institutions to local organizations, including NGO's, Foundations, and other types of organizations; have benefited from the use of these methods and are nowadays carrying along an institutionalization process. The methods have also shown to be flexible enough so as to be applied not only in the agricultural sector but in other systems of technological innovation at the national level. This paper focuses on the gaps identified and how the methods are able to fill in these gaps thus improving results of innovation adoption. The "In-depth study of demands" method contributes to innovation adoption by

promoting the identification of project ideas centered on the farmers' demands and inspired in their vision of development. The "Participatory adjustment of proposals" method makes it possible to differentiate among the expected outcomes of a project by type of demander. This way, both technology innovation and intervention system may be adjusted to fit in the particular needs of different beneficiary groups of a project. Actors such as financial and government institutions as well as service providers have monitoring and evaluation systems that provide information regarding the state of execution of interventions. Never the less, many of this systems lack the inclusion of local perception that enhances qualitatively this process. The "Participatory Mid-term evaluation" and "Participatory Final evaluation" methods provide qualitative information about the degree of demander satisfaction with the project, as well as perception of actors' performance and accomplishment of results. In all cases the challenge is to maintain the spirit of the methods in terms of promoting equity and inclusion of the least favored in development initiatives, thereby ensuring the achievement of goals proposed by national policies in terms of reducing poverty and development with equity

Farmers Field Schools for Rural Empowerment: from Experimentation and Learning in Integrated Nutrient Management to Platforms for Income Generation and Market Linkages; Experiences in Central and Eastern Kenya

De Jager, A., Onduru, D.D., Gachimibi, L.N., Muchena, F., Gachini, G., Van Beek, C.L

In Africa, the maintenance and improvement of soil fertility is considered to be one of the major factors to attain food security, reduce poverty and address environmental degradation. Research, extension and development programmes had insufficient impact in widely changing soil fertility management practices, while on the other hand various isolated successes have been recorded.
This paper describes experiences of a 4 year pilot project in Central and Eastern Kenya on experimental learning, based on Farmers Field Schools (FFS) with an entry point on Integrated Nutrient Management. This approach aims to combine (a) a technical focus on a locally feasible sustainable mix of nutrient management strategies, and (b) a developmental and institutional focus on using farmer creativity in capturing local opportunity for improving the productivity of farming. The results show that the technical learning and innovation processes in FFS have a positive impact on the level of knowledge, skills and experimentation/innovation processes of the members. Adoption of the tested technologies by the farm households is selective, but relatively high if a positive impact on one of more of the essential indicators has been observed during the learning and experimentation process. Various developed, adapted and tested nutrient adding technologies (manure, fertiliser, composting, double digging, tumbukiza, tithonia and rhizobium) as well as changes in livestock management and feeding were adopted by 40-70% of the farmers in specific locations. The role of outsiders such as extension staff, researchers, NGOs, but also neighbours in technology development remain essential to trigger the process in the beginning.
In order to make the FFS approach effective in addressing long-term rural development challenges such as soil fertility decline, successful adaptations in the original IPM-FFS approach were made focusing on facilitating the development of permanent farmer groups with a focus on sustainable learning and innovation processes. However, one year after the end of the facilitation process it appeared that implementing joint commercial activities was the dominant driving force for sustaining the group process, rather than learning and innovation. Given the leaderships problems during the project period it is concluded that during the facilitation more attention needs to be paid to leadership and group management aspects. Cohesion and sustainability of groups appear to be better when they emerge from or are based upon existing groups, compared to newly formed groups. The potential impacts of FFS go beyond processes of technical innovations and effectively addressing challenges in the farming system. It should be seen as an important stepping stone to establish farmers' organisations, linking farm households to markets and empowerment of rural people.

Change Agents Facilitate Cross-Border Diffusion of Collective Action Innovations among Pastoral Women

D. Layne Coppock, . Seyoum Tezerra, Solomon Desta, Getachew Gebru, Chachu Tadecha

In the late 1990s a routine reconnaissance by the PARIMA team in the arid rangelands of northern Kenya revealed the presence of dynamic pastoral women's groups residing in some settlements. Largely illiterate, poverty-stricken women had joined together either spontaneously or with assistance from local development partners beginning in the 1980s. The groups had a common goal, namely to improve their lives. Groups undertook collective action to accumulate financial capital, diversify livelihoods, fill gaps in public service delivery, and mitigate negative impacts on members from drought. Group achievements and ambitions for the future were impressive. In contrast to this situation, only 200 km to the north, on average, the pastoral women of semi-arid, southern Ethiopia—long studied by researchers—continued in a very traditional way of life. Households remained poorly diversified and wholly dependent on livestock production, despite increasing population pressures that have reduced the per capita availability of natural resources and thus have undermined pastoral livelihood sustainability. Cooperative behavior among such households was limited to mutual assistance concerning livestock management. The differences in culture and behavior between the Kenyans and Ethiopians was remarkable given the short distance of separation and the fact that most were members of the same ethnic group, the Oromo Boran. The PARIMA team, along with Kenyan partner CIFA, thus decided to bring the Ethiopian and Kenyan women together to share their experiences. This began with a cross-border tour involving 15 Ethiopian women who visited six of the Kenyan women's groups in 2001. The subsequent five years have been witness to extraordinary changes in southern Ethiopia as a result. Over 60 collective action groups have been formed with total membership exceeding 2,000 individuals. Change has occurred in terms of women's empowerment, livelihood diversification, demand for education, and involvement in livestock marketing. We conclude that exposure to peer innovation has been the most important factor in the proliferation of collective action among pastoralists in southern Ethiopia. Development of social capital via collective action is a major intervention pathway for people in harsh environments where the prospects for impact via production technology are poor. International border restrictions, in tandem with lack of opportunity or incentives for pastoral women to travel and interact, can create significant barriers for the diffusion of innovations. Bringing local people together via exchange visits and cross-border tours are thus important mechanisms to accelerate positive change. Applied researchers can create new and meaningful roles for themselves by freeing themselves to act more as catalytic change agents and then use their analytical and communication abilities to document and disseminate success stories.

Linking Child and Soil Nutrition: Social and Institutional Innovations in Malawi

Lizzie Shumba, Rachel Bezner Kerr, Rodgers Msachi

This paper describes institutional, technical and social innovations carried out by the Soils, Food and Healthy Communities Project of Ekwendeni Hospital in northern Malawi. The SFHC project uses an institutional innovation, in which a hospital has linked with a local farmer group to improve soil fertility, food security and child nutrition. Technical innovations involve the 'doubled-up legumes' system of intercropping pigeonpea and groundnuts followed by maize and pigeonpea. The project, which involves participatory testing of legume options to improve child nutrition and food security, has seen dramatic increases in farmer participation, use of legumes and burial of crop residue. Social innovations, which emphasize linkages between agriculture, nutrition and family cooperation, include recipe days to promote local and new recipes, agricultural apprenticeships between farmers, involvement of grandmothers in nutrition research teams, crop residue burial promotion days and multi-generational 'agriculture and nutrition discussion groups' to improve child nutrition. The Farmer Research Team developed an important political role in local village politics, which was intimately tied to the institutional role of the hospital with which it was associated. The project's success lay at least in part in the social and political role of the Farmer Research Team, and the meaning implied in the technologies as

'alternatives' to fertilizer, rather than merely in the technologies themselves. Gender dimensions were an important aspect of project involvement, since there was a high percentage of female farmer participation. The project has been closely associated with child nutrition, which is another factor in its success. The participatory approach, using farmer research teams and mother-baby trials, along with the emphasis on nutrition as the primary reason for legume adoption, is another reason the project has spread rapidly, beginning in 7 villages to now working in over 100 villages. The challenge for the project members now is determining institutional frameworks that will allow these innovations to spread beyond the local region.

Scale-Up of Napier Fodder: A Case of Institutional Innovation in Small Farmer Dairying
VL Prasad, PG Bezkorowajnyj, K Gurava Reddy, VK Mahesh and D Romney

Based on a formal diagnostic survey and subsequent focus group discussions (FGD) with farmers an improved variety of hybrid napier sourced from the Agricultural University was provided to 100 select farmers as part of a 3-year project aiming at enhancing the livelihoods of poor livestock keepers by improving availability of fodder in India. The original idea was that the recipient farmers would demonstrate the improved fodder technology and share the planting material with other farmers. However, in practice an institutional innovation in the form of fodder market emerged between resource farmers and other small farmers and the landless. The small holder farmers leased in either 500, 1000 or 1500 square meter areas each by paying annually Rupees 300 (US$7) for the grass harvested from 40 square meter area in 12 cuts. Over a 2-year period 15000 smallholder farmers in 400 villages sourced napier grown in 600 hectares by 3000 resource farmers. The lease agreements entailed that seller farmers provide, besides a standing crop of napier, water required for irrigation and that the buyer would be responsible for irrigation, fertilizer application and periodic harvesting of fodder. Thanks to the institutional arrangement, small farmers and the landless could profitably access green fodder, which otherwise remained a preserve of resource farmers. For the seller farmers the income from napier compared very well with that from the alternative crops. The milk union is also a beneficiary with the improved milk production. Seller farmers, buyer farmers and the milk union anchored the scale-up of napier because it addressed their self-interests and needs. The paper discussed the importance of coalitions of actors in generation and application of knowledge towards enhancement of livelihoods and poverty reduction.

Mechanisms for scaling-up tree domestication: how grassroots organisations become agents of change
Ann Degrande, Jacques Kanmegne, Zac Tchoundjeu, Marie-Laure Mpeck, Thaddee Sado and Alain Tsobeng

Since 1998, the World Agroforestry Centre, in collaboration with a range of partners, has been developing a participatory approach to domestication of indigenous trees. Tree domestication, defined as an *accelerated and human-induced evolution to bring species into wider cultivation through a farmer-driven or market-led process*, aims to diversify smallholder farming systems through the cultivation of indigenous trees to increase income and reduce slash-and-burn practices. A major research topic has been the adaptation of the tree domestication process to farmer conditions. To this effect, experiments on selection and propagation of superior trees, their integration in farmers' fields and the marketing of trees and tree products have been carried out with farmer groups in pilot sites. Today, the challenge is to develop ways to extend these successful tree domestication options to other communities. Therefore, in its scaling-up effort ICRAF is evaluating different approaches for efficiency. One of the approaches tested is to assist NGOs and other extension services in the dissemination of tree domestication techniques by providing them with knowledge and logistical support (e.g. transport facilities and incentives for field staff). Another method is to build training capacities of farmer leaders, so that they become agents of change in their communities and beyond. In both cases, the first step is to set-up a resource centre for training and diffusion. This is a learning site where farmers come to discover

and experiment with the new technologies, before taking the skills back to their own communities. Thirdly, through active participation in strategic meetings and through media exposure, ICRAF is trying to put tree domestication on the agenda of national and international development and conservation organisations, which are searching for innovations to raise farmers' income in an ecologically friendly manner. The objectives of linking up with these organisations is to make tree domestication options known to their network of beneficiaries and to tap into existing funding mechanisms to finance community-based initiatives. Results obtained so far indicate that the success of any of the scaling-up methods depends in the first place on the motivation and commitment of the partners (NGOs and extension services, farmers, development or conservation organisations, respectively), in addition to their financial and human capacity. Regarding human resources, it seems that successful disseminators of tree domestication dispose of a well-balanced combination of technical, relational and communication skills, which makes them convincing to farmers. Although most of these characteristics are more or less innate, training in particular aspects would enhance partners' capacities to extend innovations. Lastly, experience in the field shows that none of the scaling-up mechanisms alone can reach the level of adoption required to impact on farmers' lives and the environment at larger scale. Therefore, a winning scaling-up strategy for tree domestication must essentially be a combination of the dissemination pathways described above, probably in addition to others.

Innovation in Quinoa Cultivation in Bolivia: Effects of social interaction and absorptive capabilities of small producers

Jose Luis Soto

Innovation in Bolivian agriculture is of primary importance for its productive development; the agricultural sector is characterized by insufficient use of advanced knowledge and technology in production and processing, despite the continuous efforts of public and semi-public research and extension agencies and the development cooperation. A common hypothesis to explain low innovation rates in agriculture is that knowledge and technology provided through various development initiatives does not match with local absorptive capabilities in the farming community. This report analyzes the relationship between the use of elements of innovation packages in quinoa cultivation and the absorptive capabilities in farming communities mostly characterized by scarce resource endowment. It is the result of a study in four quinoa producing micro-regions of the Bolivian Altiplano where different innovation packages in quinoa cultivation have been promoted through various research and technology transfer organizations. The study aimed at identifying factors that contribute to the use of these packages. 120 producers were interviewed. This information was complemented with the interviews of key actors and knowledge and technology providers in the quinoa sector. The data was analyzed with descriptive statistical tools as well as econometric methods and social network analysis. The study focused on three general factors determining innovation: (1) the utility of the innovation package transferred by different technology providers, (2) the individual absorptive capability of the producers who potentially can adopt the package and (3) the collective absorptive capabilities, referring to the networks and interactions which allow the agents to exchange knowledge and information about the packages. The use of innovation was indicated through a cumulative indicator of use of the various elements of the innovation packages. Results show that the level of use varies between the different innovation packages; those differences can be explained through socio-cultural and agro-climatic conditions in the different study regions and the destination of the production (if it is for home consumption or for marketing). The levels of adoption range from medium to low. The apoximate average degree of use of the PROINPA package reaches 62%, for the South Altiplano package it is 56%, for the PROSUKO package it is at 40%, and in the case of CETHA-PAIS it is 26%. In conclusion, the collective absorption capability is important to enable farmers to innovate, however the current structure of linkages and interactions in the quinoa producing regions analyzed are deficient. To involve the small-scale farmers more intimately in innovation and development of the quinoa sector adaptation of the innovation packages to be promoted to the individual absorptive capabilities of the producers must be assured. Contributions to the enhancement of the individual absorptive capabilities of the producers through providing better

access to finance and credit and conducting intensive interactive training and awareness building exercises, must be made.The sector must promote and intensify the interaction with technology transfer and extension agents, as well as buyers and input providers, in the way that it enhances assimilation capacities in groups and improves processes.

THEME 5: MARKET-LED INNOVATION IN AGRICULTURE

Enabling Rural Innovation in Africa: An Approach for Empowering Farmers Exploit Market Opportunities and Improve Livelihoods

S. Kaaria, A. Abenakyo, W. Alum, R. Best, C. Chisike, R. Delve, I. Kahiu, P. Kankwatsa, E. Kaganzi, R. Muzira, G. Nalukwago, J. Njuki, P. Sanginga, and N. Sangole

This paper presents lessons from applying an innovative approach for linking smallholder farmers to markets. This novel approach entitled, *Enabling Rural Innovation (ERI)*, aims to strengthen social organization and entrepreneurial capacity in rural communities, encouraging farmers to produce what they can market rather than market what they produce. The approach focuses on fostering community-based capacity for the inclusion of rural women and the poor in analyzing and accessing market opportunities (domestic, regional and international), using a territorial approach to agro-enterprise development. ERI is based on three underlying principles: (i) Applying a Resource-to-Consumption conceptual framework that builds two-way linkages between community assets (natural, human, social, physical and financial) and production, with post-harvest handling, market opportunities and household consumption, and stimulating investment in the resource base. (ii) Balancing the dual needs of increasing household food security and income generation. (iii) Application of participatory methods for research and development that ensure the involvement of farmers as decision-makers and active partners in the processes of co-innovation. These principles are being tested and validated in action research with a range of research and development partners in selected learning sites in eastern and southern Africa. An assessment was conducted to understand impacts of applying this approach on rural women and the poor in terms of income; intra-household decision-making; control and access over resources; empowerment, and investment in assets. Preliminary results show that: Poor rural households, especially female-headed, benefited significantly from linkages to markets using ERI approach, however, the results also showed significant income benefit disparities between the wealthy and poor households. The average percentage of female farmers participating in agro–enterprises is 40%, and that applying the ERI approach is changing gender decision making patterns at household level towards more gender equity. Households made significant income benefits from the sale of their enterprises. For example, in Uganda total income earned by households from the sale of potatoes in 2005 was about USD 50,000, of which 45.6% was managed by women. Households invested their income on household items, livestock, savings, sending children to school, improving their houses, and in some instances women purchased plots to plant potatoes. However, the largest benefits were expressed in terms of increases in human and social capital. The results showed that rural women have increased their skills in analyzing and understanding markets, in conducting experimentation and are taking on leadership positions in project activities. These preliminary results demonstrate that ERI can be an effective approach for empowering communities to exploit market opportunities and improve livelihoods, equitable. This approach is now being validated in different contexts.

