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Competence Challenges of Demand-Led Agricultural Research and Extension in Uganda

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ABSTRACT *Governments and development agencies in Sub-Saharan Africa are experimenting alternative approaches within the innovation systems paradigm to enhance relevance of agricultural research and extension to the poverty eradication agenda. Uganda, for example, has recently shifted from the supply driven to demand-led agricultural research and extension. This paper discusses the competence challenges associated with this shift based on experiences from a capacity building initiative for a demand-led agricultural research system and a synthesis of experiences in a demand-led extension. Consequently, key competences for the supply and demand sides are suggested. For a demand-led system to work, 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 will have to be able to self-organise; lobby, advocate and negotiate; have visionary and accountable leadership; learn and experiment; and have entrepreneurial abilities. While in the short-term service providers have to be assisted to acquire these competences, the meta-challenge lies in a long-term strategy to integrate them in the training of professionals working in the value chain.*

KEY WORDS: Competence challenges, Innovation systems, Demand-led, Research, Extension

Introduction

The traditional linear model which suggests that innovations are developed by scientists, disseminated by extension and put into practice by users has not just failed in the Western world (Klerkx, 2008; Leeuwis et al., 2005) it also failed in Africa (Kline and Rosenberg, 1986; Rip, 1995; Woodhill, 2002). Sub-Saharan Africa exhibits this system failure with sustained poverty and food insecurity despite existence technology generation and dissemination institutions (FAO, 2001). Governments and development agencies are experimenting with alternative approaches to agricultural research and extension in an innovation systems paradigm.

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Innovations are new creations of economic significance incorporating technological and organisational aspects and are characterised by complicated feedback mechanisms and interactive relations involving science, technology, learning, production policy and demand (Edquist, 1997). In targeting agricultural development as the driver for poverty reduction agenda, Uganda has transformed its agricultural extension and research systems from being supply driven to being demand-led (IFAD, 2001). This has increased space for pluralistic service provision from the public and private sectors to respond to diverse demands and needs for agricultural innovations. New organisational arrangements for research and extension guided by the comprehensive government Plan for Modernisation of Agriculture (PMA) were pursued leading to establishment of the National Agricultural Advisory Services (NAADS) and the 'new' National Agricultural Research Organisation (NARO). The Parliamentary Act that established NAADS (GoU, 2001: 5) stipulates one of its objectives as to: 'empower all farmers to access and utilise contracted agricultural advisory services'. The National Agricultural Research Policy (NARP) of 2003 emphasises the demand-led orientation:

> The farmers (particularly the poor and women) are to be empowered to demand and control agricultural research processes and services, within the wider Government policies of decentralisation, liberalisation, privatisation and increased participation of the people in the decision-making... (MAAIF, 2003: v)

While organisational restructuring for extension and research is necessary it is in itself not enough to bring about the intended impacts on poverty. Demand-led service delivery is a new way of doing business requiring new competences for both supply (service providers) and demand (farmers) sides. Cognisant of this challenge, NARO in collaboration with the International Centre for Research in Agriculture (ICRA) in the Netherlands and Makerere University initiated a learning programme aimed at building capacity in Integrated Agricultural Research for Development (IAR4D) in 2004. The initiative also involved an independent consultant, Jürgen Hagmann, to enhance facilitation and organisational reform skills and the African Highlands Initiative (AHI) as strategic partner due to their experience in Integrated Natural Resource Management (INRM) and Participatory Monitoring and Evaluation (PM&E).

IAR4D is a research paradigm that seeks to ensure that research does not only lead to knowledge and publications, but also and first of all contributes to change and innovation for the betterment of people, while also preserving the natural resource base for future generations (ICRA-NATURA, 2003). It is similarities in process to other approaches such as the Sustainable Livelihoods Approach (see Carney, 2003; Ellis and Biggs, 2001; Farrington et al., 1999), INRM (see Douthwaite et al., 2004) and Agricultural Research for Development (see Mettrick, 1993; Reij and Waters-Bayer, 2001). The objective of the learning initiative was to strengthen human and institutional capacity to undertake IAR4D, as a new way of doing research in Uganda. Specifically, it was aimed to enhance and mainstream within NARO the capacity of teams to apply IAR4D approaches; and strengthen and

institutionalise the ability of Makerere University to provide capacity-enhancing opportunities in IAR4D for a range of stakeholders.

To comply with the Uganda's NARP and principles put forward in the country's PMA, NARO's realigned strategy and plan mainstreamed research into five themes: (1) Understanding people, their livelihood systems, demands, impact and innovations; (2) Enhancing innovation processes and partnerships; (3) Developing technological options responding to demands and opportunities; (4) Enhancing integrated management of natural resources; and (5) Linking producers, market opportunities and policies (NARO, 2003). In operational terms this implied a shift from:

- Doing research per se to doing research for development where accountability is in form of impact on farmers' wellbeing.
- Disciplinary and commodity-based research to an innovation systems approach addressing the entire value chain where external factors such as markets and infrastructure play an equally important role and influence outcomes and relevance of research-based knowledge interventions (Also see Hall et al., 2001).
- Doing research independently to creating strategic partnerships that enhance relevant research outputs, leading to desired impact.

