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Participatory Analysis of the Potato Knowledge and Information System in Ethiopia, Kenya and Uganda

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INTRODUCTION

Potato is important for smallholders in Kenya, Uganda and Ethiopia as both a cash crop and a food-security crop. Potato production has tripled in ten years since the mid 1990s in sub-Saharan Africa, almost exclusively because of area expansion (FAOSTAT, 2006). With its cultivation restricted to the highlands and its ever-increasing consumption in cities, potato is the cash crop of the future for the densely populated eastern and central African highlands. To satisfy the growing demand from urban centres for cheap food, there is room for additional growth in potato production. Further area expansion will, however, put a strain on natural highland forests in eastern Africa. Producing potatoes at lower altitudes in the equatorial tropics is not feasible because of pest and disease pressure and physiological limitations of the crop. The only option for increased potato production is, therefore, raising crop productivity.

In Kenya, potatoes are the second most important food crop after maize (FAOSTAT, 2006) while, in Ethiopia, potato production can fill the gap in food supply during the 'hungry months' before the grain crops are harvested. In southwestern Uganda, potato production is crucial in supporting the income and food security of the rural population. Average potato yields for 2005 in Kenya, Uganda and Ethiopia were estimated at 7.7, 6.9 and 10.5 tonnes per hectare, respectively (FAOSTAT, 2006), while progressive farmers in these countries attained yields of 25 tonnes per hectare under the same rain-fed conditions in the same period.

This yield gap can be explained by poor management of late blight, bacterial wilt and viruses, low soil fertility and drought stress. Interventions to improve crop husbandry of poor potato farmers by increasing their

knowledge could have considerable impact upon their livelihoods in terms of both improved food security and increased income.

To promote technological and methodological innovations successfully, it is important to understand the current agricultural knowledge and information system related to the potato crop (AKIS-potato). AKIS-potato can be defined as a group of individuals, public organizations (governmental and non-governmental) and the private sector who exchange information and knowledge related to potato management, processing and trade (Engel, 1997).

Understanding this system, its components and the way in which they interact is the essential first step towards a more efficient innovation system (Lundvall et al, 2002; Hall et al, 2004). Understanding the AKIS-potato system will allow research and development organizations to coordinate interventions in a way that makes use of the comparative advantages of each stakeholder. As part of a larger project on farmer participatory research, the AKIS of the potato sector in Ethiopia, Kenya and Uganda, and the interactions between stakeholders in the sector were analysed. The objectives of the study were to:

- identify bottlenecks in interaction between the different stakeholders;
- highlight priorities for intervention in the potato sector; and
- draw conclusions on how to improve the flow of information in the system.

METHODOLOGY

Multi-stakeholder workshops were organized to identify constraints and opportunities in the potato sector, with specific focus on improving the AKIS-potato in Kenya, Uganda and Ethiopia. In Ethiopia, the workshop was a two-day event which brought together representatives of potato-related organizations and farmers from Alemaya, Galessa, Jeldu and Degem districts. In Uganda, it was a one-day workshop with potato stakeholders from Kabale District. In Kenya, two one-day stakeholder workshops were conducted in both Bomet and Nyandarua districts.

Workshop participants were grouped together according to stakeholder categories such as ware-potato farmers, seed-potato farmers, public extension, non-governmental organizations (NGOs), processors, transporters and agricultural-input suppliers. Stakeholder categories represented at the workshops varied by country, depending upon their responses to the invitations. All groups analysed their own role and the role of other stakeholders in the potato chain and constructed a matrix of interactions, following a method described by Biggs and Matsaert (2004). First, each stakeholder group identified its interactions with other stakeholders in the potato chain. Then, the groups identified constraints

in these interactions. The complete matrix of interactions was then put together by the workshop facilitators and the opinions of the different stakeholder groups about the others were presented in plenary and discussed.

In Kenya, in both Bomet and Nyandarua, the problems identified in the first workshop were prioritized in the second workshop. Each participant ranked the five most important constraints, with every constraint receiving points (5 to 1) according to importance. Solutions to the most important constraints were subsequently discussed in mixed groups of stakeholders and reported back in plenary for further elaboration.

RESULTS AND DISCUSSION

Kenya

The main stakeholders of the AKIS-potato in Kenya were the Kenya Agricultural Research Institute (KARI), the public extension service of the Ministry of Agriculture (MoA), agricultural-input dealers, the Kenya Potato Growers and Marketing Association (KPG&MA), local government, potato transporters, traders, brokers and middlemen, seed-potato producers and consumption-potato producers. All were represented at the meetings, except for the brokers and middlemen, who were invited but did not attend. NGOs were notably absent.

Almost all stakeholders at the workshop complained about the so-called 'extended bag', which is a very large packing unit of 150kg to 200kg. According to farmers and extension workers, this results in low prices. Even the traders acknowledged that the extended bags were not optimal, but forced upon them by market brokers in Nairobi. There are, however, some efforts to standardize the bag used for ware-potato marketing at 110kg. The participants agreed that a price per kilogram would be ideal, but realized that this required a certain level of community organization to obtain communal weighing scales.

Many participants cited the exploitation of farmers by brokers as a point of concern; but the brokers' counter-arguments could not be heard as they did not attend the meeting. Producers, however, acknowledged that field-level brokers were members of their communities and fulfil a role in the marketing chain. They suggested a fixed commission instead of one that varies on the speculation skills of the broker.

As a result of the involvement of many different interim handlers, the transaction costs between producer and consumer are relatively high (Kirumba et al, 2004). The dilapidated road network pushes down farm-gate prices even further. Prices at the farm gate fluctuate widely, and no price information is exchanged between farmers. Farmers' access to price information could enhance their bargaining power and increase the price they get from traders (Bakis, 2002). At the level of market brokers, who

mediate between transporters and wholesalers, there are unnecessary transaction costs as a result of cartel formation.