"Give Us… Our Markets!" Facilitating Transactions and Retaining Added Value Locally

Lassalle, TJ and Ruvuga, SR

"Give us a market!" has become the outcry of most rural livelihoods in a developing country like Tanzania. From an often-inefficient state controlled market to a free trade liberalised economy, small-scale farming communities have seldom been given a voice or a role to play in the search for outlets for its products, nor have they been prepared for the challenges of free market

economy. In the mid nineties, MVIWATA, the Tanzanian National Network of Farmers' Groups, launched a national reflection on the role of Small-scale farmers in a free trade economy in Tanzania. They identified some positive experiences where local groups managed to set conditions to develop local half-bulk markets that attracted traders and boosted the local economy. MVIWATA recommended that such markets infrastructure being upgraded to support local initiatives. From 2002 to 2005, MVIWATA has been commissioned by the Government of Tanzania to execute a Rural Market Development Project (RMDP) to upgrade infrastructure linked to existing half bulk markets in 3 selected districts. Through an action training support, sustainable management mechanisms had to be set up to ensure that all market stakeholders benefit from the new infrastructure. MVIWATA faced a three faceted challenge:

- To ensure permanent conducive conditions for transactions to occur in a sustainable way
- To ensure a fair sharing of the added value amongst the economical actors in the chain
- To plough back in the local community some of the wealth produced on the market

MVIWATA, through its local networks, created autonomous registered companies to manage the markets. The farmers' organisation holds the shares of these Companies Limited locally known as "market board". Contracts have been established with the local authorities for the companies to open half-bulk markets and collect levies on behalf of the district councils. Local market boards ensure that transactions can be held with the required level of quality services (market access, security, cleanness, weighing procedures, storage…). Representatives from main stakeholders are represented in the Market board that regularly correct, through the negotiation of new bye-laws, deviant practices that tends to favour actors that are in a dominant position. Local Market boards reshaped the markets to give local actors an instrumental and permanent role. Beyond these achievements, new challenges are now to be addressed: are the services provided by the market board effective and cost worth? Is the level of fairness of the sharing of the added value adequate? How transparent is the use of the levies paid to the district councils that are supposed to be ploughed back to benefit the whole society? MVIWATA, as shareholder of the Market Boards is too be constantly well informed and updated to support its market boards and to draw learnings from their experience to feed the national debate on the marketing of agricultural products policy. Once the market is there, the game is only starting…

Sustaining Gari Marketing Enterprise for Rural Livelihood: Farmers Indigenous Innovations in Southeastern Nigeria.

Ekwe, Kenneth Chikwadom

The ugly effects of poverty on the rural dwellers are vividly expressed in the deplorable state of their living conditions. Part of efforts of policy makers in arresting the ugly situation is the current campaign for development of meaningful and sustainable livelihoods for the rural households which will thrive on the effective use of available natural, materials and human resources. In Southeastern Nigeria, gari processing and marketing enterprises have gained wide acceptance and have been enmeshed into the socio-economic activities of the rural ouseholds.This paper seeks to x-ray farmers' creativities and experiences in developing indigenous innovations as imperative backups for sustenance of gari market enterprise which has emerged as an important livelihood for many rural households in South Eastern Nigeria. The innovation processes hinge principally on adjustments in mechanisms of Gari processing for household consumption and markets as well as optimizing the use of existing market potentials for the commodity. Specifically, farmers developed new strategies for making large quantities of gari available at the both urban and rural markets all year round in a conscious effort to capture opportunities provided by the ever increasing gari market demand to enhance their livelihood. The dividends of these innovative strategies to rural households in the zone are quite enormous. There is increased food production for the households; efficient processing of cassava into gari; large quantities of gari are processed and sold by farm households which provided both employment and cash income to members; several service provider emerged to facilitate the gari market all contributing to a synergic network for the development of micro agro-enterprise for the commodity. Statistics show that by these efforts, poverty among rural households in the study area is substantially alleviated while living standards are significantly improved. Innovation processes for sustaining gari market in the study area were substantially facilitated by adoption and large scale diffusion of improved

gari processing technologies disseminated to farm households by extension agents. On the other hand, the appropriateness of the improved processing technologies invariably stimulated certain interests and entrepreneurships in marketing of gari hence the wide spread adoption and diffusion of the technology in the study area. Lessons to learn from the farmers' efforts' include the following: (a.) that farmers possess certain creativeness and ingenuity in devising and initiating innovation processes to explore opportunities for enhancing their livelihoods. (b) The entrepreneurial endeavours of rural inhabitants are stimulated easily through innovative of local resources and practices. (c) Integration of improved technologies into farmers'indigenous innovation processes is indispensable. (d)market driven innovations for rural livelihood enhancement have in turn resulted to several other opportunities and possibilities which are being explored by rural dwellers. It is thus recommended that market channels and structures be developed in the study area as means of assisting rural households optimize the benefits of gari market enterprises for enhancement of their livelihoods. Again, the improved processing technologies can be made more available to rural people by establish gari processing centers at the rural communities as well as supporting rural groups own prototype gari processing machines.

Success factors for organising smallholder producers for certified organic production and marketing. Experiences from Uganda

Florence Nagawa, Alastair Taylor and Bo van Elzakker

Successful organisation of small holder producers to attain organic certification is a great opportunity for better market access, thus improved income. Organisation of smallholder producers for collective production and marketing is a concept that is been long sought after by many developmental projects. Several experiences from elsewhere have showed that they are key factors that are critical for organising a sustainable small holder producer and marketing project. The export promotion of organic products from Africa project (EPOPA) has demonstrated and learnt some key lessons and elements that are required for organising farmers for organic production, certification and marketing in the last thirteen years of its operation in Uganda. The innovative ways that have led to the successful organisation of small holder producers for certified organic production and marketing in Uganda, and the factors that have proven critical for this success are analysed and discussed in this paper.

BOOM OR BUST: Strategies to exploit market opportunities for Kabale apples in Southwest Uganda.

Gard Turyamureeba, George Cheminingw'a, Imelda Kashaija and Richard Hawkins

Uganda policy of poverty eradication under overall guidance of Poverty Eradication Action Plan (PEAP) and Plan for Modernisation of Agriculture (PMA) calls for high value enterprises that can have high return to investment for farmers. National Agricultural Research Organisation (NARO) and its development partners has been having rigorous priority setting exercises to identify agro-enterprises that can lead to rapid reduction of poverty levels especially at rural households level. It is against this background that apple was selected for introduction and promotion in the highland agroecological environments of Uganda. Apple (*Malus domestica* (L), a temperate deciduous crop is a newly introduced agro-enterprise in the highland agroecological environments of Uganda. The first trials of several temperate fruits including apples, pears, peaches, plums, grapes and figs were established by NARO in collaboration with ICRAF between 1999 and 2004 with the main objective of assessing their adaptability and fruit performance. Preliminary finding were that several cultivars of temperate fruits could easily flower and set fruits that are of marketable value. Two cultivars Anna and Golden dorset are already being grown by farmers and with yields of up to 200 fruits per tree per season. However a lot remained unknown especially post harvest handling, processing, farmer association linkages, and overall market chain analysis needed to be evaluated before full promotion of these commodities could be

carried out. In 2005, NARO requested ICRA to carry out a detailed analysis of the apple production chain in Kabale district. Using the IAR4D approach the team interviewed all stakeholders in the apple enterprise including farmers, traders, administrators and processors.
The study found out that apples had the potential to be produced in Uganda. It however found out that several strategies must be put in place if it has to be fully beneficial to apple growers. The analysis was based on the ecological, technical, economic and social perspective and develops a strategy that can contribute to apple becoming a significant crop in the South Western Highland of Uganda in particular but offer guidance to it becoming a regional high income crop for smallholder farmers. Stakeholders in the apple enterprise, their linkages, weaknesses are discussed. The paper compares and contrasts stakeholders linkages that ere necessary for a future production and marketing system that can compete with the current imports from abroad especially South Africa. This paper highlights the main strategies and innovative mechanisms to implement them are suggested. Recommendations are also given about the environmental, socioeconomic, and biophysical consequences that might be associated with the promotion of apples in Uganda. If apple is to boom in future rather than burst, lessons from previous commodity introductions in the zone that failed to establish like pyrethrum will be brought out clearly.

Rural Market Imperfections and the Role of Institutions for Collective Action to Improve Markets for the Poor

Bekele A Shiferaw, Gideon A Obare, and Geoffrey Muricho

Market liberalization is a necessary but not sufficient condition for increasing access to markets by smallholder farmers in many countries of sub-Saharan Africa. The expected positive response by the private sector in many areas with limited market infrastructure has however been disappointing, leaving a large number of smallholder farmers under subsistence production and, therefore, unable to benefit from liberalized markets. Structural problems of poor infrastructure and lack of market institutions needed to fill the vacuum left when governments withdrew from markets in the process of liberalization contribute to high transaction costs, coordination failure and pervasive market imperfections. This realization has necessitated new kinds of institutional arrangements to enhance the uptake of market-oriented and productivity-enhancing technologies, link farmers to markets and foster market participation and commercialization of smallholder production. One of these institutional innovations has been the strengthening of producer organizations and formation of collective marketing groups as instruments to remedy pervasive market failures in rural economies. The analysis presented here has shown that while collective action – embodied in Producer Marketing Groups (PMGs) -is feasible and useful, external shocks and structural constraints in the system require farmer organization and coordination mechanisms at a higher scale to exploit scale economies. Recurrent droughts in semi-arid areas and low productivity of soils reduce marketable surplus and increase vulnerability and attenuate the benefits of collective action. The continued existence of PMGs under such circumstances depends on the ability to organize farmers at a higher level of coordination (e.g. district), and their ability to tackle technological and financial problems that now limit crop yields and the amount procured in a given season. It is evident that marketing channels in the study areas are characterised by long and complex marketing chains and high transaction costs which considerably lower the farmers' share of the consumer price. Producer marketing groups have the potential to simplify and shorten the marketing chain by directly connecting small producers to secondary and tertiary markets; better coordinate production and marketing activities and facilitate farmer access to production inputs at fair prices. Even so, only relatively successful PMGs will be able to exploit this potential. The effectiveness of this collective action was reflected in the larger volumes of grain transacted and capital assets held by the group. The effectiveness of collective action in terms of these performance indicators was found to be a function of the level of collective action in the form of increased participatory decision making, member contributions to the PMG, and initial start-up capital. Hence, better performing groups in terms of collective marketing, showed evidence of high levels of collective action. The higher the levels of collective action, the more successful the PMGs were in terms of monetized per capita assets

built over time and also the per capita grain volumes traded. The number of elections held, initial start-up capital and membership fees were all positively associated with group performance, while the number of villages covered by the PMGs, distances to markets and group size seem to have the opposite effect on group performance. The challenge therefore is to sensitize members on the democratic principles of participatory group governance through elections, to provide initial start-up capital to kick-start their operations, and to encourage members to increase their registration fees for membership to raise the necessary minimum capital. This calls for interventions that will improve governance and democratization of the PMGs; solicit for external support in establishing a start-up capital base; and encourage increased annual contributions to the PMGs by the membership. This will need to be coupled with training of managers and possibly members of the PMGs in business skills to facilitate effectiveness and accountability in running the PMGs as business enterprises. In addition the PMGs have to be registered as legal business entities and not as self-help groups, which restricts their ability to access essential business services. Although the PMGs demonstrated that they could fill gaps in the marketing channels and pay better prices to farmers, their effectiveness was hampered by their lack of cash capital to pay for produce deliveries by farmers. The brokers and rural wholesalers who can pay cash on delivery were still dominant market participants in rural grain markets. The PMGs on average required some five weeks to pay the farmers after grain delivery. Cash constrained farmers find it very difficult to wait for that long, even when the PMGs' would eventually be in a position to pay prices significantly higher than other buyers. Hence many small producers choose to sell their grain to other traders although this may mean receiving lower prices. Therefore, until the PMGs are able to pay promptly for deliveries made (even if it means a proportion of the final price) small producers will not be in a position to benefit from market opportunities opened through collective action. There is thus a need to enhance the ability of the PMGs to access working capital through access to financial credit. An innovative strategy would be to use the PMG crop inventory before sale as collateral for financial credit and to subsequently encourage formal financial institutions to extend ware-house or inventory credit services to the PMGs. This is critical to enable PMGs to overcome the binding liquidity constraints and facilitate effective coordination of the marketing functions for small producers. In addition to credit, the experience in eastern Kenya shows that collective marketing activities are constrained by, low volumes, price variability and low business skills. The formation of an umbrella union of PMGs may help in addressing the problem of low volumes and price variability and lack of credit. Low transacted volumes are attributed to delivering of small quantities of grain by producers. This may be due to drought conditions, low productivity of traditional agriculture and weak incentives to sell through the PMGs. Moreover, the farmers are scattered over a wide area making coordination costly and difficult. This calls for enhanced institutional arrangements for better vertical and horizontal coordination of marketing functions according to manageable spatial units. A union of PMGs (under an umbrella body) may ease the market coordination constraint, thus lowering the coordination costs. This option would enable the PMGs to vertically coordinate transactions in addition to facilitating access to a broad range of buyers at the upper end of the marketing chain. The seasonal price variability may also be exploited through bulking and storage during periods of excess supply and selling when prices improve as the supply diminishes. The alternative option for smoothing supply will require investments in drought mitigating and water harvesting techniques that would enable farmers in drought-prone areas manage production risk more effectively. External support for strengthening existing institutions and collective investments in integrated watershed management may also generate significant economic and environmental benefits to the affected communities.

Partnerships for enhancing Market-led Innovation processes – Experiences and Lessons from IPMS Ethiopia

Ranjitha Puskur, Ponniah Anandajayasekeram, Kahsay Berhe and Dirk Hoekstra

The IPMS project proposes to 'contribute to improved agricultural productivity and production through market-oriented agricultural development, as a means for achieving improved and sustainable livelihoods for the rural population' in Ethiopia. The focus areas in which the project is

investing include strengthening innovative knowledge management systems; capacity enhancement of public agricultural institutions for promoting innovative extension systems and that of private sector for contributing to innovation processes and; contributing to evidence-based policy making to support innovation processes and capacity development. Adopting the Innovation systems perspective, the project acknowledges multiple sources of innovation and the critical role of institutions. The activities deploy the use of partnerships and linkages along the value chain to promote complementary investments in necessary areas and sectors to generate innovations and impact. Innovative approaches to production, NRM, technology adaptation and delivery, service delivery, marketing and, institutional change, linked to market demands and the capacity of the communities and its individual members to handle such innovations in a sustainable manner are being introduced and adapted in pilot sites. Learning from these experiences is an integral aspect to draw lessons for scaling up. This paper summarises the experience of IPMS in developing and nurturing innovative partnerships and lessons learnt, to date.

Maginata verde and pine-apple in Costa Rica: How can farmers face the market needs for production standardisation and take into account the diversity of agricultural practices?
Guy Faure, Henri Hocdé, Eduardo Chia,

The small scale farmers face new challenges to export their products and address the market needs for respecting standards or for producing homogeneous products. In Costa Rica a pine-apple farmers' organization had to adopt an EurepGap certification at farm level to export to Europe. A ornamental plant farmers' organization need to regularly produce an homogenous product to satisfy the clients needs. But the farmers have different ways to produce according to their objectives, means, and constraints. How can the farmers face the market needs, for product standardization and/or respect of standards, and recognize the diversity of farmers pratices ?
Two research-action in partnership were implemented to analyse the problem and identify solutions with farmers based on the principles detailed on the text. The farmers' organization boards with research representatives were in charge of managing the innovative process. Surveys about farmers practices were carried out and the results were discussed with farmers' committees to identify practices dealing with market needs and farmers realities. They identified different ways to produce, more or less labor or input-intensive, according to different strategies developed by farmers and to the market needs. A guide book were elaborated to recognize and synthesize all the debates leading to a recognition by the farmers' themselves, by the technicians, and by the clients of the local knowledge and the farmers' capacity to create innovations. All the process generates innovations inside the farmers' organizations and learning processes for farmers empowerment at individual level and collective level.

THEME 6: BUILDING CAPACITY FOR INNOVATION SYSTEMS

Building inter-institutional capacity for rural innovation: Experience from Uganda, Kenya and South Africa.
Richard Hawkins, Robert Booth, Colletah Chitsike, Emily Twinamasiko , Moses Tenywa, George Karanja, Thembi Ngcobo and Aart-Jan Verschoor

Since 2004, R&D partners in Uganda, Kenya and South Africa have been working with ICRA to improve the capacity for rural innovation or "Integrated Agricultural Research for Development" (IAR4D). The overall strategy followed in all three countries consists of 4 components: (i) building inter-institutional steering groups that increase awareness of the need for collective action and oversee joint capacity building (CB) initiatives; (ii) building a national team of facilitators that designs and implements in-country CB programmes; (iii) strengthening the skills of current professionals and the ability of their institutions to work together to promote rural innovation; and (iv) reviewing and revising the academic teaching programmes that produce future professionals.