The learning initiative therefore, was a competence development programme for the new institutional arrangement to deliver on the new ideology of 'demand-led' within an innovation systems context. This paper discusses emergent competence challenges of demand-led agricultural research and extension based on experiences of this learning initiative and documentary review on NAADS programme. It is neither an evaluation nor a critique of research and extension but it describes critical competence challenges to make the new paradigm of demand-led research and extension work.

Methodology

Competence challenges of demand-led research were synthesised from an iterative process of workshops, field practice and mentoring of participants engaged in the IAR4D learning initiative. The initiative was set-up as an action learning process, with a series of five learning workshops intermitted by field practice in teams based at the Zonal Agricultural Research Institutes (ZARIs) over a period of nine months. A total of 54 participants were involved comprising of 24 ZARI staff, 16 from National Agricultural Research Institutes (NARIs)/NARO secretariat, ten from Makerere University and four from District Local Government (DLG) extension. Seven teams were formed, the ZARI staff and their respective DLG partners being the core members of each team. These were occasionally joined by participants from NARIs and Makerere University for joint practice and learning. To each team, a resource person (mentor) from among the facilitators was attached to guide processes and facilitate lessons learning. Two of the authors were resource persons who engaged with participants as action researchers. Experiences and lessons learnt during practice sessions were shared and used as learning resource in the subsequent learning workshops.

Workshops and participant observation were the main methods of data generation. In each workshop the teams reflected and shared their challenges in a structured manner. These were clustered and synthesised to bring out the generic challenges of IAR4D. Subsequent workshops reviewed previous challenges to clarify, refine and monitor how the learning programme addressed the pertinent challenges. Monitoring was achieved by using the critical incidents technique (Flanagan, 1954). Important moments (critical incidents) within the process of knowledge sharing, developing and transfer in this case were elicited and discussed with the participants. Data were therefore, generated in an action research mode characterised by cycles of action and reflection (McKernan, 1991). Specific challenges of demand-led extension were synthesised from the NAADS programme review documents and needs assessment studies done in the previous stages of its implementation. The documentary review was further enriched by some field observations.

The workshop reports, observation notes and the written reflections on the critical incidents and general workshop participation were analysed and compared with the intention to discover some structure and coherency. Usually the participants' ideas and experiences tended to repeat themselves with some variation, but after several rounds of interpreting, a deep structure of common themes emerged which were translated into sets of key competencies for actors on both the demand and the supply side. Finally, the competencies that emerged from the data were also confronted with existing theories and other research results related to re-orienting rural extension.

Findings

We will phrase the competence challenges that emerged from the data analysis as '*How to . . .*' questions to emphasise that challenges represent issues that embody both a problem and an opportunity. Figure 1 shown this in rather rudimentary way. Generally, supply side competence challenges for research and extension overlap but for clarity, they are discussed separately.

Supply Side Competence Challenges for Integrated Agricultural Research for Development (IAR4D)

1. *How to develop and maintain effective partnerships in research and development?*
Partnerships in technology development are important because of their benefits in innovation performance derived from productive relationships between organisations

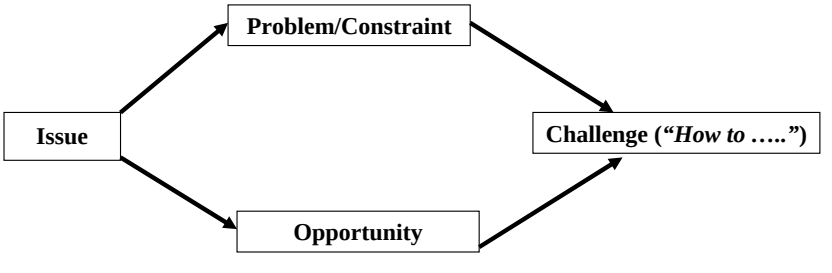

Figure 1. Formulation of a challenge.

engaged in formal research and those engaged in use of new knowledge in economic development (Hall et al., 2001). IAR4D aims to impact on farmers' wellbeing and more specifically in this case to reduce poverty but such impact can only be achieved via partnerships with other complementary service providers. A framework in which the partners fulfil their mandates to contribute to impact in a coordinated way is needed. But partnerships are also characterised by conflicts requiring excellent facilitation skills, platforms for negotiation and consensus building, joint reflection/learning and team performance.