In all CB programmes, the main principle is to combine knowledge acquisition (e.g. on systems concepts), and skills development (e.g. in team and group processes) within the context of a programme of action-reflection-documentation where inter-institutional teams address a shared development challenge or "entry point". These entry points can be formed around a particular product or commodity, or a particular natural resource management issue. The important point is that the CB programme directly involves the different stakeholders with a collective interest in innovating or resolving a particular issue. In all three countries, national steering groups and teams of CB facilitators have been formed. In Uganda one in-service "learning cycle" was carried out in 2004-2005, involving staff of NARO, MAK and local government, working in teams around priority issues identified by the 7 Agricultural Research and Development Centres (ARDCs). A system of "mentoring" has been established by NARO and MAK working together to support IAR4D at the ARDCs, identify continued CB needs and opportunities for new programmes at MAK. In S. Africa, two "in-service" learning programmes were carried out during 2004-2005, with staff of the ARC and Provincial Departments of Agriculture (PDAs), working on issues identified by the PDAs. Work with review and revision of tertiary education is only just beginning, with the establishment of In-House Committees at 5 participating Universities, and seven collective MS programmes being planned at these universities together with Wageningen Agricultural University. In Kenya, efforts have focussed on initiating the development of a pilot IAR4D learning site and on obtaining the commitment of participating organisations at various levels. A number of lessons have been learned in the implementation of these programmes that relate to individual and institutional involvement. One challenge is how to sustain teams when individuals already have heavy commitments or take up new opportunities. The integration of CB activities within ongoing programmes, work plans and budgets across multiple organizations – at both local and national levels - requires patience: it takes considerably more planning and follow-up than normal "training programmes", and requires intensive sensitization of institutional heads, strategic units and new institutions (including funding organizations). At the same time, CB needs to be opportunistic and "development-led", rather than respond to the needs of individual institutions for personnel development. More generally, focus and loyalty has to be changed from an institutional basis to one of a collective challenge – not an easy change.

Developing Systemic Skills to Foster Innovations in African Universities: The Personal Mastery/Soft Skills Experiment at Makerere University, Uganda.
Jürgen Hagmann, Paul Kibwika, Adipala Ekwamu

There appears to be generally a broad consensus that the multidimensional nature and complexity underlying the critical problems of Africa such as poverty, food insecurity and disease urge for integrated and holistic views and approaches to deal with the challenges successfully. Innovation systems approaches are promising, but in practice they require new mindsets and competences for systemic thinking, institutional interfaces and partnerships – all skills which are not mainstream at present. Universities as the prime centres for developing human resource in research and development are expected to integrate the required competences in their training and research programmes. However, universities themselves need to develop those competences first. In their programs, universities need to go beyond a disciplinary focus and integrate cross-cutting social skills that can enable them and their graduates to influence change or development impact in society. Often curriculum review is seen as a solution, but in reality, even before considering curriculum review, it is critical that they deal with the basic elements of changing mindsets, and building a new vision and new skills for training and research amongst the academic staff. This paper is based on an action research initiative towards reorienting mindsets and building complementary 'systemic' and 'soft' skills among university lecturers for holistic and interactive learning; and impact oriented research and consultancy. The approach was named 'Personal mastery' and was applied as an entry point to change in attitudes and creating alternative worldviews and skills. The initiative was conducted with 26 lecturers from three agriculture related Faculties of Makerere University over a period of two years. It was set-up as a rigorous action research project based on four pillars: learning workshops, practice to apply what is learnt, peer-learning/coaching groups, and self learning. The action research 'experiment' was rigorously assessed through multiple perspectives involving participants' self-assessment,

their managers' assessment, and assessment by an independent assessment team nominated by university managers. The outcomes and impacts of this action research demonstrate overall enhancement of personal and professional development profiles of the lecturers which resulted in better teaching and interaction with students, the move towards action research in their work and proposals, and the fact that many members of that group have become consultants and facilitators in demand within the universities and outside. Another indicator for their self-development has been the rapid promotion of more than a third of the group into major management positions in the university within a short time. Generally the assessment brought out the following outcomes: enhanced self-awareness and taking action to develop their full potentials; the abilities to influence change in the university system through feedback; taking initiative to work in team and promote peer-learning; facilitation skills for interactive learning and collective action processes; overcoming fear to try out new things as reflective practitioners; communication for problem solving – negotiation, conflict resolution; and thinking beyond disciplinary boundaries to influence development impact through action research and process consultancy. A direct impact of all this factors was that the previously rigid boundaries between faculties have developed into a fluid collaboration and exchange which had never been possible before. Using a practice based learning wheel methodology, concepts and operational frameworks for interactive learning in university context; designing and managing impact driven action research; and managing an effective consultancy process were developed. The potentials, implications and challenges personal mastery for other spheres of innovation systems development will be highlighted. Implications for design, implementation and institutionalisation of such initiatives as well as lessons learnt will also be discussed in this paper.

Building competencies for innovation in agricultural research: A synthesis of Experiences and Lessons Learnt in Uganda
Akullo, D., Harro, M., Kashaija Iand Ayo, G

Agricultural research organizations face a critical challenge of adequately reaching their intended recipients with desired technologies and re-orienting agricultural productivity for market besides producing higher yields. To rise up to the challenge, the national agricultural research organization (NARO) was reformed with a new research strategy that highlights the need for institutional innovation. And based on more grounded discussions, NARO recognized that to build on the successes it recorded with the FPR approaches coupled with its challenges required amongst others, working in partnership with other institutions, involving multi-disciplines and enhancing the competencies of researchers to initiate and facilitate far-reaching research processes. To realize its vision, NARO initiated a collaborative learning initiative with Makerere University (MAK) and International Centre for Development Oriented Research in agriculture (ICRA). Enhancing capacities of individuals and institutions needed for teamwork and partnership in an innovative process was complex. This required what ICRA defined as an Integrated Agricultural Research for Development (IAR4D) approach. NARO contracted a private consulting firm to run the personal mastery programme along the IAR4D approach. Both approaches were expected to strengthen human and institutional capacity to implement Agricultural Research for Development (AR4D) as a new way of doing business, initially in Uganda and later, at sub-regional level in association with ASARECA. It was designed to (a) enhance and mainstream within NARO the capacity of teams to apply IAR4D approaches (b) strengthen and institutionalize the ability of MAK to provide capacity-enhancing opportunities in IAR4D for many stakeholders at various levels (c) regionalize such capacity strengthening efforts.

Competence Challenges of Agricultural Innovation Systems in Sub-Saharan Africa: Experiences of Demand-led Agricultural Research and Extension in Uganda.
Paul Kibwika, Arjen E.J. Wals, Maria Goretti Nassuna-Musoke

The traditional linear model which suggests that innovations are developed by scientists, disseminated by extension and put into practice by users has failed. The Sub-Saharan Africa is a

good example of this type of system failure. Governments and development agencies are experimenting alternative approaches which tend towards innovation systems paradigm. In Uganda, the Plan for Modernisation of Agriculture (PMA) shifted extension and research from being supply-driven to demand led systems. The shift resulted into the National Agricultural Advisory Services (NAADS) and the "new" National Agricultural Research Organisation (NARO). While the shift is desirable for impact on poverty, it can be severely curtailed by lack of matching competences. This paper discusses competence challenges of demand-led agricultural research and extension in Uganda. It is based on experiences of a collaborative initiative for capacity building in Integrated Agricultural Research for Development (IAR4D) between NARO, Makerere University and ICRA-Netherlands; and documentary review on NAADS programme. The paper is neither an evaluation nor a critique of research and extension, the intention is to point out critical emergent competence challenges that need addressing to make the shift from supply-driven to demand-led approaches more beneficial and sustainable. Challenges of implementing IAR4D include how to: develop and maintain effective partnerships; empower farmers to demand and actively participate in research; design and manage quality integrated research; develop and maintain multi-disciplinary teams throughout the research process; cope with the dynamism of socio-political and ecological environment; instil a culture of honesty, ethics and transparency; mobilise and manage resources from multiple partners; and appropriately reward, motivate and retain high quality personnel. Similar challenges apply to extension but specifically they include how to: provide advisory and information services with a system focus through contracted service providers; move away from training and demonstrations to learning and experimentation with farmers; develop strong farmer institutions that can articulate quality service demand and foster accountability for services and resources; and build the capacity of private service providers to effectively deliver services. Based on these challenges, key competences for the supply (research and extension) and demand (farmers) sides are suggested. The supply side will have to be able to facilitate action learning and experimentation; broker information and knowledge exchange; develop and support empowerment of local organisations; think systemically; develop teams and work in teams; develop and manage partnerships; and enhance enterprise development. The demand side too has to be able to self organise; lobby, advocate and negotiate; have visionary and accountable leadership; learn and experiment; and have entrepreneurial skills and attitudes.

Integrating stakeholder Perspectives in Monitoring and Evaluation Systems of Formal Research and Development Organizations: Strengthening Capacity for Participatory Monitoring and Evaluation

Jemimah Njuki , Susan Kaaria, Colletah Chitsike, Pascal Sanginga and Festus Murithi

Participatory monitoring and evaluation (PM&E) offers new ways for strengthening learning and change both at community, project and institutional level. PM&E can and has been used for various purposes, including project planning and management, organizational strengthening and learning, understanding and negotiating stakeholder interests, and the assessment of project outcomes and impacts. One of the biggest challenges for R&D organizations has been to involve various stakeholders in PM&E beyond the traditional role as information providers. The process involves scientists and communities negotiating and agreeing on what changes they expect from projects; what they need to do to achieve these changes; what local and scientific indicators will track these changes; and which success and failure factors need to be monitored to ensure that the projects are on track. The paper presents lessons and experiences from establishing and applying PM&E systems at both the community and project levels within KARI. It details the process strengthening the capacity of scientists and development workers to effectively engage communities in PM&E and in technical aspects of PM&E. It describes the PM&E implementation process including strategies for stakeholder involvement, identification and negotiation of objectives to be monitored, identification of community and scientific indicators, development of PM&E frameworks, data collection, analysis, reflection and use of PM&E results for decision making using a case study of the Kenya Agricultural Research Institute (KARI). The paper discussed the differences in objectives and indicators between scientists and communities as well

as between different social groups within the communities such as differences in perceptions and indicators for change between men and women. Results indicate that the involvement of different stakeholders especially communities enables scientists and development workers to engage their stakeholders in joint planning, developing common objectives and vision, and in collectively assessing progress. Scientists are paying more attention to issues and concerns of stakeholders and are adjusting project outcomes, outputs, and indicators based on stakeholder priorities. These results demonstrate that integrating local indicators with project level indicators provides a more holistic view of the benefits and impacts strengthens information feedback process between communities and R&D systems. This process also provides indicators for measuring the often hard to measure process level outcomes such as empowerment from the perspectives of the communities. Developing indicators and negotiating them with different stakeholders allows for the impact to be measured from the perspectives of different project stakeholders including women, the marginalized and the resource poor. Involving communities in PM&E also leads to more relevance of projects and to increased accountability of R&D organizations towards communities and beneficiaries. The challenges of such PM&E system are discussed.

Agricultural Research for Development (ARD) as approach to collective innovation in the resource poor agricultural sector: Describing ARD practise in the South African Tertiary Education, Research and Development system.

Aart-Jan Verschoor, Thembi Ngcobo, Petronella Chaminuka, Lindie Botha, Richard Hawkins, Colletah Chitsike, Driek Enserink, Juan

The South African agricultural scenario, with its complex dual setting, and its relatively low dependence on production due to extensive social security systems, requires an inter-institutional approach to enhance development. Due to SA's political history, the developing sector, or 2nd economy, in government terms, had a skewed development pattern over the past century. Since 1994 emphasis on this sector had positive results, but generally support services struggle to move away from an ad-hoc, poorly informed and poorly coordinated approach. Social reality in the developing areas (re-settlements resulting from land reform, or ex-homeland areas) is often not recognised nor aligned with R&D initiatives. The ARC, as the primary research organisation has been criticised extensively over the past decade for its lack of impact in the 2nd economy. The bulk of its scientific capacity has had, until very recently, limited knowledge, exposure or understanding of the social realities and dynamics of the 2nd economy. Due to government pressure, the ARC explored options to broaden its staff skills, in order to enhance impact. Limited collaboration with ICRA was initiated in 2000. In 2003 the Sustainable Rural Livelihoods Division (SRL) was created to facilitate R&D for the 2nd economy. SRL Management engaged ICRA in 2003 in order to facilitate ARD capacity development. It soon became clear that collaboration with public sector research and extension, housed in Provincial Departments of Agriculture (PDAs), was imperative. To ensure that the capacity development programme suited local conditions, a number of tertiary education institutions were also engaged. The SRL Division established and facilitated a National ARD Task Team (NARDTT) that oversees the broad ARD process in the country. A unit within the SRL Division, the ARC Technology Transfer Academy was subsequently established to deal with the ARD capacity development process in the ARC, and with partners. The in-service programme; consisting of a knowledge acquisition and practical implementation phase (expanded on in another paper), led to collaboration with six PDAs, whilst the need for capacity at higher learning institutions, led to five universities having individuals capacitated in ARD. The next breakthrough was obtaining significant funding through a Dutch organisation, which led to an ICRA office for Southern Africa, at the ATTA. The process of integrating ARD into the agricultural R&D and higher education system has gained momentum recently, resulting from broader understanding and exposure through the field studies, 10 lecturers being capacitated and funding for activities of the NARDTT. Milestones achieved in terms of capacity created, field studies completed and lessons learnt are elaborated upon in the paper. The challenge to create an environment for ARD practise, beyond capacity building into long term collective innovation and implementation is discussed, as are challenges related to achieve a mind shift in bureaucratic powers and processes, in obtaining participative buy-in from

PDAs, the capacity of stakeholders to contribute, and inherent reluctance of institutions to commit to collaboration, are described.

Encouraging university teachers and students to promote local innovation
Mitiku Haile and Fetien Abay,

Agricultural education in Ethiopia has paid little attention to local knowledge and innovation. Course content was based on western concepts for large-scale commercial production, but Ethiopian farming is dominated by smallholders growing for subsistence and local trade. Education should reflect this reality. Mekelle University (MU) recognised the need for change so that local knowledge and innovation become the basis for formulating agricultural research, extension and education programmes. It has being trying to move away from conventional teaching to a participatory learning approach and to instil appreciation for smallholders' abilities to produce under adverse conditions. In research, it emphasises practical solutions to rural problems, working together with farmers and communities. One strategy in making this change consists of arousing enthusiasm about farmer innovation. It is not enough just to design a new curriculum. The people who implement it and the organisations that will employ the graduates must be enthusiastic to teach and learn about local innovation and to engage in participatory development. MU has tried to raise this enthusiasm in various ways:

- exposing staff to farmer innovation and discussing implications for research and education
- stimulating media coverage through television, radio and the press to make farmer innovators' achievements more widely known
- organising travelling seminars to bring researchers, extensionists and farmers to sites of local innovation
- engaging regional and national policymakers in dialogue, through personal visits and exposure to innovators when opportunities arise
- coordinating a multi-stakeholder platform in Tigray Region, involving government research and extension agencies and NGOs, to promote local innovation in agriculture and natural resource management (NRM).

A module on participatory research has been incorporated into the "Research Methods" course given to all students of agriculture and NRM. National and international postgraduate students are encouraged to make field studies on farmers' innovation and informal experimentation, and to document and analyse participatory research. MU incorporates the experience of its many mature students from government, NGOs and development projects into university learning. During their several-month practical attachment, numerous undergraduate students document local knowledge and innovation, and thus learn to appreciate knowledge-intensive agriculture, respect local creativity and become committed to support endogenous development processes. MU has taken advantage of externally-funded projects, such as Indigenous Soil and Water Conservation (funded by the Netherlands) and Operations Research (funded by Ireland) to provide means for academic staff and students to engage in participatory innovation development and for staff training to support this change in ways of teaching and conducting research. MU has grown rapidly in the 12 years since it was established. This poses huge challenges to efforts to encourage participatory learning processes. It becomes increasingly complicated to arrange field trips and practical attachments for the growing number of students. Teachers with large classes find it difficult to facilitate active learning approaches and may be tempted to revert to conventional lectures and examinations. The faculty and students will need to be more innovative in how they implement action learning about agricultural innovation.

Innovation Response Capacity for Livestock Sector in Ethiopia
Ekin Keskin

In recent years, the global outbreak of diseases has excited much attention and has caught the attention of both private and public sectors. Moreover, sanitary and phytosanitary issues and quality concerns of consumers posted new challenges especially for the agricultural sector. The

ability of the companies, sectors and the governments to responsively innovate to these evolving and unpredictable challenges & opportunities is increasingly central to economic performance of developing countries. In this paper, we will try to explain what Innovation Response Capacity means and also come up with a framework to analyze it for the livestock sector. In doing this, we combine a number of conceptual perspectives: notably recent thinking on capacity development and innovation system concepts. The overarching aim is to apply this framework for the livestock sector in Ethiopia which is faced with many challenges and opportunities as well.

POSTER ABSTRACTS

THEME 1: CONCEPTUAL AND METHODOLOGICAL DEVELOPMENTS IN INNOVATION SYSTEMS

1. Strengthening Partnerships for Enabling Rural Innovation in Africa: Achievements, Prospects and Challenges

Pascal C. Sanginga; Susan Kaaria, Simba Machingadize; Rupert Best; Ignatius Kahiu, Colletah Chitsike; Rogers Kanzikwera, Jemimah Njuki and Michael Hauser

Despite increasing interest and support for multi-stakeholder partnerships, examples of successful partnerships are either uncommon or undocumented. There is also a dearth of simple tools and approaches that enable research and development organisations to benchmark the status of their partnerships, assess their effectiveness and performance, and to reflect on their experiences and lessons in partnerships. This paper applied the After Action Review (AAR) and peer assist, two innovative techniques to facilitate collective reflection and analysis of experiences with partnerships based on the key elements for success and challenges of maintaining and institutionalizing effective partnerships. Results highlight the dynamic process of partnership formation and the key elements that contribute to their success. These include: (i) shared vision and complementarity, (ii) consistent support from senior leadership; (iii) evidence of institutional and individual benefits; (iv) investments in human and social capital; (v) and joint resources mobilization and sharing. However, institutionalizing partnerships requires creative strategies for coping with high staff turnover and over-commitment, conflicting personalities and institutional differences, and transaction costs. The paper suggests that AAR and Peer Assist techniques can be extremely valuable tools when combined with well grounded qualitative analytical methods and rigourous quantitative analyses to strengthen the robustness of the results.

2. Participatory evaluation of imperfections in interaction between potato stakeholders in Ethiopia, Kenya and Uganda

Peter Gildemacher, Peter Kinyae, Paul Maina, Agajie Tesfaye, Belew Damene, Rogers Kakuhenzire, Joseph Mudioope.

As part of a larger investigation of the knowledge and information system of the potato sector in Ethiopia, Kenya and Uganda the interactions between stakeholders in the sector were analyzed. The objectives of the study were: 1) identify bottlenecks in interaction between the different stakeholders. 2) Identify priorities for intervention in the potato sector. 3) Draw conclusions on how to improve the flow of information in the system. Stakeholder's workshops were conducted in the three countries to map linkages between different stakeholders in the potato chain. In a first step the different stakeholders and their roles in the potato sector were identified. Secondly the stakeholders identified their interactions, and especially the constraints in interaction with the other categories identified under step 1. In step 3 the results were presented back to the whole group and possible improvements were discussed.The method worked well and conflicts and opportunities for improvement were identified clearly, leading to open discussions between stakeholders. A lack of interaction and general mistrust was identified between agro-input dealers and extension services. Researchers are being criticized for not responding quickly to research requests, having a low topographic coverage and not developing appropriate communication products. The agricultural extension service is criticised for its limited presence on the ground in all three countries. In all three countries farmers have poor access to price information. Farmers complain about adulterated chemical inputs, especially fungicides. In Ethiopia the lack of organisation of farmers was identified as a major constraint, in Kenya the unavailability of clean seed potato and in Uganda the multitude of organizations intervening, but not collaborating. Agro-chemical dealers need to be considered as agents for delivering information to farmers by extension workers and researchers. Research organizations have to engage more in the development of mass dissemination strategies for their information and develop communication materials in collaboration with extension partners. The limited extension presence is there in all three countries is a major impediment for the effective flow of information and clear strategies

needs to be developed by the different stakeholders to mediate this and improve the coverage, either through mass media, farmer facilitators or farmer organizations. Independent price information for potato farmers would increase their bargaining power with brokers and traders, especially during periods of glut. Pesticide packaging and retailing is in need of better regulation and control. The research organizations involved in seed potato multiplication need to develop the strategic partnerships to increase the amount of high quality seed available and improve their timing and targeting. In all three countries a platform in which research, public and private extension, farmer organizations, traders and processors interact would be welcome.

3. Public-private sector partnership in diversifying semi arid tropical (SAT) systems through medicinal and aromatic plants

Ravinder Reddy Ch, Gurava Reddy K, Thirupathy Reddy G, Ashok S Alur, and SP **Wani**

The broad objectives of the project were to enhance and sustain the productivity of medium and high water-holding capacity soils in the intermediate rainfall eco-regions of the semi-arid tropics of Asia. ICRISAT has been developing sustainable and economically productive livelihood opportunities in rural areas through crop diversification and value addition. Promising strategies for crop diversification by introduction of medicinal and aromatic plants (MAP) through technical, capacity building, and marketing support from private industries partnership developed. Increased the income of smallholders groups and improved the livelihoods through new crops and facilitated marketing tie-up between private industries (Buyer) and farmer groups (producer) by signing formal/ informal agreements, thus bringing down the risk factor of marketing MAP products. Increased trade value of crop products by growing more profitable crops and adding product value through village level processing. This holistic participatory process oriented approach includes new science tools, linking on-station research to on-farm watersheds, thematic and technical backstopping through consortium of institutions with convergence of livelihood-based activities. Due to technological, and financial a base village has been selected for introduction of new crops and rural agro-industries development for value addition to the products in Karivemula village of Kurnool district of Andhra Pradesh, India

4. Concept and Process of "Community Empowerment and Networking Program"

Daigo Makihara, Benedict Mtasiwa, Jane Kembo, Bernard Bazirake, Yasuyuki Morimoto, Patrick Maundu, Patrick Kariuki

Community Empowerment and Networking Program is an innovative approach to community development that seeks to optimize utilization of local resources and opportunities, without specifying sectors. The program was developed to effectively produce positive socioeconomic impact within target communities by maximizing synergistic effects from appropriate coordination of three functions of African Institute for Capacity Development (AICAD), namely Research and Development, Training and Extension, Information Network and Documentation. During the process of program development, experiences from various community development programs around the world were consulted. The program targets community groups which have common interest with regard to community development, poverty reduction, and improvement of livelihoods. The purpose of the program is "to empower target communities to take an initiative in community-driven development activities towards poverty reduction". The overall goal is "to improve the social and economic livelihoods of the target communities". If successful, the model will be expanded to embrace more regions in East Africa and else where. The program was initiated in selected regions in Kenya, Tanzania, and Uganda in March 2006, which are referred to as "Model Regions". The east side of Mt. Kenya including Embu, Mbeere and Tharaka districts is the model region in Kenya, while the model regions in Tanzania and Uganda are Kibaha and Mityana districts, respectively. The areas of intervention and target community groups will be identified on the basis of results of field reconnaissance in the model regions. In order to benefit the target communities, appropriate approaches to intervene in the target community groups will be identified through participatory methods. The basic approaches include "community

mobilization and participation", "transfer of appropriate knowledge and technologies to the communities", "addressing problems which hinder the communities from development", "generating ideas for community development", "planning and implementation of community development activities by communities", "networking the participating communities for information sharing". Other approaches could also be considered when and where required. In order to keep abreast with the needs of the communities, mechanisms will be established to receive inquiries and inputs from the communities. The data accumulated through this program such as needs, problems and opportunities within the communities, as well as the ways of coping with them, will be stored in a database, regardless of success or failure. The information will be utilized in future when dealing with other similar cases. Specific activities in the program such as participatory community surveys, needs analysis, research projects, training activities, extension activities, and community development activities, will be implemented with the help of AICAD's partners. These include universities, Non Governmental Organizations (NGOs), Community Based Organizations (CBOs), national and international research/training institutes, central and local governments, and private organizations/enterprises. AICAD will take the role of coordination and management of the whole program. Community coordinators will be identified from local human resources in the model regions as a channel of communication between communities and AICAD. In order to ensure the sustainability of the community development activities, local human resources such as extension workers and practical farmers will be fully utilized.

5. The transformation trajectory associated with adopting an innovation-system approach: Experiences from a research team in Uganda

C. Opondo, C.Almekinders, J. Hagmann, R. Kanzikwera, P.Kibwika, P. Birungi W. Alum and B. Margret

Overtime, a series of workshops to reform the national agriculture research system in terms of functions, structures, procedures and competences needed to meet development challenges have been held in Uganda, targeting NARO researchers and research managers. These reforms are in line with the concept of IAR4D and new agricultural research policy that is emphatic on targeting poverty alleviation, decentralization of services and stakeholder inclusion in research and development efforts. Field experience and interactions with researchers and managers in public research organizations who participated in the series of workshops show that (1) embedded mindsets concerning technology development (supply along scientific disciplines or commodity lines, researchers as 'expert' and trainer of farmers, compliance to research station mandates, doing "good science") and (2) organisational procedures and culture are slowing the pace of institutionalizing reforms, including new approaches such as innovation systems and integrated agriculture research for development. Reflective sessions with a research-station team in Uganda illustrate the efforts of researchers 'on the ground' to shift the research process from predominantly technology-supply mandate to one that embraces an integrated innovation systems approach – and the stumbling blocks encountered. Empirical data suggests that the challenge for researchers is the operationalization of the new approaches in an organization that still largely functions according the conventional established routines and institutional beliefs and culture. The development partners especially the non-governmental organizations, the private sector and the new government program of privatizing extension are equally confining themselves to their organizational mandates and approaches. The farming communities still 'thinks' in supply - driven mode despite the calls for them to demand for research and development services. They expect researcher to come with technologies and associated inputs. Experimentation is something that may pay off in the long run, but for farmers benefits need to be more tangible. The competencies of farmers to articulate their priority needs, change their own mindsets, as well as capacity for R&D actors to forge partners and manage an innovation system need strengthening.

THEME 2: STRENGTHENING PARTNERSHIPS AND OTHER FORMS OF SOCIAL CAPITAL IN AGRICULTURAL INNOVATION SYSTEMS

6. A multi-stakeholder approach to seed systems of food-feed crops for smallholder farmers in Nigeria

Ralph Roothaert, Olusoji O. Olufajo, Peter G. Bezkorowajnyj

Raising cattle and small ruminants is part of a long tradition of crop farmers in Northern Nigeria. Bulls are used for draught and small ruminants for slaughter during festivities or for cash income. Crop-residues such as cereal straws, cowpea- and groundnut haulms are the main animal feeds for the longest time of the year in this semi-arid environment. Prices of these products climb after harvest, and much income is derived from sales of preserved and stored fodder. The International Institute for Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the Institute for Agricultural Research (IAR) in Nigeria developed new varieties of cowpea and technologies which increased the amount of food and feed obtained from an area of cultivated land. Limited production and inadequate distribution systems of seed of these new varieties have been causes of unrealised potential of increased food security and income for millions of farmers. To address this problem, an actor linkage approach was used to bring together farmers, traditional research and development partners, and unconventional partners from the private sector and service providers at State level. The poster illustrates how interactions caused changes in linkages, institutional cultures, information flows, business opportunities, seed production and distribution systems, and wider adoption of new cowpea varieties within one year.

7. Water for the thirsty: a case study of Katulani location water situation, Kitui district, Kenya

Christine A. Onyango, Mary Ambula, Peter M. Gitika, Rosemary N. Mwanza, Gitonga N. Mburugu , John M. Mwaniki, Sophia Ngala,

Hunger and malnutrition among Kenya's communities in the arid a semi-arid lands (ASAL), continue to pose a challenge to the development of these areas. These zones exhibit ecological constraints which set limits to settled agriculture and pastoralism. Indigenous people of these areas have developed simple coping methods to overcome the adversities caused by these conditions. However, increasing population pressure coupled with poor resource management has placed a heavy toll on these fragile ecosystems in which they live. The persistent droughts, lack of good policy environment and increasing poverty among other factors have further exacerbated the problem and led to the worsening of food security in the area. Katulani location in Kitui District is typical of the ASALs in Kenya. Katulani receives low rainfall that is erratic. The few rivers traversing it are seasonal. Wells and boreholes yield mostly saline water that is unsuitable for crop production, domestic and livestock use. In addition, the water that is available is not efficiently captured, making water a major concern for any meaningful development of the area. Using IAR4D approaches, an inter-institutional facilitating team engaged with stakeholders at the community, district and national levels to establish a common understanding on the nature of the challenge and propose strategies for its resolution. A series of workshops, interviews and group interactions with the community were conducted over a period of six (6) weeks. The process of engaging with stakeholders, lessons learnt and their implications were documented. The choice of Katulani as a location for practically applying IAR4D approach served to show that this approach works. The longer-term objective of the initiative is to maintain the location as an IAR4D learning site and an example of multi-stakeholder collaboration that can be emulated by others keen to address complex rural development problems using a similar approach. At the end of the six weeks, the outcomes realized were identification of the core problem, its causes and effects; key strategies to address them and the role of different stakeholders in the possible implementation of the strategies. Further, a multi-stakeholder platform to address the challenge was also convened. The most important outcome realized was ownership of the challenge by the different stakeholders involved. Ownership was attained through thorough interaction with

stakeholders. Their views and perspectives were always considered and their contributions were highly valued. This generated a high level of participation and interaction between stakeholders and the facilitating team resulting in acceptance and ownership of the problem and its possible solutions. Ownership is viewed as the key to sustainability in rural development and this has been sorely lacking in several previous development undertakings. The lessons learnt will inform the agenda for the 3rd Stakeholders workshop and subsequent activities.

9. Experiences of VSF Belgium led livestock consortium in responding to chronic emergency facing the agropastoralist communities in Southern Sudan
Kamau et. al.

Most of the southern Sudan communities have been traditionally dependent on livestock for providing inputs to secure their household food security. However, two decades of civil war coupled with natural calamities have eroded their traditional coping mechanisms exposing them to livelihood vulnerability. This has progressed to become an eminent chronic emergency problem that requires a holistic approach in order to safe human life. The most affected members of the community include the internally displaced people, returnees and female headed households who are dependent on small stock and poultry, fish, wild fruits and vegetables. Although livestock interventions are not perceived by many humanitarian agencies as directly saving lives of vulnerable communities, it is obvious that for livestock dependant communities, such interventions would play a great contribution. In response to this, the VSF Belgium livestock consortium was formed in 2004 and comprises of international and Sudanese indigenous Non Governmental Organisations which are working closely with the Ministry of Animal Resources and Fisheries (MARF) in southern Sudan. Through the consortium, gap areas have been identified and now covered, more harmonised approaches, technical & operational synergy, increased coordination and cost effectiveness have been realised. This successes are attributed to shared vision and mandate, respect and trust between partners, clear agreements, collaborative and consultative decision making, endurance and determination and good communication among others. So far, the consortium has been able to achieve its objectives but not without challenges. This is the right time to learn from other existing consortia on strenghening partnerships and how to strategically address the current challenges. In addition, the consortium would like to remain active for the next couple of years in order to contribute in achieving the livestock development goal in southern Sudan.

10. Participatory Methods for a Project's Life Cycle
Vivian Polar F., Edson Gandarillas M., Juan Fernandez y Walter Fuentes,

For over three years the FOCAMproject in Bolivia worked on participatory methods within the framework of Applied Technological Innovation Projects financed by the Bolivian Agricultural and Livestock Technology System (SIBTA), and other actors involved in innovation processes. One of the purposes was to adapt, create, test and implement participatory methods to optimize intervention results. Once created and adapted, the methods were tested on different projects throughout Bolivia. Such methods are "In-depth study of demands", Participatory adjustment of proposals", "Participatory Mid-term evaluation", "Participatory Monitoring and Evaluation" and "Participatory Final evaluation". The methods were well accepted both within and outside SIBTA. Furthermore, partner institutions that participated in the process that range from Government institutions to local organizations, including NGO's, Foundations, and other types of organizations; have benefited from the use of these methods and are nowadays carrying along an institutionalization process. These methods have methodological guides for their application.
The market place will have banners showing each one of the methods and their articulation within a projects life cycle, along with methodological guides for each one of them. Furthermore, there will be the need for a data display to show a sequence of pictures that take the viewer through the process in each one of the methods. A person of the team will be there constantly to promote discussion and receive feedback from other experiences.