2. *How to empower farmers to demand, and effectively participate in research?*
The last few decades have been characterised by attempts to establish some models of effective participatory research practice (see Friis-Hansen and Kisauzi, 2004 for a review). This effort, however, failed to go much beyond asking farmers questions through surveys and offering on-farm demonstrations of technologies. In essence, research continues to be driven by the researchers' agenda, and tends thus, supply driven. A demand-led approach seeks to put farmers in a position to influence the research agenda and enable the research process generate relevant outputs. While debate in this area has focussed more on what needs to be done, a more critical issue is how to empower the farmers to influence research. Empowering farmers requires researchers to build mutual trust and respectful relationships with farmers in addition to enhancing their organisational capacity. It also invites change in attitudes from the experts providing solutions to joint learning and discovery, and hence a dynamic integration of scientific and indigenous knowledge (cf. Hagmann et al., 1997; Murwira et al., 2001).

3. *How to design and manage integrated research with quality?*
An increasingly integrated world requires integrated approaches to problems (Woolcock, 2002). Many bottlenecks to adoption of agricultural technologies happen to be outside the narrow confines of the technology development process. Markets and policy, for example, are critical aspects influencing technology uptake. The argument among scientists, is often that such a mix of issues bundles together manageable research problems and unmanageable externalities. This degrades the quality of their research, as methodologies in their disciplines cannot take into account such a diversity of perspectives. The challenge is how to design and implement research in a holistic way and without loss of rigor. New strategies for engagement, alternative research methodologies and approaches to monitoring and evaluation of research are needed. At very least, announcement of an effective technological intervention needs to be accompanied by a fully specified set of assumptions regarding the external environment in which a specific innovation will and will not work.

4. *How to develop and maintain multidisciplinary teams throughout the research process?*
Integrated agricultural research thus, means integration of disciplines. Scientists are trained to excel independently in their disciplines. The complexity of reality, however, compels them to work with other disciplines interdependently—resulting in tensions between professional training ethos and practice. Earlier lessons from the Farming

Systems Research (FSR) to a great extent only managed to understand systems from different disciplinary perspectives but did not achieve its goal of integrated interventions. Integration of policy, social aspects, biological and ecological issues to influence social change processes remains an acute dilemma of multidisciplinary and/or interdisciplinary research as currently encountered. The underlying issues include the need for orientation through training, to enable researchers to see beyond their disciplines and to work with other relevant disciplines so as to influence systemic change.

5. *How to cope with the dynamism of socio-political and ecological environment?*
The socio-political and ecological environment is volatile. Farmers' needs and priorities are not static either. Yet 'good' science is about systematisation, often characterised by following prescribed procedures towards 'logical' conclusions. The gap is in the room available for quick adaptation to a changing context in which theory informs practice but yet is not a rigid prescription for practice. How can we systematise within chaos? Should agricultural science try to do that? And if it turns its back on this challenge will it remain relevant? This requires a new mindset, in which systematisation is directed towards client problems, as opposed to systematisation for conformity to theory.

6. *How to instil a culture of honesty, ethics and transparency in the system?*
Sustaining multistakeholder engagements relies on mutual trust, high-ethical standards and transparency on the part of all partners especially with respect to management of resources for joint action. Success in joint ventures therefore demands a strong value base of honesty, ethics and integrity. Ethical standards in science are maintained (ideally) by processes of 'double blind' peer review. Problem-oriented science will need to develop an enlarged peer review mechanism, involving all stakeholders, including farmer clients. How to make such systems work is not yet known, but the new professionals have to be alert to the issues at stake, and the renewed danger of cronyism and patronage where laboratory data sets are not the only basis for judgement. Some of the dilemmas of evolving ethical and professional standards for participatory development approaches are addressed in recent work (Mosse, 2005).

7. *How to secure and appropriately manage resources for Integrated Agricultural Research for Development (IAR4D)?*
IAR4D poses a serious challenge for resource mobilisation and management. Firstly, funders insist that a research proposal be focussed on a specific problem, leaving little room for flexibility to address emerging issues. Secondly, how should partners commit their resources to joint engagements? Thirdly, how should resources contributed by various partners be managed? Fourthly, how will credit or blame be shared, in case of success or failure respectively, among the partners? These are among important research management issues that complicate the operationalisation of IAR4D. Research programmes focussing on impact rather than outputs deviate from the logical frame-based designs of research projects that researchers are now accustomed to. A mechanism is needed for efficient and flexible use of resources—something that donors also have to adjust to.