11. Mainstreaming gender analysis in livestock research to increase participation of the marginalised in innovation systems.
Ralph Roothaert, Yeshi Chiche, Maria Mulindi

Agriculture in Africa is dominated in numbers by low-input smallholder integrated farming systems. Livestock form an essential component for sustainability of the cropping system, but also provide opportunities for improving household nutrition, farm mechanisation, and increased income. Gender issues in livestock management, use, ownership, and marketing of products are complex. Within regions, communities and households great gender variability exist in access and control to forage, water and livestock resources. Yet livestock related research projects have rarely incorporated a thorough strategy for gender analysis. This has resulted in turning out technologies which have not been accepted by the ones who needed to benefit from them, e.g. rural women, and has resulted in incomplete and ineffective recommendations. This exhibit shows experiences of the International Livestock Research Institute to mainstream gender analysis in its research agenda. It elaborates on the principle areas for mainstreaming and institutional change: policy, accountability, technical expertise and culture. An approach for an institutional gender audit is presented, common pitfalls to address gender issues are discussed, and an example is given how this has resulted in a comprehensive short term and long term action plan.

THEME 3: INSTITUTIONAL ARRANGEMENTS, POLICY OPTIONS, AND KNOWLEDGE-SHARING MECHANISMS TO SUPPORT AGRICULTURAL INNOVATION SYSTEMS

12. Towards Accountability of National Agricultural Innovation Systems: Strengthening human and social capitals trough PM&E
Vivian Polar F., Edson Gandarillas M., Juan Fernandez y Walter Fuentes.

During the last few years Bolivia has been going through a social transformation process that exercises deep and continuous pressure over government structures, seeking true representation in its quest towards equity and out of poverty. One of the highly questioned areas of government was the Bolivian Agricultural and Livestock Technology System (SIBTA), developed to respond to technological innovation demands in agriculture. Some aspects of the system that were observed by SIBTA's first effect and impact evaluation, were the need of long term investigation, better articulation to genuine demands and effective accountability of service providers. For over three years the FOCAM project in Bolivia worked on implementing Participatory Monitoring and Evaluation systems and other participatory methods within the framework of Applied Technological Innovation Projects financed by SIBTA and other actors involved in innovation processes. The purpose was to adapt the methods to Bolivian reality in order to promote institutionalization thereby optimizing intervention results. The PM&E method was tested on over 50 different projects throughout Bolivia. Furthermore, partner institutions that participated in the process range from Government institutions to local organizations, including NGO's, Foundations, and other types of organizations. The contributions made by the PM&E system were clearly recognized by partner institutions that nowadays are carrying along a PM&E institutionalization process. Through the process of implementation evidence was gathered regarding the contributions of PM&E to human and social capitals. Furthermore, it is also possible to perceive how this social innovation process develops demand for institutional innovations that lead to truly accountable systems. Some of the contributions of PM&E to human and social capitals include:

- Management and leadership abilities strengthened.
- Improvement of internal democracy within the organization.
- Proactive capacity of the organization improved.
- Capacity to clearly state an organizational vision and start planning processes strengthened.

- Reinforcement of organizational capacity to formulate and apply internal policies as well as to influence decision making levels.
- Promotion of technological innovation.
- Promotion of self awareness within technology innovation service providers.

Strong organizations are those that practice internal democracy and that truly represent the interests of the majority, and they are the real key to participation. That is why the PM&E system focuses on such strengthening through participation, thus generating demand for institutional innovations to promote participation in innovation processes. Agricultural technology service providers have gained awareness of the importance of local perception regarding their work, and are therefore progressively improving their services to be truly accountable.

13. "Phanda na Vhulimi": Producing and Using Video Films as Tools for Agricultural Extension

Mphahlele, CK, Lassalle, TJ, Mollel, NM

Progress and innovation in agriculture are based on information access and information dissemination. To bring change, extension services use visual aids as communication methods and video films are among them but many educational videos are top down. Access to information does not only mean to be able to be reached by, but also to relate to the context and content of the disseminated information. In 2003, the Center for Rural Community Empowerment of the University of Limpopo in partnership with Limpopo Province Department of Agriculture co-produced a video film called Phanda na Vhulimi with farmers. The production of the video film was taken as a process, which started with the definition of the film concept by the production team and stakeholders involved in rural development and farmers' leaders. Farmers liked the idea and selected one farmer who should be the focus point during the production phase. A conceptual framework was designed and approved by farmers focussing on what kind of a video film was desirable and who would be the targeted audience. This paved way to the production/shooting phase. Most shooting took place in the village where the selected farmer lived, followed her at provincial level when she attended farmers' leaders' workshop and when she was recognised during a public event by high profile personalities. Shooting was followed by post-production/editing where all tapes with shootings from different places, notes, conceptual framework and notes from de-rushing, information gathered from pre-production were gathered and used until an 11 minutes film was accepted. Projection process started with setting appointments with farmers and preparations for projections to set a conducive viewing environment. Before the video film was shown the director and researcher made a short presentation about the purpose of the study but never discussed the content and context of the video film. It was projected without any interruptions but viewers were allowed to react among themselves. Under the facilitation of the director, the video film was discussed with the audience. This allowed to bring in farmer-to-farmer sharing in relation to what was portrayed, farmers could also raise questions that could be addressed by other farmers or raise inputs relating to broader farming activities. This process indicates that when a video film is produced with characters of the same background, targeted audiences associate themselves with the product and feel that it represents them and their activities. Video film production must be like a process of writing with pictures, must be conceptualised before and it takes a dedicated technical team with experience (both technical and rural) to accomplish the production process. Before projection people have to be aware of the planed projection. They must be able to see and hear properly what is projected, reflect and learn what they have seen. Films touch the audience's feelings, evoke emotions and provoke inner reaction beyond a simple transfer of technical innovation. Films are meant to be part of a transformation process complimenting other extension tools. It is particularly adapted to enhance discussions at community level.

14. Continuity and Change: Resilience of Innovative Mechanisms of Traditional Leadership and Systems (Institutions) in Agro-forestry Resource Management: A Case Study of Bizana, Eastern Cape, South Africa

Munyaradzi Saruchera

Despite some Afro-pessimistic views and idealised Euro-centric notions of democracy regarding traditional institutions, this paper will argue that there remains are important lessons to learn and appreciate from viable traditional systems. In many parts of Africa highly-valued common pool resources continue to be best managed under traditional institutions with viable and observed traditional laws and social sanctions that form part and parcel of the local myths and beliefs systems. In Bizana district of the Eastern Cape, the Amapondo clan is managing indigenous forests and thatching grass conserved by the local community under the leadership of traditional leaders (*induna*, chiefs/chieftainesses etc) and healers. The community is self-policing its common pool resources for the benefit of all. With regards to thatching grass, until the local *induna*, in consultation with the community, indicates that the grass can now be harvested, households do not contravene the traditional laws, even though the resources may be occurring or growing on their private plots. This paper will explore and highlight the factors holding this form of traditional resource management system in a context of material poverty, modernisation and breakdown of traditional forms of government in preference for democratic systems.

15. The Role of Intellectual Property System in Innovations in Developing Countries

Georges Shemdoe

The paper reviews the potential of patent documentation in its contribution to the business and technological development. Further more the paper examines the current initiatives in Tanzania to promote utilization of patent documentation for innovations, technological development and hence poverty reduction.Intellectual property rights particularly patenting has two major functions. One is the “monopoly function”, which encourages creativity and innovations and the other is the “information function” which adds knowledge and contributes to promotion of further creativity and innovation. Information is power and is the source of knowledge, which is an essential tool in decision making. One of the major sources of technological information is the patent documents. There are over fifty million patent documents worldwide with a lot of technological information which could be used for innovation purposes. Unfortunately in less developed countries patent information is not yet fully utilized, Tanzania being among them. In Tanzania patent documentation is not mostly used, this could be attributed due to the lack of intellectual property rights awareness and awareness of the existence of the patent information among the potential users. It therefore necessitates the need for making efforts to create this awareness among scientists, technologists, inventors, innovators and the general public. It is therefore recommended that universities, R&D institutions and firms should consult patent documentation in their R&D activities. The country should also formulate policies and strategies to make effective use of patent documentation for its economic growth.

16. LEISA magazines as knowledge-sharing mechanisms to support agricultural innovation

Rik Thijssen

The Centre for Information on Low External Input and Sustainable Agriculture (ILEIA), in collaboration with regional partners in Africa, Asia and Latin America, works to increase the availability and exchange of knowledge and information on Low External Input and Sustainable Agriculture (LEISA) and to improve the quality of such information, through an effective sourcing and documentation process. LEISA is an umbrella concept which covers many different specific approaches to agriculture, based on agro-ecological principles, local knowledge and innovative techniques that can increase agricultural productivity while regenerating natural resources and maintaining biodiversity, thereby safeguarding the environment. LEISA enables the development of viable medium and small scale farming, which is a major part of rural livelihoods and thus

contributes significantly to developing economies. ILEIA's major activities focus on identifying practical initiatives and innovative practices taking place at local level all over the world, and to publish information about them to a wider audience who will benefit from the ideas and discussions. This is principally done through the thematic LEISA magazines (in English, French, Spanish, Portuguese and Indonesian), and increasingly through the LEISA website (www.leisa.info) as well as the production and dissemination of informative CD-ROMs. In this way, ILEIA is a principal player in linking the many actors within the field of sustainable agriculture closer to each other, in order to increase sharing of experiences and information. A readers survey in 2004 showed that ILEIA is reaching its target audience of development field staff and farmers (60% of respondents), as well as teaching and research staff in universities and training institutions (30% of respondents), and also some administrators and policy makers. Over half of survey respondents work in government institutions, while a third were members of NGOs or CBOs. Information can empower and be an effective weapon in the fight against poverty and the importance of the exchange of knowledge and information for sustainable agriculture in support of rural communities is recognised in major international fora. The readers survey demonstrated that the LEISA magazines stimulate discussion among readers and influence what readers do in their practical work with agriculture. Impact studies have shown that the LEISA magazines inspire and enhance local action and innovation processes through broadening the perspective of the readers (currently about 200,000 people worldwide). The reader is exposed to new ideas; new ways of thinking about agriculture and examples of innovative technologies that have been tried out in the field. The magazines also support the building of innovation capacity through stimulating participatory approaches and an awareness of gender issues, through providing guidance and presenting experiences.

17. MODELING EFFECTS OF DETERMINANTS OF INNOVATION LINKAGES BETWEEN R&Ds –SMEs IN DEVELOPING COUNTRIES: The case of Tanzania agricultural machinery and equipment enterprises

Mafunda Ndugushilu

Theories of various innovation models and firms' growth show that innovation development and transfer to Small, Micro and Medium Enterprises (SMEs) are costly and risky, making products of firms particularly in developing countries to be characterized by uncompetitive products, unsustainable production capacity and hence stagnation, failure or reversal of firms' growth. Though various researches have been done in developed countries, none in developing countries have delineated clearly the effective innovation linkages and their sensitivity of their determinants on various stages of SMEs' growth. It is from these facts that a PhD research was undertaken to establish type of effective innovation linkages and the nature, extent and effects of their determinants that could bring Research and Development institutions (R&Ds)/universities and Small and Medium Enterprises (SMEs) to cooperate/collaborate in their innovations activities. The discussion of the findings is based on the data collected from a questionnaire which was administered to 104 SMEs followed by five case studies, one university, one R&D and three SMEs (represented by one micro enterprise, one small enterprise and one medium enterprise). On the one hand the analysis indicate that for R&Ds to achieve innovation capability they require heavy capital investment and appropriate educated personnel. These require external support/innovation linkages as well as government commitments. The analysis also established that the innovation linkage determinants do vary from one linkage type to the other. On the other hand most successful SMEs have innovation linkages with R&D institutions, contributing to a substantial degree of firm's growth. While the unsuccessful SMEs have unclear/lack of effective innovation linkage limiting the firms' growth. In conclusion the study established that the dependence of our SMEs on imported technologies makes our country to be successful in the short run, but vulnerable in the long run by lacking the innovation and technological capabilities. A need for building our own innovation and technological capability is by linking our R&Ds and for our governments to be cognizant of the linkage parameters when drafting or amending their innovation policies/national system of innovations.

18. From Water Committees to the Emergence of Water Users Association:
Phaladi, R.E, Lassalle, TJ, Mollel, NM

In South Africa, the 1998 National Water act (Act 36 of 1998) launched an in-depth reform of water resource management. The act distinguishes national areas of water management from regional and local ones. New management entities Water Users Association (WUA) and Catchment Management Agencies (CMA) are to be established in order to achieve that purpose.
The current paper is based on a several month action research process within a the rural community involved in transforming its current management of small-scale irrigation schemes. Mohlapitsi irrigation schemes used to have water committee but they were not very effective and poorly efficient. The overall objective of the action research process was to support the community members to establish a Water Users Association (WUA) for Mohlapitsi irrigation schemes in Mafefe Ward covering three traditional schemes (Mashushu, Mantlhane and Fertilis) based on their respective existing water committees. Factors of success and constraints in establishing this new water management institutions were to be identified in the process. The action research process was facilitated by the researcher who resided on site, in collaboration with the extension officer. Her participation in all events, formal and informal, linked to the emergence of the association was instrumental. A three step process was followed: An *institutional introduction with* sensitisation meetings with local leaders and organizations of mass meetings for all scheme members to identify the institutional challenge posed by the new policy; the *identification of existing* water committees and practices through visits and interviews. Water committees selected representatives to drive up the emerging process and report back to them. Water committees also discussed and drafted bye-laws based on concrete operational rules that were validated by representatives at the association level. *The Water Users Association emerging process supporting the core team of representative through drafting the constitution* and public meetings with all water users for feedback were organized. Farmer to farmer exchanges with other small-scale irrigation schemes were facilitated. In Ga-Mampa area, there has been a strong willingness of the local organizations to form a WUA. This could be seen by the willingness to respect new rules and changes that were introduced during the process. However due to changes in the government intervention, the association could not be registered. It is recommended that Government allows a clear registration process to take place regardless of its own intervention programme. Leaders in steering committees should be made aware of what is expected from them. Extension officers need to be trained on how to support a group to draft their bye-laws and be familiarized with various models of constitution. Government should hold workshops to firstly identify the current roles played by water committees in their irrigation schemes and to assist them to transform their current practices into an institutionalized body.

20. Village Information Centers (VICs) in Rwanda
Silvia Andrea Pérez and Amare Tegbaru

International agricultural research organizations have made efforts to ensure their research products reach the intended beneficiaries, in order to reduce poverty and to improve rural livelihoods. Examples exist of initiatives to transfer technologies (research institution to farmer) and to facilitate the information sharing processes. These initiatives include participatory approaches, capacity building processes, and, in various cases, have utilized new information and communication technologies (ICT). These ventures have also been a step in the process of participation and democratisation of farmers in what has been called the information society. There are still limitations hindering the participation of farmers in many technology transfer projects however. Often farmers are unable to access the “media” of information sharing, or they may find the information is not useful, irrelevant, or in an unfamiliar language. These problems are compounded by a lack of awareness and skills in ICTs such that the possibility of feedback to, and communication with, research organizations can seem very remote. Village Information Centers (VICs) in Rwanda are public spaces where farmers can share knowledge, access information in their own language, and other community services (shop for sale of agricultural inputs, amalgamation of products for getting better prices, cooperative banks, training points, community meeting places and so forth) in their own place.

Free access and democratization of information are key principles in organization and operations of VICs. Organized farmer groups in a form of farmer association is the basic requirement of establishing the centers to ensure institutional support backing, hosting and managing the VICs, including cost share the running of the centers. From the initial stage of establishing the VICs it should be clear that the centers are demand-driven and address the information needs and priorities of the rural and marginalized communities (women and men, youth, sick, elderly and disabled). In other words VICs should be organized in manner that there is broad ownership base as the objective is to benefit the maximum number of farmers on wider and diversified issues related with agriculture and rural development. Efforts should also be made to ensure that VICs promote multidirectional flows of information and communication between different stakeholders, R&D partners, farmer's associations and other communities groups, including sharing of expert as well as traditional knowledge of communities. The long term sustainability of VICs lies in community empowerment which also demands a strategic vision, basically developed in partnership with farmers to invest in human resources, in the physical condition of the VICs, and in training. In this way VICs can be an economic and effective mechanism for research organizations to disseminate to farmers the products of their research and to facilitate a feedback about the process and results of the research.