8. *How appropriately to reward, motivate and retain human resources for superior organisational performance?*

Only well-motivated and highly committed researchers can pursue IAR4D approach as the desired impact will come neither easily nor speedily. The present incentive structure, including remuneration for researchers in developing countries, is far from generating the level of motivation and commitment IAR4D requires. Furthermore, staff performance appraisal is skewed in favour of publications rather than impact on the community. As in any academic/research institution in Africa the survival formula is *publish or perish*. It does not matter whether the publication translates into visible change in the foreseeable future, so why bother so much about impact? To encourage IAR4D, staff performance criteria need to change to appropriately reward and recognise those who strive for impact. This issue is a crucial one, but devising the right kind of incentive structure goes beyond the present scope. Clearly, however, a major methodological question is raised. Incentives need to be related to community impact criteria, but the very basis of cooperative research activity makes it hard to assign values to the contributions made by the various parties. Currently, conventional reward assessments would almost force a researcher assisting self-reliant farmers to try and claim the activity as his or her own, for example. Measuring 'added value', or effective synthesis of farmer and scientist knowledge, is an area requiring specific detailed study.

Supply Side Competence Challenges for the Demand-Led National Agricultural Advisory Services (NAADS)

1. *How to provide advisory and information services with a systems focus through contracted service providers?*

In NAADS, private service providers are contracted to provide commodity-focussed advisory services, but the services are disconnected and not anchored in contextual constraints such as markets, natural resource management and HIV/AIDS (Bua et al., 2004; Eilu and Turamye, 2004). While, for example, natural resource management and HIV/AIDS are cross-cutting in contracts, in practice, their integration has not been successful. This is not only a design issue, but it is also a competence issue. First, it requires a mindset that is appreciative of the value of integration of disciplines in services delivery. Second, it requires capabilities for networking, and managing functional partnerships. Mechanisms for coordination and sustaining partnership have to be in place.

2. *How to move away from training and demonstrations to learning and experimentation with farmers?*

The set-up of NAADS programme is geared towards training and demonstrating technologies to farmers. The assumption here is that the solution lies solely in technology and information dissemination, similar to other top-down approaches, like the Training and Visit (T&V) system, which NAADS replaced. Application of knowledge at the farm level is compounded by other constraints concerning, for example, inputs, credit and markets (Obaa et al., 2005; Oxfam-GB and FOWODE, 2004). Addressing such complexities requires addressing underlying issues via strategic interventions that provide scope to learn with farmers rather than to teach them.

Focus on training, and multiplicity of contracts corresponding to specific enterprises and commodities, develops into a scenario based around creating schools for farmers. This is problematic as each farmer is engaged in multiple enterprises, implying that s/he is expected to attend a training session almost every day of the week like students attending school everyday (see Box 1).

Box 1. Are we taking farmers to school?

In one of the training sessions on farmer institutions development observed in Mukono district, the trainer came with a box of exercise books and pens for farmers to take notes. The trainer taught about farmer groups—the need for a group, leadership structure and responsibilities of group leaders. Although, occasionally punctuated by questions to the farmers, it was no different from a typical 'lecture'.

When asked whatelse he was going to do in that village with regard to farmer institution development, he said his organisation had only a three-month contract. He did not envisage doing much more in that village because he had several other villages to cover.

After the training, one of the farmers complained '*we should also get holidays!*' He was referring to trainings that take place every day, turning them into full-time students. Students do in fact get holidays, and he argued that farmers also deserve holidays.

The approach is basically misconceived, since the training is still formulated around the notion of a contract to supply. It would be better to start by asking what farmers think they lack, and then build a demand driven training curriculum. Indeed, service providers recognise progressive decline of farmer interest in training, yet contracts are partly evaluated on the basis of farmer attendance lists. To attract farmers, some service providers offer incentives such as food and drinks during training (CEED, 2004; Obaa et al., 2005) but the 'benefits' of such induced participation can be contested.

It is known that farmers learn more from fellow farmers and indeed extension staff too have a lot to learn from a two-way flow of knowledge formation. But in practice extension workers are yet to learn much if anything from farmers, as they still carry with them into the field the mentality of being an 'authority' to teach farmers. In a study by Mubangizi et al. (2004), NAADS service providers listed their major sources of information as college notes, textbooks/manuals and NARO. Farmers as a source of information came 14th among 17 sources. The marginal recognition of farmers as a source of knowledge indicates how distant the system is from being a learning organisation. Given the present orientation, service providers can hardly engage with farmers to learn and jointly experiment promising options to key problems. Change needs to be twofold: in addition to attitude change, it requires a different set of competences to effectively engage in learning processes with farmers—listening to farmers is one of the essential competences to develop.

3. *How to develop strong farmer institutions capable of articulating quality service demands and fostering accountability for services and resources?*

A functional farmer organisation is the platform for processing and articulating farmer needs in a precise and inclusive manner, that is, there is a need to move beyond wish lists put together by vocal community leaders in 'instant' meetings. Inclusiveness here means taking care of different levels of needs among different classes of farmers within a shared development goal. Even small-scale farmers are not homogeneous. For example, Bagnall-Oakeley et al. (2004) expresses the difficulty of delivering information to the poor who are food insecure and rarely interact with the market. Richards (1993) argues that agriculture as a performance is part of a wider performance of social life in which technological needs and innovation possibilities cannot be separated readily from a range of often unequal relationships tying small-scale resource-poor farmers into various kinds of dependency relationships. This makes it very difficult to 'represent' farmers, unless farmers themselves have organised the mode of representation and worked through some of the political issues dividing them.

The lack of true democratic representativeness of even participatory rural development activity has been a subject of recent comment (Mosse, 2005; Richards, 2006). It has, for example, been noted that people who benefit from NAADS are those with convertible assets or have access to external financing or remittances (Oxfam-GB and FOWODE, 2004). For inclusiveness, service demand has to be differentiated, targeted and tailored to relevant farmer group and class; otherwise commercial demand automatically excludes many—and probably the ones most in need of what poverty targeting programmes are intended to provide. Within genuinely democratic farmer organisations, farmer representatives are able to follow up a range of interests and demand accountability. This entails having abilities for mobilisation, leadership, lobbying and advocacy, networking and business analysis among others, at farmer organisation level. Developing viable organisations and sufficient skilled organisers at this level will require long-term engagement and skills development. It also leaves aside whether or not there is sufficient political commitment to democracy to allow farmers to organise in ways that genuinely empower. Where local confidence is sufficient to demand better services it may also demand far-reaching political change as well. Self-organisation for farmers requires a prior reasonable level of emancipation, to challenge the system to be accountable. The risk is that otherwise platforms created in order to articulate demand will be hijacked by a few elite farmers who connive with service providers around their own interests.

4. *How to build the capacity of the private service providers to deliver effective demand-driven advisory services?*

One of the major reasons for failure of service delivery reform processes is too narrow, a focus concerning what it takes to do things differently. Most often, the temptation is to do new things in old ways, which changes little. While one of outputs of NAADS is developing private sector institutions, this has been limited to supporting attainment of legal status for service providers. No investment has been made in the functional competences of service providers to make them effective in delivering demand-driven services. It is unrealistic to expect that by merely changing the 'rules of the game'—as in the present case—service providers would respond by offering better quality services.

Service providers can only do what they know how, and are able to do. They must be enabled to do things differently through a protracted competence development programme.

Implications for Competence

The challenges discussed claim certain critical competences on both the supply and demand side to enable a beneficial transition from a supply led to a demand-led agricultural service delivery system. The requisite competences are explicitly outlined below.

Key Competences for the Supply Side

In addition to proficiency in their speciality technical skills, providers of agricultural research and extension should have the abilities (attitudes and skills) to:

- Facilitate action learning processes with farmers, to enhance experimentation and joint discovery. Developing mutual trust and integration of indigenous and technical knowledge are key elements here. Service providers could, for example, develop a scientific dimension to farmer experimentation to arrive at logical findings acceptable to both parties and capable of being scaled up or out to other farmers. Joint critical reflections are also essential for exchanging views and opinions, in order to enhance learning and adaptation.
- Serve as information and knowledge brokers. Information and knowledge brokerage is not just dissemination of information. It is about linking those who have information and knowledge to those who need it. This might be a matter of linking farmers themselves, or it might involve linking farmers and service providers. In this case the broker has interests on both sides and intervenes to negotiate fair deals for all the parties. Brokers also develop a knowledge management function to allow effective accumulation and exchange of knowledge and experiences. Therefore, the brokers should be able to document and manage information for future reference.
- Develop local organisations and facilitate farmer empowerment processes. This goes beyond formation of organisations to enabling emergent organisations to come up with their own development agenda. On the basis of this agenda, genuine demand for services can be articulated. Empowerment also means developing potentials that enable organised groups to identify and take advantage of existing opportunities (Narayan, 2002). Ability to mobilise for social action, to ensure accountability for services and resources at all levels, are also key elements of local organisational development and empowerment. In turn this requires leadership, awareness of rights and how effectively to use the powers that people have.
- Apply system-wide perspectives in programme design, implementation and impact assessment. This is thinking beyond outputs to focus on ultimate impact, which in this case is poverty alleviation (van Meele et al., 2005). In a systems perspective, one is able to see what it takes to influence impact and consequently design appropriate processes and mechanisms to link the different actors to contribute. Clarity about what it is that the different partners are contributing

to impact, and how their contributions complement each other, is critical. In such mechanisms, strategic planning, PM&E of impact are embedded aspects.
- Develop and promote teamwork, and be good team players themselves. Firstly, they should be aware of how effective teams function and have the techniques to enhance teamwork. Managing group dynamics, self-awareness and self-control are key skills here. In addition, critical are functional communication skills for influencing change—that is, negotiation, lobbying, advocacy and conflict resolution skills.
- Facilitate development and manage partnerships for collective action. Impact on livelihoods is an outcome of effective engagement with multiple actors. For the actors to work in a complementary manner requires process management skills. The key ones include facilitating stakeholder platforms to develop a shared agenda, negotiating roles and responsibilities and setting-up management arrangements for coordinated action. Conflict management is part-and-parcel of these processes.
- Support enterprise development. This requires skills for strategic and business planning as well as entrepreneurial skills. Understanding enterprises in a broader market system helps in assessing their viability.