21. PM&E and the Empowerment of Producers' Organizations.
Juan Fernandez R., Edson Gandarillas

The Participatory Monitoring and Evaluation (PM&E) system developed by CIAT was applied by the Promoting Changes project in the context of the Bolivian Agricultural and Livestock Technology System (SIBTA), prior adaptation and adjustments of the methodology for the different rural areas, characterized by having one of the highest levels of poverty in Latin America. The principles of PM&E are oriented towards contributing to the empowerment of the people, organizations and institutions. This article is based on analyses of information about the progress made and results accomplished in processes of implementing PM&E in Small Farmers Economic Organizations (OECAs) that are demanders of PITAs, promoted by SIBTA. It would be an overstatement to assert that the implementation of PM&E empowers the organizations and the people. PM&E is one element among many that contribute to empowerment.In the case of APAJIMPA, they underwent a process of about one-and-a-half years to adopt PM&E. In this process the Association's leaders were committed to institutions and entities such as the Municipal Government, which provides the services, and FDTA, as well as to fulfill the objectives of both the PITA and the organization. In the Chaco region, different from APAJIMPA, which had a "bottom-up" process, the executive bodies of the FDTA-Chaco, based on the successful application of PM&E in other settings, promoted the validation of the methodology in their context and contributed to generating mechanisms for its institutionalization. Based on the information of the experiences regarding the effects of PM&E in different contexts, it was concluded that overall, PM&E contributed to empowerment in the following aspects:

- The organizations have begun a process of appropriating PM&E, in which their leaders have played an important role in training and disseminating it among the farmers.
- PM&E is permitting service providers to present a better service.
- PM&E is contributing to a better response and participation of the beneficiaries in the process.
- The producers in their different strata are informed about the characteristics and development of the projects of which they are beneficiaries.
- PM&E is contributing to improve the management and leadership capacity of the producer organizations' managers.

- PM&E contributes to the empowerment of the producers' organizations, basically because it promotes the active participation and involvement of the members of the organization in all project phases and decision-making related to their own development.
- The use of PM&E is contributing to a change from a passive (receptive) attitude to an active one (decision-making) on the part of the farmers. Thus it is improving their capacity for (a) representativeness and internal democracy, (b) participating effectively with proposals in the strategic planning exercises, (c) negotiating with other institutions and actors, and (d) developing a sense of co-responsibility.

22. Enhancing Community Empowerment through Community Driven Participatory Monitoring and Evaluation Systems

Lewa K.K., J. Ndungu, J. Njuki, M.N. Njunie, S. Bimbuzi, A. Mzingirwa, B. M. Muli, S. Kaaria

Participation of community members in planning and implementation of their development projects has been considered integral to community empowerment leading to the success and effectiveness of the projects. Currently, many agricultural technology transfer projects in Kenya use group approaches such as farmer field schools (FFSs). The success of these FFSs depends primarily on the collective action and decision making by their members. However, poor participation was observed in some of the FFSs in the region. To improve this situation, PM&E was introduced on a pilot basis in two projects: Soil and water management project (SWMP) and the Tissue culture banana (TCB) project. Training on PM&E was conducted on staff from both projects. They selected eleven FFS, eight from SWMP and three from TCB where PM&E was introduced. The project staff started by engaging the FFS members in discussions to raise their awareness on the importance of PM&E. The aim was to empower the groups to understand this process since community based PM&E is managed and supported by the local communities. After this step, the groups were facilitated to envision their long and short-term objectives using the current - future situations. The FFS members identified the changes/impacts they expected from the project, identified indicators for those changes and agreed on what to monitor and evaluate. Eventually, the groups formed monitoring and evaluation (M&E) committees whose responsibilities were to gather information, process and present it to the whole group for discussion during reflection and feedback sessions. Members used the reflection/feedback sessions to discuss the PM&E results, derive lessons and design adjustments to their activities and strategies. The study showed that farmers use M&E information but not in a systematic manner. However, when PM&E was integrated coherently, it enhanced farmer empowerment in a number of areas: Women participation and confidence increased as evidenced through more participation in group discussions and decision making; Group organization improved. Members felt the need to enforce their existing constitutions. Where existing constitutions were not adequate to meet members' needs, they were amended accordingly. There was improved planning of group activities, and implementation could be followed keenly. Constant discussions ensured that expected group outcomes remained in focus and there was increased accountability of funds from group officials. Demand for change was made when officials were not accountable. Members had a better understanding of their projects and the costs/benefits associated with those projects. For project staff, there was improved feedback from the farmers and a better understanding of the farmer priorities. This brought up the need for diversification in the projects currently undertaken by the farmer groups.

23. Facilitating Farmer-to-Farmer Learning and Innovation for Enhanced Food, Nutrition and Income Security in Kamuli District, Uganda
Robert Mazur, Haroon Sseguya, Dorothy Masinde, Joseph Bbemba, Grace Babirye

Achieving food and nutrition security among poor, vulnerable rural populations is a formidable challenge that requires innovative approaches. In Kamuli District, one of Uganda's poorest, a local non-government organization, VEDCO (Volunteer Efforts for Development Concerns), with its partners at Makerere University and Iowa State University, enhances local capabilities and assets through its work with farmer groups to foster sustainable improvements in food, nutrition and income security. During a five-year period, VEDCO trains and supports volunteer Rural Development Extensionists (RDEs) and Community Nutrition and Health Workers (CNHWs) who serve as learning catalysts for farmer group and community members. Participatory monitoring and evaluation of training and support for RDEs and CNHWs, and how they in turn train and support farm group and community members, contributes to continuous improvements that foster successful local adoption, adaptation and innovation. Discussion of lessons learned to date and ongoing program innovations is intended to contribute to enhanced effectiveness among those engaged in rural extension and development.

THEME 4: ENHANCING LOCAL INNOVATION PROCESSES

24. Assessing the Social and Human Capital Impacts of Participatory Research Processes: A case study of Local Agricultural Research Committees (CIALs)
Fernando Hincapie, Viviana Sandoval and Susan Kaaria

Participatory research seeks to involve the intended beneficiaries of research in the research process itself. The idea is that user participation will lead to more efficient and effective design and targeting of technologies, thereby reducing diffusion time, increasing adoption and helping to ensure that the intended beneficiaries are reached with technologies that are appropriate to their particular circumstances, needs and priorities. Empowering participatory research approaches focus on enhancing the innovative capacity of local communities by strengthening social and human capital. The capacity of farmers to innovate may be particularly important in poor, marginal environments where conditions are highly variable. This paper examines one such participatory research approach, the CIAL methodology. It examines how the CIALs as an institutional innovation affects the human and social capital and other assets available to individuals and communities, and the implications of that these assets have for livelihood outcomes. The study found four major areas of impact: technology, which includes better planning and organization of farms, new technology and its diffusion; food security which looks at nutrition; income generation from the standpoint of developing local agro-enterprises and production projects; and social and human capital which takes a look at leadership, empowerment and gender.

25. Impacts of traditional soil and water conservation methods on agricultural production in marginal areas: analysis of best practices in sub-saharan africa
Riziki S.SHEMDOE., Idris S. KIKULA and Patrick VAN DAMME

This paper describes best practices of traditional soil and water conservation (SWC) techniques with their influences on agricultural production in Sub-Saharan Africa. It bases on the hypothesis that traditional SWC methods are useful practices and can have substantial impacts on enhancing agricultural production in marginal areas. Literature survey on the best practices regarding traditional SWC techniques and their impacts on agricultural production has indicated that in most of Sub-Saharan African countries, smallholder farmers have developed and improved their traditional SWC methods which have favoured their survival. Varieties of these methods have assisted farmers in managing drought risks at their farm household and watershed levels. In

this article, different traditional SWC methods regarded as best practices from smallholder farmers in selected countries in Sub-Saharan Africa are analysed. These practices have effectively conserved soil water resulting to greater crop yields in marginal areas. Traditional SWC methods which are discussed in this article as examples of best practises include: *chimpacas* (in Angola), z*ai* (in Burkina Faso), t*assa* (in Niger), *ngoro* and c*hamazi* (in Tanzania), *fanya juu* (in Kenya) and *daldal* (in Ethiopia). As these practices do better in marginal areas where most of modern technologies do not reach smallholder farmers so often it is important for these methods and many others to be documented, tested and improved. Furthermore, institutional, policy and knowledge-sharing mechanisms to support these traditional methods is essential for improving agricultural production in these areas where majority of smallholder farmers live.

26. Innovative methods for linking farmers to inputs markets through farmer field school networks for increased production and food security

Muli M.B, H.M. Saha, A. M. Mzingirwa and K.K. Lewa

Research Centres in Kenya have developed technologies geared towards reduction of yield gap between the potential yields of improved varieties and at farm level. In coastal Kenya, the average yield of maize on-farm is only about one ton of grain per hectare, whereas yields of up to 5.5 t ha^{-1} have been realized under researcher managed on farm plots. This wide gap is attributed to failure of farmers to access and/or use the improved maize production technologies. In order to address this problem, existing farmer groups were identified and re-organized into Farmer Field Schools (FFSs) to facilitate the transfer of the existing technologies and enhance adoption. Technologies on improved maize varieties, use of inorganic and organic fertilizers and their combinations to improve soil fertility, water harvesting methods, crop protection against maize stalkborer and spatial plant arrangements were passed to the farmer groups through FFSs. One acre demonstrations plots were also established at strategic locations to cater for non FFS farmers. Yields of up to fifteen 90-kg bags per acre were obtained from the FFS and demonstration plots compared to four 90-kg bags per acre in farmers' fields. After farmers graduated, only a small fraction of them implemented what they had learned in their farms. Meetings were held between farmers, extension officers and researchers to discuss the factors hindering adoption even after acquisition of the skills. It emerged from the discussions that the cost of inputs was a major constraint to most farmers. Different FFSs were therefore brought together to form networks. The management of the networks is by committees elected by the farmers groups. Participatory monitoring and evaluation was incorporated into group activities to empower them systematically analyse and interpret progress in their activities. Arrangements were also made with reputable stockists to supply and deliver the inputs to farmers at prices applicable at the source without any extra charges on transportation costs. This reduced the price of fertilizers at farm level from Kshs. 50 and 40 to Kshs. 32 and 25 for DAP and CAN, respectively. The farmers were also able to access the pesticide for maize stalkborer control at Kshs. 120 compared to 170 per kilogram. Improved seed price was accessible by farmers at a price Kshs. 120 per kilogram compared to Kshs. 150 at the nearest shopping centre. Those farmers who could not afford to apply fertilizers as recommended chose to apply either DAP only or DAP plus half rate CAN or DAP and foliar feed. Others applied half rate DAP and foliar feed. Some farmers also mixed pesticide with sand to reduce the amount applied. Other farmers went for foliar fertilizers to save on labour. Even after the technology modifications, farmers were able to double or triple the maize grain yield per unit area with some obtaining up to 13 bags per acre. Farmers realized that it was possible to utilize 25% of the labour to cultivate only one acre and obtain food equivalent to what they used to get from 4 acres.

27. Scaling out benefits of technologies through farmer field school networks: a case study of integrated nutrient management (Process)

Saha, H.M., M.B. Muli, A.M. Mzingirwa, J.M. Ndungu and K.K. Lewa

Integrated Nutrient Management (INM) technologies were scaled out in Kaloleni division of Kilifi district, Kenya using the Farmers Field Schools (FFS) approach between 2001 and 2006. The technologies) included: (i) mucuna (*Mucuna pruriens*) plus half the recommended rate of FYM (2.5 t DM ha^{-1}), (ii) mucuna plus half the recommended rate of fertilizer N (30 kg N ha^{-1}), (iii) half rate FYM plus half rate inorganic N, and (iv) mucuna plus half rate FYM plus half rate inorganic N. Through their training in the FFSs, the farmers were exposed to the four different INM technologies and were expected to make decisions on the technology they would use on their farms. A total of 33 FFSs were conducted in two locations, Rabai and Ruruma in Kaloleni division. Following the graduation of four FFSs in Ruruma in March 2005, a farmer sensitization meeting was held, where farmers were sensitized on the need to form networks, the avenues through which farmers would have collective bargaining power during input acquisition and the produce marketing. Two FFS networks were formed in Kaloleni division: the Rabai and the Ruruma FFS Networks. During the sensitization meetings, the farmers in the Ruruma FFS Network realized that it was beneficial to produce their own maize rather than purchasing. This could reduce the cost of feeding a family of 10 people by at least 40.5%. They also identified the bottlenecks to the adoption and realization of the full benefits of INM technologies which included: (i) untimely/poor land preparation, (ii) use of unimproved maize varieties, and (iii) inadequate control of stalk borer and storage pests. As a follow up, Ksh.100,000/= was sourced from the Coordinator of the Legume Research Network and Soil Management Projects in April 2005 to start the FFS Support Initiative. The money obtained was utilized by FFS graduates in the form of a revolving credit fund to meet the cost of removing the bottlenecks to technologies adoption. The Ruruma FFS network committee manages the revolving fund. A group of 30 members of FFSs formed the first Phase and were facilitated to prepare one acre of land early by tractor. Each farmer obtained 10 kg of certified maize seed and 4 kg of pesticide for the 2005 long rains season. Six percent of the farmers in Phase 1 were able to more than double their maize yield through the use of various soil amendments. One outstanding case was a female farmer whose yields increased from four 90-kg bags to 19 bags per acre. The Ruruma FFS Network sourced and identified market for 120 bags of maize from the participants of Phase 1 of the FFS support initiative. At the end of Phase 1 of the FFS support initiative, all network members held a review and planning meeting to share the experiences of Phase 1 participants as well as prepare the participants of Phase 2.

28. Co-building of socio-technical and organisational innovations in fish farming systems in Cameroon.

Victor POUOMOGNE, IRAD, Olivier MIKOLASEK, Minette TOMEDI, Michel DULCIRE, CIRAD Tera, Eduardo CHIA.

Fish farming can be an important source of feed, employment and income for the rural populations of Africa. However, in most cases fish farming does not constitute a full time farming activity, and the fish farming systems put in place by rural populations have not been able to prove their economic profitability. Presently, if sustainable fish farming is to be promoted, it would be a prerequisite to work on the socio-technical and organisational innovations. This hypothesis is being tested within the context of a research programme on the Conception of Innovations and the Role of Partnership, being undertaken by researchers from CIRAD, IRAD and the University of Dschang, Cameroon.The current work consisted in the elaboration of an action-research programme in partnership with producers focusing technical and organisational concerns, in the aim of identifying and facing problematic issues which remain a cause of concern for the various key stakeholders. Paradigms sustaining sociology of translation and sciences suggest that innovations are built on social pillars. It is within the ambit of this theoretical reasoning that we would like to situate the approach developed here. Two groups of producers (Common Initiative Groups) in the west of Cameroon following "Action-Research" and "Partnership" principles were

involved in the process. Work protocols (in the form of written contracts) were jointly defined (researchers and each of the producers' group) and dealt with the construction and management of fish ponds and the supply of fingerlings. The principal methods used were regular meetings involving all the members of the Common Initiative Groups. Aims of meetings included programming activities, restituting the results so far obtained and following up of experimental protocols. The main result was the successful formation of the Common Initiative Groups (GIC), where it was possible, following common experimental protocols designed and conducted altogether, to agree upon a common working language and representation; these tools are necessary for any socio-technical and organisational innovation. Another result not less important is the role of the written action protocols in the formalisation of the code of ethics necessary for working in partnership. Members modified the representation and together shared the first elements of a localised fish farming model. In this process, strategies of each group in the partnership could be appraised and adjusted accordingly based on sustainability of the fish farming activity, which was put beforehand as the commonly shared target of all. In conclusion we would like to draw the methodological lessons so far derived from this piece of work (ongoing), and particularly on the type of competence which participating researchers need to employ. These researchers are supposed to serve as mediators, facilitators and translators; and also as a mouthpiece of groups which hitherto belonged to varied schools of thought. This needs a big deal of humanism, humility and patience.

29. Facilitating Empowered Communities to use their Indigenous Knowledge to Enhance Sustainable Grazing and Wetland Management to sustain healthy livelihoods: Sustainable Grazing Management based on Indigenous Shona Practices Prior to Introduction of Western Ideas in Zimbabwe

Osmond Mugweni, Njeremoto Biodiversity Institute: Zimbabwe.

The Project evolving at the Njeremoto Biodiversity is demonstrating the Indigenous Shona Knowledge on Grazing and Land Management. In the Shona culture, the land evolved with herding animals. Hence the absence of one results in the destruction of the other. The conventional grazing management belief that too many animals cause overgrazing is a misconception of the semi-arid savanna environments of Southern Africa where these environments evolved with thousands of herding grazers such as wildebeests and buffalo. The Shona believe that overgrazing is caused by inadequate recovery period for grazed plants. Further, they believe that in conventional western grazing management practice overgrazing is a result of domesticated animals overstaying on the same piece of land (continuous grazing) or returning too soon to the grazed area (rapid rotational grazing systems). In the next three (3) years starting in December 2006, the project will further develop sustainable land use systems on grazing and wetland utilization and management at the Njeremoto Biodiversity Institute and with satellite rural communities in Zimbabwe and Southern Africa Region (South Africa) guided by modern and indigenous Shona technology systems. Opportunity exists on vast areas of degraded land to utilize animals (domestic and wildlife) to heal the land, improve water cycles and build biodiversity, while enhancing food security, reducing poverty, and establish ecological stability at a landscape scale hence positively changing peoples' lives. Silted Rivers Common in Semi-arid ecosystems with current management practices This project is exploring and evolving new technology for semi-arid rangelands management as well as empowering and capacitating the humans with skills and tools to sustainably manage the ecosystem while ensuring sustainable livelihoods for the present and future generations. At the Njeremoto Biodiversity is the hub of the project where research and demonstration as well as training of communities and research students will take place to date these land is responding positively as in picture below.