Key Competences for the Demand Side

The demand side, that is, the farmers too needs to be able to:
- Self-organise and mobilise people and resources for a shared development goal. Firstly, this requires having a shared development agenda and then mobilising social energy to pursue that agenda with perseverance. Secondly, it requires awareness of farmer rights and/or entitlements, as well as skills for ensuring accountability at all levels. There is a beginning to the literature on how, practically, to develop a rights based approach among farmer client groups in Africa (cf. Archibald and Richards, 2002).
- Lobby, advocate and negotiate for services. Farmers should be able to identify the type of services they need and use their leaders to lobby, advocate and negotiate for those services with service providers and politicians. This requires confidence, determination and persistence. Leaders, it is said, are born not made, but in fact much can be done to prepare leaders, once popularly chosen, to carry out their functions more effectively. Commitment to development is the intrinsic driver and poverty in Africa is sometimes clearly the effect of poor local leadership. New professionals need to know how to help improve the capacity of farmer leaders.
- Elect and support visionary local leadership that is accountable. This is based on awareness of good leadership qualities and exercising freedom to elect their leaders without manipulation. In effect, further extension of the agenda of democracy and good governance, to which most African countries have now committed themselves, is a basic requirement for the implementation of the technical reforms here envisaged. Farmers need to accept the responsibility to use their legitimate power to enforce accountability by their leaders.
- Demonstrate entrepreneurial skills in their business. Farmers need to be able to analyse situations to see opportunities among challenges and to engage with

challenges in a positive way. Poverty alleviation requires, on the demand side, a more proactive approach (rejection of the 'victim' culture) in which local groups take responsibility for their own development. This is possible through appropriate investment in skills of self-awareness, and challenging oneself to develop unutilised potentials.

– Engage in learning processes with intention to experiment options for potential solutions. Learning requires positive thinking and action towards a solution—hence experimentation. This should be supported by consciousness to reflect on processes and outcomes to draw lessons for success. It also requires, at times, local adaptation of the scientific (evidence-based) approach as a means of sifting viable and non-viable approaches and treatments. People's science is not an impossible dream, as shown by the success of integrated pest management approaches based on farmer learning (Richards, 1995).

It is reiterated that competences on the demand and supply sides appear to be mutually dependent. One way of looking at this is to recognise that the supply side has a responsibility to facilitate the emergence of requisite competences on the demand side, while the demand side provides all-important feedback controls. Figure 2 shows this interaction and interdependence of supply and demand side competences. The interaction is effective only if both parties engage, with a motive to learn for mutual benefit. The relationship is enhanced and sustained by honest feedback (Figure 2).

Conclusion

This research has generated key competences that are needed on both ends of the value chain. In re-orienting rural extension towards a more demand-driven system these competences will need to develop in interaction. The quality of such interaction heavily hinges on the quality of facilitation and feedback loops. This conclusion not only suggests that much attention needs to be paid to capacity building of facilitators guiding this interaction (Brinkman et al., 2007) but also that the dichotomy between supply and demand side is somewhat artificial. Perhaps, it is therefore, more useful to

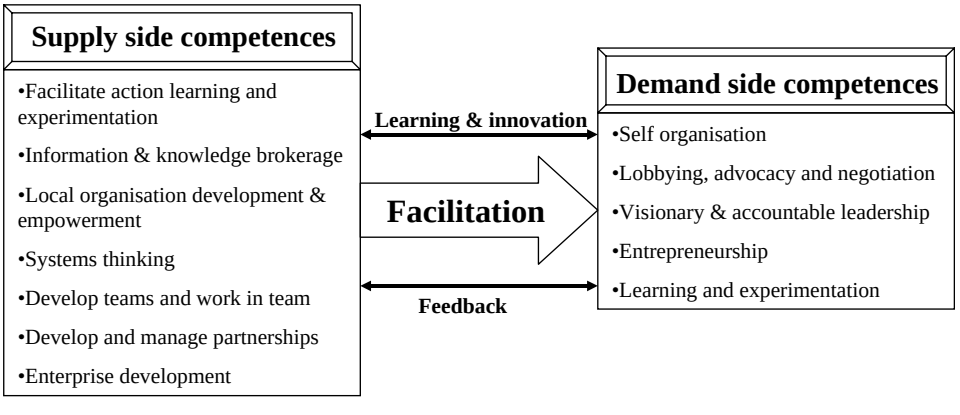

Figure 2. Interaction of competences.

speak of a shift towards a hybrid extension system that creates a new dynamic between supply and demand which is more conducive to innovation and the emergence of sustainability.

Finally, the competences that have been described here are of a generic nature in that they cut across disciplinary boundaries. In the short term, agricultural professionals must be assisted to acquire these competences; otherwise we could be treading futile efforts towards agricultural innovations systems in the Sub-Saharan Africa. The long-term implication is that such competence development would have to be integrated in the professional training for all those likely to work in the value chain. How universities, for example, can prepare themselves to integrate those skills in their training programme is discussed elsewhere (Kibwika, 2006; Wals, 2005). But first, the university must ensure that these competences exist among their own academic staff, otherwise their ability to assist in their development will be greatly impaired.

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References

Archibald, S. & Richards, P. (2002) Conversion to Human Rights? Popular Debate about War and Justice in Rural Central Sierra Leone. *Africa*, 72(3), pp. 339–367.

Bagnall-Oakeley, H., Ocilaje, M., Oumo, F., Nangoti, N., Oruko, L. & Rees, D. (2004) Mapping and Understanding Farmers' Indigenous Agricultural Knowledge and Information Systems and the Implications for Contracted Research and Extension Systems. *Uganda Journal of Agricultural Sciences*, 9, pp. 119–125.

Brinkman, B., Westendorp, A.M.B., Wals, A.E.J. & Mulder, M. (2007) Competencies for Rural Development Professionals in the Era of HIV/AIDS. *Compare*, 37(4), pp. 493–511.

Bua, A., Okorio, J., Kataama, D., Mutabazi, S. & Okwadi, J. (2004) Study on the Process of Technology Development and Uptake in the National Agricultural Advisory Services (NAADS). Preliminary Report. Kampala, Uganda: NAADS.

Carney, D. (2003) *Sustainable Livelihoods Approaches: Progress and Possibilities for Change*. London: Department for International Development.

Coalition for Effective Extension Delivery CEED (2004) *Managing Change: Farmer Institutional Development under NAADS*. Kampala, Uganda: NAADS.

Douthwaite, B., Ekboir, J.M., Twomlow, S. & Keatinge, J.D.H. (2004) The Concept of Integrated Natural Resource Management (INRM) and its Implications for Developing Evaluation Methods. In: Shiferaw, B., Freeman, H.A. and Swinton, S.M. (Eds), *Natural Resource Management in Agriculture: Methods for Assessing Economic and Environmental Impacts*. Wallingford: CAB International, pp. 321–340.

Edquist, C. (Ed.) (1997) *Systems of Innovation Approaches: Their Emergence and Characteristics*. London: Cassel Academic.

Eilu, G. & Turamye, B. (2004) Baseline Survey on Integration of Natural Resources Management in NAADS Activities. Consultancy Report by the Environmental Conservation Trust of Uganda. Kampala: Environmental Conservation Trust of Uganda.

Ellis, F. & Biggs, S. (2001) Evolving Themes in Rural Development 1950s–2000s. *Development Policy Review*, 19(4), pp. 437–448.

FAO (2001) *Farming Systems and Poverty*. Rome: FAO.

Farrington, J., Carney, D., Ashley, C. & Turton, C. (1999) Sustainable Livelihoods in Practice: Early Applications of Concepts in Rural Areas. *ODI Natural Resource Perspectives.* Number 42, Overseas Development Institute, UK.

Flanagan, J.C. (1954) The Critical Incident Technique. *Psychological Bulletin*, 51, pp. 327–358.

Friis-Hansen, E. & Kisauzi, D. (2004) Evolution of Extension-farmer Relationship in Uganda. Proceedings of Workshop on Extension and Rural Development: A Convergence of Views on International Approaches, Washington, DC, 12–15 November 2002.

Government of Uganda (GoU) (2001) The National Agricultural Advisory Services Act, 2001. Acts Supplement No. 9, The Uganda Gazette No. 33, Volume XCIV.

Hagmann, J., Chuma, E., Connolly, M. & Murwira, K. (1997) *Propelling Change from the Bottom-up: Institutional Reform in Zimbabwe*. IIED Gatekeeper Series No. 71. London: International Institute for Environment and Development.

Hall, A., Bockett, G., Taylor, S., Sivamahan, M.V.K. & Clark, N. (2001) Why Research Partnerships Really Matter: Innovation Theory, Institutional Arrangements and Implications for Developing New Technology for the Poor. *World Development*, 29(5), pp. 783–798.

ICRA-NATURA (2003) Mobilising Partnerships for Capacity Building in Integrated Agricultural Research for Development (IAR4D). Documentation of a Workshop Held at the International Agricultural Centre (IAC), 27–29 November 2003, ICRA, Wageningen, The Netherlands.

IFAD (2001) *Rural Poverty Report: The Challenge of Ending Rural Poverty.* Oxford: Oxford University Press, pp. 266.

Kibwika, P. (2006) *Learning to Make Change: Developing Innovation Competence for Recreating the African University of the 21st Century*. Wageningen, The Netherlands: Wageningen Academic.