30. Farmer Innovation Systems: A gateway for higher adoption of Water System Innovations in Makanya Watershed. Tanzania

Masuki K. F. G., A. Z. Mattee, S.D. Tumbo, G. Myombe and F. B. Rwehumbiza

As the future World food demand depends on the increase in water productivity in irrigated as well as in rainfed agriculture, exogenous and improved indigenous water system innovations are needed to cope with the changing biophysical, socio-economic and environmental conditions that causes failure of some of the "traditional" systems to provide satisfactory returns to the farmers. A study was conducted in the Makanya Watershed to identify indigenous and exogenous water system innovations and their adoption/adaptation processes. Literature reviews, focussed group discussions, key informants and workshops on knowledge sharing were used to collect the information in this study. Generally, it was found that most of water system innovations are indigenous; nevertheless some have undergone a process of adaptive development and are currently used in different form from originally founded. A very well correlation between farmers' ranking of the water system innovations to toposequence was observed. Adaptation of some water system innovations was enhanced by farmers to suit some conditions at farm level. The study revealed that the rate of adoption of in-situ systems to be higher compared to other water system innovations which involve diversion and storage. It was revealed that the dissemination of the water system innovations was performed through informal and formal modes of knowledge sharing. Limited exposure of farmers to some novel technologies has minimised their desire to test them. Finally, a more dynamic and participatory approach that involves multi-stakeholders is highly recommended for a successful large scale adoption of the water system innovations.

31. Farmers' experiences in testing forage legume innovations: A case study of dairy farmers in Uganda

Kabirizi, J, Mpairwe, D. and Mutetikka, D.

Smallholder dairy cattle production is a major source of income, manure, milk and employment among smallholder farmers particularly the resource poor women in Uganda. The realization of potential economic benefits is however impeded by inadequate feeds during the dry season leading to low animal productivity. Findings from on-station research, suggest the possibility of incorporating forage legume innovations in crop/livestock farming systems could solve feed shortages during the dry season. Participatory on-farm trials were therefore conducted on 24 smallholder dairy farms to demonstrate the effects of leguminous forage innovations on feed availability and response of dairy cows fed forages from cereal or elephant grass intercropped with forage legumes and supplemented with lablab hay and/or calliandra leaf hay. The study lasted 18 months. This paper presents farmers' experiences in testing forage legume innovations in smallholder crop/livestock production systems and lessons learnt form working with resource poor farmers. Major benefits identified by farmers as a result of incorporating forage innovations in farming systems were improved feed and household food security and increased milk yield. More women (93%) than men (54%) mentioned less burden of searching for feeds during the dry season due to improved quantity and quality of feeds. Seventy four percent of the women cited weed control as a major benefit resulting from lablab/maize intercrop innovation compared to 64% of the men. Improved household income as a result of selling more milk and maize due to improved forage innovations was cited by about 37% women compared to 87% men. Forty six percent of the farmers reported that calliandra leaf hay had marked positive effect on taste of milk. Over 80% of the farmers cited high cost or unavailability of forage legume seed, high labour and capital demands, initial slow growth and low FODDER yields of legumes in mixtures as major constraints to use of elephant grass/legume intercrop. About 90% of the farmers who intercropped lablab with bananas reported a reduction in banana yields. The low fodder yield of forage legumes in mixtures during the dry season discouraged about 87% of the farmers because they could not have sufficient fodder for the animals. Lessons learnt from the study were: the

performance of promising innovations developed on-station can be tested under “real-life” agro-ecological and management conditions; farmers’ capacity and expertise for conducting collaborative research is built up and becomes a valuable resource for future research programmes; cross-visits and feedback workshops are very effective in sustaining and keeping farmers’ interest and improving their skills; working with farmer groups enhance adoption of forage innovations as farmers share experiences and resources required for the innovation to succeed and; development of positive rapport among stakeholders is a key to success of on-farm trials. In conclusion, the key to adoption of forage innovations is to allow farmers experiment, identify the constraints versus the benefits associated with the technology, adapt and expand.

33. Fodder tree development and farmers innovative ideas to balance multiple objectives in the Ethiopian highlands

A.Mekoya, S.J.Oosting, S.Fernandez-Rivera, and A.J. Vander Zijpp

Many institutions and organizations have been involved with the development of multi-purpose fodder trees in Africa for many years. The fodder tree development was specifically aimed at strategic supplementation of livestock during the dry season while maintaining soil fertility and preventing land degradation. Likewise, in Ethiopia, efforts started in the 1970s. Despite the apparent benefits, the scale of fodder tree planting undertaken by smallholder farmers is relatively low due to inadequate adoption rates and abandonment soon after adoption. It is believed that farmers need to balance a complex array of multiple functions. In the present study, structured questionnaire and focus group interviews were used to obtain information about farmers’ perception of fodder trees in two districts and production systems (cereal and horticulture-based livestock production systems) of the Ethiopian highlands. The objective of this study was to assess constraints to adoption, to compare exotic and indigenous fodder trees, and to get insight in to farmers’ innovative ideas to tackle constraints using a local multi-purpose fodder tree. Respondents mentioned agronomic problems, low multipurpose value, land shortage and labour shortage for the frequent management it requires as major constraints. The comparative evaluation on the parameters of biomass, adaptability, ease of establishment, life span, multi-functionality and compatibility to the cropping system showed that farmers’ preferred local fodder trees (*Ficus* spp., *Acacia* spp., *Millettia* spp., *Cordia Africana)* to introduced fodder trees like *Sesbania sesban* and *Calliandra calothyrsus*. However, farmers had relatively similar perception on the feed value of the local and introduced fodder trees. In one of the study districts, farmers had developed their own propagation technique for use of one of the most preferred local fodder trees (*Ficus* spp.). The innovation was to plant two-meter long cuttings on farmlands and soil and water conservation structures. Farmers had also discovered that branches of the trees cut one month before and transplanted immediately after the beginning of rainy season had higher survival rate and better vegetative growth. This innovation enabled farmers to produce more supplementary feed during the dry season, alleviate the management problem when planted on farm lands due to the prevailing free grazing system, protect soil erosion and maintain soil fertility while fulfilling demands for fuel wood, construction with less labour and land requirements. This study shows that there are indeed local resources, knowledge and possibilities of building on those traditions instead of relying on technologies from outside. The exploitation of local multipurpose trees and the spread of these small-localized success stories could significantly improve agricultural productivity. Hence, the involvement of agricultural research and development actors to work together with farmers in scaling out local level knowledge and innovation is quite indispensable.

34. Dairy Goats Keeping in Rural Communities: An Innovation development beyond a transfer of technology

Letsoalo, EM

In South Africa, goat keeping in most of the rural communities is still neglected. Goats are only looked for when it is time to sell or to perform rituals. Ga-Mampa community is one of the rural communities where goat keeping is given little or no care from the keepers. These goats only produce little amount of milk for their kids and are never milked. On the other hand, the community had no access to milk apart from the local goods retail shop at a high cost. Through an action research process implemented within the community by Centre for Rural Community Empowerment (CRCE/University of Limpopo), community members became interested in developing goat milk production to improve food security and incomes in the area. CRCE exposed the idea of dairy goat keeping which was very doubtful to the community members as it was their first time to hear about goats bred for milk production. Eighteen farmers showed interest and formed a group: the Lafata Dairy Goat Keepers ("the innovation seekers in dairy goats keeping"). The training process focused on three main aspects:

- Sensitization to develop a vision of what could be dairy goat keeping in the Mafefe context; where experiences of dairy goats keepers from Tanzania were shared and discussed using a video film before to define conditions for a local success.
- Technical support from a range of identified sources;

Before farmers could own dairy goats, technical training and advices was needed for future dairy goat keepers to be able to deal with any situation by themselves once the dairy goats would be on their farm.

- To build capacities of the group to deliver support services to individual dairy goat keepers:

For farmers to access goats, a tripartite leasing agreement was drawn involving the individual keepers, the group and the support agency, CRCE. The Lafata Dairy Goat Keepers are now also providing services at a dispensing fee to other local goat keepers and they retail veterinary medicines and other needed inputs. Learnings drawn by CRCE are that; a video film as one of the extension tools played a very crucial role as eye-opener in alleviating fears and perceptions about dairy goat, technical support from supporting agencies is crucial when blend with existing knowledge in the community, a written agreement between an individual farmer, a group and the supporting agency is one way of building people' confidence of the partners involved and that the whole process was broader than a transfer of technology. It resulted in capacitating not only the eighteen members but the Ga-Mampa community to take a better care of the local goats.

35. Enhancing farmer innovations in sorghum breeding for food security in centre of diversity, Ethiopia.

Firew Mekbib

Sorghum (*Sorghum bicolor* (L.) Moench) is the fifth most important cereal crop worldwide and it is the fourth most important crop in Ethiopia. The national average yield amounts 1369 kg/ha. In order to assess the innovations in farmer breeding various types of research were undertaken. These include survey research to quantify the trend in productivity, the level of and reasons for adoption of improved varieties, yield performance and preference evaluation of farmers' varieties (FVs) and improved varieties (IVs). As per the trend analysis over the last four decades, total production and yield per hectare has increased by 11.63% and 14.2% respectively. However, area allocated to sorghum has decreased over years by -2.93%. The lack of consistent productivity is attributed to the fluctuation of environmental factors. Sorghum production in Ethiopia is predominantly based on varieties developed by farmers. The share of IVs is very low. FVs and IVs are adopted by 87.3% and 12.7% of the farmers respectively. Besides, the adoption

of IVs is limited to the lowland crop ecology. The comparative yield of FVs is higher than IVs by 132%. On top of yield, farmers do prefer their varieties for other multipurpose values namely feed, fuel wood and construction material. FVs under production are identified in each *wereda*. Farmer breeding has been successful compared to four decades of formal breeding. On the contrary, both farmer and formal breeding are not without weaknesses; a comparative balance sheet is outlined for both. Ideotypes for the three major crop ecologies are suggested and integrated plant breeding is anticipated to develop the proposed ideotypes and enhance farmer innovations in sorghum breeding.

36. Gender and Crop Genetic Resources Management: The Role of Women Farmers in Conserving the Genetic Resources of Jugo Beans and Cowpeas in KwaNgwanase, KwaZulu Natal, South Africa.
Munyaradzi Saruchera,

The significance of gender in understanding the role, knowledge, practices and representations associated with crop diversity remains underestimated. One major reason for this is the 'invisibility' (through ignoring or undervaluing) of women farmers' contribution to agriculture by research, policy and others. Through their multiple roles as farmers, cooks, gardeners, keepers of culinary traditions, seed custodians and healers, women play a major role in shaping agricultural biodiversity. In rural areas, the conservation and use of plant genetic resources begins and ends with women farmers. As smallholder farmers, rural women are involved in all areas of the crop cycle from seed selection to planting, harvest, storage and processing. At household level, women farmers are responsible for food gathering and preparation, medicinal plants and welfare. In fulfilling these roles, women farmers invariably determine which plant resources they will conserve and use, which seed to select, which crop varieties to grow, which food products to keep for home consumption and which to sell at local markets. Given their varied and complex responsibilities in rural households, women farmers have a special interest in the diverse and multiple uses of plants and other biological resources. The experience, special skills and knowledge that women acquire as managers of these resources for livelihood, health and food security constitutes a knowledge system that ensures community needs and subsistence and contributes to the conservation and use of local varieties. However, in many instances plant genetic resource conservation research, policy and statistics have lacked critical gender analysis by either ignoring or undervaluing potentially rich information on the knowledge, skills and practices of women farmers. The 'invisibility' of women farmers' role has weakened official plant genetic resources conservation efforts. The case study seeks to address this shortcoming that reproduces and reinforces the 'invisibility' of rural women farmers' knowledge and practices by documenting their knowledge and genetic resources management systems using a case study of women's cowpeas genetic resource management at KwaNgwanase.

THEME 5: MARKET-LED INNOVATION IN AGRICULTURE

37. How rural poor households value and access poultry: A study of village poultry keeping in Ethiopia using participatory and survey based approaches
Aklilu Hailemichael, Henk Udo, Conny Almekinders

Village poultry production is a technical-biological system managed at household level by family members. Its development requires understanding of technical-biological aspects and social context, as well as their interaction. This study examines the role of poultry in the livelihood of farmers and their access to poultry ownership & benefits, and related utilized poultry technology in three locations in Tigray, Ethiopia. The study employed multiple participatory and conventional quantitative methods. The study revealed that rural poultry is important economically as starter capital for building wealth, means of recovery from disaster such as drought and famine,

accessible protein source, disposable income and exchange purposes and socio-culturally, for hospitality, exchange of gifts, mystical functions, leading to strengthening of reciprocal social relationships. Poor households had smaller number of poultry, which was associated with remoteness (less market access). Men-headed households had a larger flock than women-headed households. Poor rural households developed their own socially innovative poultry sharing system. This sharing system does not need cash but requires building the social network. Understanding of the interaction of technical aspects and social context forms the basis to identify the target household-groups, develop the specific adapted facilities and marketing information suited to enhance their involvement in poultry keeping. The type of information produced by the study show that effective research and development of rural poultry cannot address technical (poultry) problems on their own - but rather see them as an integral livelihood issues in the local innovation system of rural and resource- poor farmers.

38. Linking Ugandan farmers to markets – The contract farming approach
P. Engoru, S.Ferris and E. Kaganzi

In this age of market liberalization and globalization, contract farming provides smallholders an opportunity to fully participate in the market economy. In contract farming, a central processing or trading unit purchases the harvest or production of farmers. These purchases can supplement or substitute for company production. The terms of the purchase are arranged in advance through contracts, the exact nature of which can vary considerably from case to case. Contracts are generally signed at planting time in case of crops and specify how much produce the company will buy and at what price. Often the company provides credit, inputs, farm machinery, rentals and technical advice. It always retains the right to reject substandard produce. One of the key features of contract farming is that it provides farmers with access to markets that would not otherwise have been available to them for example without the quality control and tight coordination offered by contract farming, it is frequently unlikely that smallholders would be able to sell perishable goods overseas through open market sales. However it has also been criticized for providing an avenue in which agribusinesses take advantage of legally unsophiscated and financially desperate farmers by hiding agribusiness-favourable terms in the fine print of production contracts and offering those contracts on a take-it-or-leave-it basis. Only a small portion of Ugandan farmers are linked to markets through the contract farming approach however its popularity is slowly increasing. This paper aims at examining the various contractual farming arrangements in Uganda especially in the context of their linkage of farmers to markets. It will look at the organisation, strengths and weaknesses of each of these approaches in relationship to each other and to those in other parts of the world.

40. Farmer participation in market research to identify income-generating opportunities; analysis of critical success factors for agroenterprise development.
Elly Kaganzi, Shaun Ferris Flavia Asiimwe, Julius Barigye and Jemimah Njuki

Farmers increasingly have to provide not only for their household food needs but also to generate cash income to cover other basic family necessities such as clothing, school fees, medicines etc. The surplus of the basic food crops that they are accustomed to growing often fetch very low prices in the market, especially in the harvest period when there is over supply. An alternative strategy for these farmers is to identify opportunities for either:

- Diversifying their production, with the incorporation of higher value crops or livestock into their farming system, or
- Adding value to the crop or livestock products that they are already producing through improvements in quality and presentation, or through transformation into products more attractive to consumers.

Producing for the market is inherently more risky than producing crops and raising livestock for one's own consumption. The selection of options for generating income requires the collection of precise information that will help the farmer to make decisions appropriate to his or her situation. The present paper presents the steps of a process that seeks to develop the capacity of farmers to identify and select attractive options which meet a set of criteria that a) ensure an economically viable and environmentally sustainable enterprise, and b) meet the specific needs of the communities and the farmers who are going to engage in the respective enterprises. The community or market facilitator, who can be a staff from a governmental or non-governmental organisation, plays a critical role in leading the farmers through the identification of market opportunities by means of market visits, and the subsequent characterisation, evaluation and selection of the most attractive options. The methodology has been validated with farming communities in Uganda, Tanzania and Malawi. The results from the different countries have been varied; hence the paper tries to identify critical success factors. . The results and lessons learned from these experiences are summarised.