Klerkx, L. (2008) Matching Demand and Supply in the Agricultural Knowledge Infrastructure: The Emergences and Embedding of New Intermediaries in an Agricultural Innovation System in Transition, PhD Thesis, Wageningen University, Wageningen.

Kline, S.J. & Rosenberg, N. (1986) An Overview of Innovation. In: Landau, R. and Rosenberg, N. (Eds), *The Positive Sum Strategy: Harnessing Technology for Economic Growth*. Washington, DC: National Academic Press, pp. 275–305.

Leeuwis, C., Klerkx, L., Smits, R.E.H.M., Grin, J. & Kuipers, A. (2005) Equivocations on the Post Privatisation Dynamics in Agricultural Innovation Systems. Position paper scientific program Transforum. Wageningen, The Netherlands: Transforum.

McKernan, J. (1991) *Curriculum Action Research: A Handbook of Methods and Resources for the Reflective Practitioner*. New York: St Martin's Press.

Meele, P. van (2005) *Innovation in Rural Extension: Case Studies from Bangladesh*. Wallingford: CABI.

Mettrick, H. (1993) *Development Oriented Research in Agriculture: An ICRA Textbook*. Wageningen, The Netherlands: ICRA.

Ministry of Agriculture, Animal Industry and Fisheries MAAIF (2003) *The National Agricultural Research Policy.* Kampala, Uganda: Government of Uganda.

Mosse, D. (2005) *Cultivating Development: An Ethnography of Aid Practice*. London: Pluto.

Mubangizi, N., Mangheni, M.N. & Garforth, C.J. (2004) Information Sources and Constraints Under National Agricultural Advisory Services Programme of Service Providers in Uganda. *Uganda Journal of Agricultural Sciences*, 9, pp. 257–264.

Murwira, K., Hagmann, J. & Chuma, E. (2001) Mainstreaming Participatory Approaches to SWC in Zimbabwe. In: Reij, C. and Waters-Bayer, A. (Eds), *Farmer Innovation in Africa: A Source of Inspiration for Agricultural Development.* London: Earthscan, pp. 310–324.

Narayan, D. (2002) *Empowerment and Poverty Reduction: A Resource Book*. Washington, DC: World Bank.

NARO (2003) *NARO's Realigned Strategy and Plan 2003–2005 and Beyond: From a Commodity Based Organisation towards an Integrated Agricultural Research Service Provider for Development*. Kampala, Uganda: NARO.

Obaa, B., Mutimba, J. & Semana, A.R. (2005) Prioritizing Farmers' Extension Needs in a Publicly-funded Contract System: A Case Study from Mukono District, Uganda. Agricultural Research and Extension Network. Network Paper No. 147.

Oxfam-GB & FOWODE (2004) Obusobozi: Enhancing the Entitlements of Subsistence Farmers in Uganda. A Discussion Paper on the Impact of PMA/NAADS on Female Subsistence Farmers, Kampala. Oxford: Oxfam Great Britain.

Reij, C. & Waters-Bayer, A. (Eds) (2001) *Farmer Innovations in Africa: A Source of Inspiration for Agricultural Development*. London: Earthscan.

Richards, P. (1993) Cultivation: Knowledge or Performance? In: Hobart, M. (Ed.), *An Anthropological Critique of Development: The Growth of Ignorance*. London: Routledge, pp. 61–78.

Richards, P. (1995) Participatory Rural Appraisal: A Quick and Dirty Critique. *PLA Notes*, 24, pp. 13–16.

Richards, P. (2006) Against Discursive Participation: Authority and Performance in African Rural Technology Development. European Association for Studies of Science and Technology, Lausanne Conference, August 2006, Session: Approaching Participation. http://www2.unil.ch/easst2006/Papers/R/Richards.pdf (Accessed January 22, 2009).

Rip, A. (1995) Introduction of New Technology: Making Use of Recent Insights from Sociology and Economics of Technology. *Technology Analysis and Strategic Management*, 7, pp. 417–431.

Wals, A.E.J. (Ed.) (2005) *Curriculum Innovations in Higher Agricultural Education*. The Hague: Elsevier/Reed Business Information.

Woodhill, J. (2002) Sustainability, Social Learning and the Democratic Imperative: Lessons from the Australian Landcare Movement. In: Leeuwis, C. and Pyburn, R. (Eds), *Wheelbarrows Full of Frogs: Social Learning in Rural Resource Management*. Assen, The Netherlands: Royal Van Gorcum.

Woolcock, M. (2002) Getting the Social Relations Right: Toward an Integrated Theology, Theory, and Strategy of Development Cooperation. Von Hügel Institute Working Paper WP2002-11 (draft), http://www.st-edmunds.cam.ac.uk/vhi/research/woolco2.pdf, downloaded July 2006. (Accessed January 22, 2009).