41. Linking farmer field schools to markets. a participatory business planning process to agroenterprise development in eastern uganda

Flavia Assimwe

Farmer Field Schools in Eastern Uganda were started in 2002 under the Project 'Piloting Farmer Field Schools for Soil productivity and improvement' by Inspire. As a result of the approach there was an increase in agricultural production with farmers having a surplus to sell and some also going in for commercial framing. The challenge to this was therefore where and to whom the farmers would sell their products at a good price. However, producing for the market is inherently more risky than producing crops and raising livestock for ones own consumption. The selection of options for generating income requires the collection of precise information that will help the farmer to make decisions appropriate to his/her situation. In 2005 CIAT collaborated with Africa 2000 Network to address this challenge through the Agroenterprise Development approach. The approach involves facilitating of farmers to conduct market research to identify market opportunities and using the information collected to make decisions regarding what to produce and where to sell it and planning (business planning) for the enterprises in a participatory manner. Results from the market research were subjected to a Cost Benefit Analysis (CBA) and according to the CBA, ground nuts was the most profiting enterprise and this enterprise was therefore selected for 2006A. A farmer monitoring and marketing committee is to ensure that members follow the schedule of activities in the business plan to ensure that the crop is ready for sell at the same time and hence enabling bulking of the produce and marketing of the produce respectively. The paper shows evolution of the enterprise, problems/challenges encountered the steps of a process that seeks to develop the capacity of farmers to identify and select attractive options which will fetch more, how business planning has helped the farmers, farmers' own initiatives as a result of the AeD approach, progress and way forward for the enterprise.

42. Sustaining Smallholder farmer Linkages to High Value Markets: The Role of Internal Savings and Credit Institutions

J. Barigye, H. Ahimbisibwe, E. Kaganzi, J. Njuki and S. Kaaria

There is an increasing recognition of the need for systems approach in working with smallholder farmers. This includes the recognition that smallholder farmers require not only access to improved technologies but also access to financial resources with which to develop their agriculture enterprises. This has become increasingly important as smallholder farmers endeavor to engage in high value markets. Previous efforts to help the smallholder farmers access high value markets, has put much emphasis on collective action of pooling the volumes to meet the quantities and frequency of supply required by the markets. Access to financial resources has emphasized on farmers accessing credit from banks and other rural and urban financial institutions. Smallholder farmers however face very many constraints in accessing funds from these institutions such as the lack of collateral, high interest rates, the unpredictable nature of

agricultural production, which varies depending on climate among others. While there is potential for internal savings and loans in overcoming some of these constraints, little has been done to find out how the small holder farmers can access and maintain linkages to high value markets using their internal saving and credit institution and which categories of people are utilizing the savings to sustain the markets. Internal savings and credit schemes offer an opportunity for smallholder farmers to access the much-needed credit from their own resources without the stiff formal requirements of the rural and urban financial institutions. While the potential exists, it is important to understand how such internal savings and credit schemes should be structured and who stands to benefit from these schemes. This paper uses a case study of the Nyabyumba United Farmers Association to critically analyze the role of internal savings and credit schemes, it describes and analyses the structure and resources of the organization how farmers are using different strategies to pool savings to together. An analysis of how different types of households including men and women are benefiting from the internal savings and credit schemes. The paper also makes a comparison of other different sources of financing for farmers and how this compares with the internal savings and credit schemes. Results show that while internal savings and loans are an important strategy for rural financing especially useful for smallholder farmers that require financing to maintain links to high value markets, different strategies are required to mobilize enough resources to make them sustainable sources of funds for their members. Nyabyumba United Farmer Group has been able to sustain and maintain market-linkages through its internal saving and credit scheme where members access affordable credit to purchase farm inputs like clean potato seed, spray pump, fertilizers, chemicals, land for rent to meet market demands; and sometimes buy potato ware from non group members to raise the quantity required by the market. There is differentiation in the type of households accessing different loan products including agricultural loans, school fees loans and emergency loans. While these internal savings and credit schemes are good sources of finance for their members, they need to be supplemented by other rural financial mechanisms especially for borrowers that require large amounts of money and also policies which encourages and supports farmers in forming producer-co-operatives alongside internal savings to ensure comprehensive small holder farmers income.

THEME 6: BUILDING CAPACITY FOR INNOVATION SYSTEMS

43. Participatory Technology development and Partnership in Agricultural Sustainability in Southern Cameroon: Lessons learnt from a decade of experimentation

Mala Armand William and Jean Tonye

This paper is an assessment of partnership and participation processes used in developing agricultural and NRM innovations at the forest margin. The stakeholder configuration including farmers, researchers and consumers and their involvement processes have characterized. The paper shows that the social units (household) and ecological scales (plot or on farm) which underlie these technological innovations did not support social learning ; more over, it reveals that there is an imbalance between the biophysical options orientation including agricultural productivity, biodiversity and soil fertility and others institutional and social innovations like farmers organisation and marketing of forest-agriculture products. This orientation added to a insufficient traceability in the processes of participation and stakeholders involvement approaches limit their potential of producing knowledge of adapted innovations for agricultural and NRM sustainability. Finally, the assessment recommends that there is a need to upscale the participatory technology development by keeping the organic link between household livelihood and the community landscape management level. At this level, there are many opportunities for social learning and knowledge interface that can support the articulation of adaptive resource management options.

44. Grow more food with less water: Experiences in Promoting Drip irrigation technology in the Eastern Africa Drylands
Noah Lusaka

This paper highlights an innovative initiative taken by ALIN-EA to promote the drip irrigation technology in the region focusing on successes, lessons learned and the challenges experienced. The main aim was to reduce the community's vulnerability to drought and reliance on relief food. Food security at household level is a major problem for communities living in the drylands. Coupled with lack of adequate water supply, most communities rely on relief food during drought periods. Drip irrigation is a method of watering plants with single drops of water at a time. The set up consists of tapes with very small outlets that let out water one drop at a time wetting the soil around the plants roots. The technology was developed in the USA and Israel for growing crops in dry climates where water is limited. The technology is efficient in use of water - no water is wasted as runoff or lost by moving down through the soil too quickly for the roots to absorb it. The technology has been further simplified and requires low water pressure to operate. The tapes are very flexible and can be modified to suit different lengths of rows or plot sizes. This technology has enabled communities to grow vegetables using less water during the dry season. The network's activities on this technology started in early 1998 when technical information on bucket drip irrigation was published in the networks *Baobab magazine* that was read by well over 2000 community development workers in Africa. The article generated a lot of interest from the magazine's readers involved in drylands agriculture. As a result, ALIN-EA organized an experience-sharing workshop on drip irrigation in September 1998. The workshop brought together 30 drip users, researchers from Kenya Agriculture Research Institute (KARI) and officials from the government and Non-Governmental Organisations to expose them to the technology and map out strategies of implementing pilot programmes in Kenya. Following this workshop, the use of bucket drip irrigation gained momentum and many organizations are now promoting the technology in the region successfully enabling poor farmers to produce food. Through the use of the network's information and technical support in trainings and demonstrations, the drip technology has spread widely in the region including Ethiopia, Tanzania and Uganda. The network also developed a simplified and well illustrated 'Drip Irrigation Extension Manual' targeting field based extension workers through a participatory workshop with participants drawn from the drylands of Kenya, Uganda and Tanzania. Some of the challenges include clogging of the drip lines, lack of a sustainable local supply system of the kits, water availability and lack of competent trainers.

45. Mainstreaming farmer innovativeness in WAD goat genetic improvement schemes in the development of sustainable goat production systems in Southwestern Nigeria.
S. O. Oseni, B. A. Ajayi and M. Ishola

The West African Dwarf (WAD) goat is well-adapted to the humid forest regions of Sub-Saharan Africa where it makes significant contributions to the livelihoods of hundreds of thousands of farm families. However, its potential role in poverty alleviation programmes in this region has not been fully exploited. Comprehensive studies are needed on ways that WAD goats can play a greater role in improving rural livelihoods. The goal of this presentation is to create a methodological framework employing local innovations rooted in traditions, for the development of sustainable goat production models, with illustrations drawn from an ongoing Research & Development (R&D) project in Southwestern Nigeria. The proposed framework examines crucial sub-components of WAD goat production – genotypes, nutrition, housing, health-care – under village conditions as influenced by local knowledge systems. This is to facilitate the development of sustainable models for its management and production. Research hypothesis states that effective local innovativeness in WAD goat management, stock selection, breeding and improvement exist, that can be harnessed in boosting the productivity and contributions of WAD goats to the diversified livelihoods of goat farmers in rural areas in the region. The proposed framework is hinged on local knowledge systems and innovations that utilize renewable farm resources as inputs for the development of sustainable models for goat production. The framework examines

the role of local knowledge systems in the maintenance of a diverse genetic pool of WAD goats, animal care and management, nutrition, housing and healthcare, based on the use of renewable resources that are sourced within the locality. Steps in defining the methodological framework include: (a) Stakeholders' meetings based on Focused Group Discussions and Needs Assessment, involving interactions between researchers and farmer groups; (b) Campaign for a paradigm shift among researchers, about new research priorities focusing on the need to *document, evaluate and introduce* traditional farmer innovativeness into mainstream livestock husbandry, as a principal component in R&D programmes; (c) creation of databases for the institutional documentation of all known local innovative approaches to WAD goat breeding, stock selection, management and production; (d) establishment of a multi-disciplinary study team (including Livestock Specialists, Economists, Rural Sociologist/ Anthropologist, Oral traditionalist, etc), to coordinate research efforts on the *documentation, evaluation, application and institutionalization* of local innovative knowledge systems in WAD goat management; (e) scientific evaluation of such innovations to validate, refine and introduce such into mainstream animal husbandry under smallholder units; (f) development of sustainable WAD goat production models based on such innovations; (g) multi-locational testing of such models, and (h) incorporation of such models in the design of improved management systems, with full participation of farmer groups, under *on-farm* conditions. The proposed framework will help to define workable intervention measures for the development of highly sustainable WAD goat production models under village conditions, geared towards poverty reduction.

46. Integration of Community based PM&E within FFS curricula

Njunie M.N K.K Lewa, J. Ndungu, FN Muniu, J. Njuki, and B. Mweri

The farmer field school (FFS) approach for technologies up scaling was first introduced to coastal Kenya in 2000 through FAO. The main objective of using the FFS approach was to empower farmers to train others on available technologies, and consequently increase household food security and income in smallholder farms. The FFS involves the farmers in decision-making and improves adoption of technologies. The FFS implementation process involves ten established steps: ground working; identification of participants and training needs; identification of sites; training of trainers; Participatory technology development PTDs); follow ups by trainers; field days; graduation; farmer run FFS and Monitoring. In coastal Kenya, FFS approach has been used to up-scale: fodder production and utilization; use of green manure for maize production; soil fertility improvement; water harvesting, and cashew and banana production. By July 2006, over 336 FFS involving 7,772 farmers had been established in coastal Kenya. Participatory monitoring and evaluation (PM&E) was introduced in the region to facilitate project staff and the farmers to systematically analyse, interpret change and measure progress towards achievement of their objectives at the project and farm level. The PM&E concept was first introduced in 2004; KARI Mtwapa being among the five centres that implemented "Strengthening PM&E in research and development systems project" pilot phase. Consequently, two projects were engaged in PM&E: Soil and Water Management project to enhance food security in coastal Kenya (SWMP) and Tissue culture banana (TCB) projects. To start, 14 research and 13 extension staff involved in various projects were introduced to PM&E principles and concept at KARI Mtwapa in May and June 2004. Performance frameworks that incorporated current and future situation, impact goal, outcomes, outputs, activities, indictors, information requirements, and data collection tools were developed for 11 FFS (eight from SWMP and 3 from TCB projects). Having identified useful attribute of PM&E, 15 ATIRI (Agricultural technology information response initiative) farmer groups were later introduced to PM&E process. In addition, the cashew productivity project included PM&E as a special topic during FFS approach training. Sixty extension officers were trained and later established 80 cashew management FFS. Based on anticipated benefits of integrating FFS and PM&E, KARI, CDA and CIAT project staff developed a curriculum that integrates the. The first step was to build capacity of the staff in their understanding of both the FFS and PM&E. Twenty three participants attended the workshop (six FFS farmer facilitators; 11 extension staff; and six research staff), and would apply the skills gained during the implementation of TCB, Cashew, and SWMP projects in the region. Integration of FFS and PM&E

showed potential to strengthen the FFS approach. The integrated process would facilitate performance monitoring of the technologies under farmer experimentation and the effects of the FFS itself, thus enhancing both the acquisition of technical knowledge and collective action by the group members

47. Impact of Regional Capacity Building Networks in meeting Africa's Socio-economic Development Objectives

JPR Ochieng'-Odero

Over the last three decades, the delivery of training programmes through *Clusters of networks'* have gained widespread acceptance, being seen as innovative mechanisms to promote postgraduate education in Africa. They are regarded as being more focused in their training approach, delivering a graduate output product that is more closely in-tune with the national development priorities due to the design of their training curricula, and are also seen as being more cost effective, since they ensure duplication is minimized by the implementation of coordinated training programmes across a number of universities, both nationally and within regions. A good example of a network established to specifically address focused capacity building, is the African Regional Postgraduate Programme in Insect Science (ARPPIS), coordinated by the International Centre of Insect Physiology and Ecology (*icipe*). Since its establishment in 1983, the ARPPIS network has steadily grown and presently involves 33 participating African universities and has graduated 170 PhD-level scientists and 120 at MSc-level from 29 countries. One of the key elements of *icipe*'s training programmes is the emphasis on problem solving with the target communities and end-users, be it through strategic research, training farmers or training of trainers (ToT) and extension workers. This approach is pivotal in ensuring that the training remains relevant and that the trainees are aware of the pressing on-the-ground problems of technology implementation and adaptation. With very few exceptions, graduates from ARPPIS have remained to work in Africa. A number of graduates have risen to policy-influencing positions within their governments and have maintained linkages with ICIPE through the ARPPIS Scholars Alumni Association (ASA). Using the example of ARPPIS, the main goal of this paper therefore, is to evaluate how successful have networks been in addressing development priorities? What organizational learning has occurred over the years, and to what extent has that learning informed change in the individual networks for better efficiency? As an attempt in re-interpreting a new role for the university, would this `cluster of network' approach be a better cost-effective model for the African university to adopt as way to deliver on impact? The paper will show, that since the functioning of science, technology and innovation (ST&I) systems rely on complex integrated interactions, there a tendency for inefficiencies to be numerous, which can only be addressed through concerted long-term investment in capacity strengthening interventions. These weaknesses are not limited to national boundaries and are quite common in similar systems within the region. It is in this regard that we posit that *Clusters of Networks* is likely to serve a wider regional constituency better by delivering the much-needed relevant knowledge-based solutions, and thereby ensuring impact on development.

48. Combating Food Security In Sub-Saharan Africa: The Emergerce of NERICA Rice Varieties

S.A. Igbatayo, and P.B. Imoudu

At the turn of the Millennium, about two hundred million Africans were undernourished, in sharp contrast to one hundred and thirty-three million people twenty years earlier. This sobering trend is the manifestation of a major development issue that has undermined post-independence development efforts across the continent. Food insecurity has assumed a crisis dimension in several African countries, exacerbating poverty and political instability in the most severely affected countries. In Sub-Saharan Africa, about one-third of the population is severely undernourished, creating a deep concern for policy makers in affected countries and their development partners around the World. While other developing regions, with a few exceptions,

have been able to successfully tackle the scourges of hunger and endemic famine through innovative agricultural technologies, the sub continent has lagged behind in the combat against global hunger. While the Green Revolution came to the rescue of many Asian countries in the 1960s and 70s, averting the threat posed by imminent hunger and widespread starvation, the cereals produced under the great initiative were of little assistance in Africa. The improved Asian rice varieties were susceptible to the extreme tropical climatic conditions in Sub-Saharan Africa, which undermined their output potential. This development has now changed, with the emergence of the New Rice for Africa (NERICA) varieties, developed in Africa for Africans. NERICA is the result of an international collaboration led by The West African Rice Institute. The new rice varieties combine high yielding attributes of the Asian rice species with resistance to pests and diseases, as well as adaptation to extreme climatic conditions prevailing in African countries. These unique features have been attributed to the successful application of innovative technologies that are set to transform rice productivity and livelihood prospects across the African continent. However, the gains of NERICA can only be sustained through large-scale distribution of the new varieties to African farmers. This process is plagued by severe institutional constraints, which undermine the capacity of agricultural research and extension agencies in the sub continent. Therefore, this paper proffers innovative solutions aimed at developing the capacities of African agricultural research and extension agencies through Participatory Learning & Research (PLAR) The proposed mechanism is aimed at promoting technological change by improving farmers' capacity to exchange knowledge, experiences and practices.