The long marketing chain is a barrier to the flow of information on both product quality and market prices. Low-quality farm-gate produce – as a result of no grading on tuber size and quality, immature harvesting and mixing of varieties – led to high losses in the transport, marketing and processing chain, as indicated by traders and processors. There is, however, no feedback from the market to the farmer about the quality of the produce, and there is hardly any price incentive that stimulates farmers to deliver better-quality potatoes.

An important problem identified in both districts is the lack of high-quality seed potato. The need for certification was stressed by farmers, extension workers and the KPG&MA, who claim that farmers are cheated by poor-quality potatoes sold as seed. However, the seed growers state that farmers are not willing to pay extra for good-quality seed.

The lack of information transfer between research, extension and farmers was another concern raised. Research is considered slow in responding to problems raised by the extension staff. Extension staff are blamed for not delivering new technology, reacting slowly to farmers' needs, not being visible and not leaving their offices. In the opinion of farmers (potato growers, seed farmers and the KPG&MA), research and extension are also to blame for the inadequate supply of high-quality seed potato. The lack of credit facilities was also mentioned as a shortfall of the extension service.

Farmers do not consider 'change agents' in research and development as messengers of information only, but have wider expectations from them as service providers. Extensionists stand between research and farmers in the agricultural knowledge system and are easily blamed for inadequate communication. On the one hand, they have to live up to high expectations from the side of the farmers, even under poorly resourced conditions. On the other hand, research expects them to communicate 'new information' to farmers, who are not necessarily receptive to, or interested in, this information.

Figure 10.1 clearly illustrates how the outcomes of this analysis provide insight into the interrelations and perceptions of the actors in the potato value chain. It presents the opinions and the intensity of interactions between agricultural-input dealers, farmers and extension workers. Extension workers noted the low attendance of input dealers in their training efforts as a constraint, while the input dealers identified the bad timing of meetings by extension staff as a problem. Potato producers noted that the extension workers lack knowledge on new technologies, while the extension workers accused farmers of resisting new technologies. The input dealers felt that they could play a role in information transfer and advice regarding the use of agrochemicals. The extensionists, however, did not recognize such a role for input dealers and accused them of misinforming farmers. In reality, these dealers do give advice to farmers,

but complain that farmers do not follow the advice regarding the use of chemicals. Farmers complained that the dealers sell them adulterated products. Looking at Figure 10.1, there seem to be opportunities to improve the flow of information in the triangle by enhancing the linkage between the extension staff and agricultural-input dealers, who already have strong contacts with farmers. Mistrust by both farmers and extension workers towards the dealers stands in the way of such communication. Moreover, the dealers indicated that farmers are not willing to learn, an opinion they share with the extension workers.

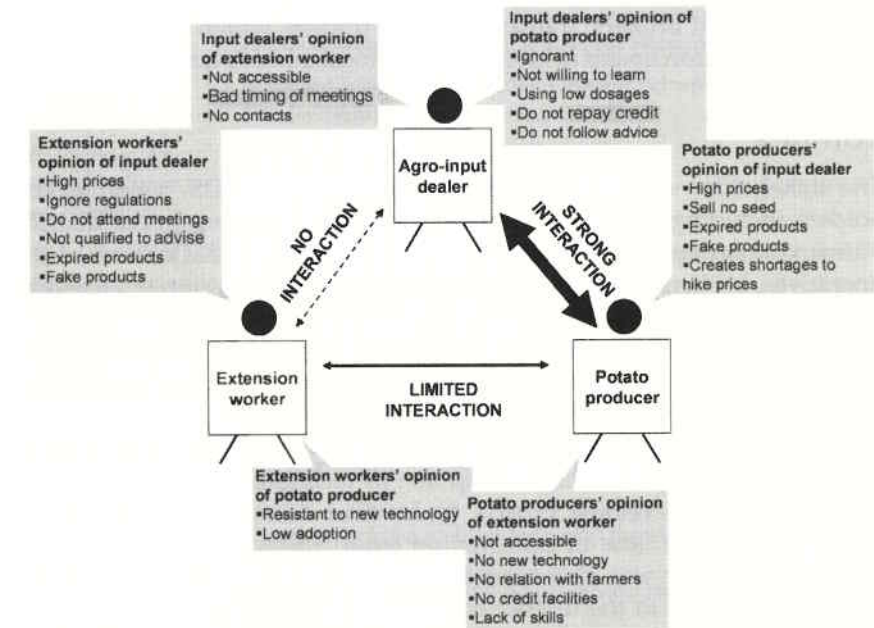


Figure 10.1 The level of interaction between agricultural-input dealers, extension workers and potato producers and their perception of each other, Bomet and Nakuru districts, Kenya, 2005

Table 10.1 ranks the problems in the potato value chain and possible solutions suggested by the stakeholders. When analysing the suggestions for improvement, the need for farmer organization became clear. For almost any intervention, a certain level of farmer organization is required. The KPG&MA appeared to be the obvious forum that could support further intervention. The farmers, however, indicated a general reluctance to join such initiatives as a result of a long history of failed organizations and dishonest leadership. Participants indicated that community leaders with track records of failed communal projects should be left out of any new organizational initiatives to reduce the level of mistrust among potential

members. The setting-up of study groups and common-interest groups was suggested as a possible option to improve farmer–extension–research linkages, test new technologies, receive training and multiply seed.

Interestingly, the different actors were very aware of the need for quality improvement at the farm-gate level and suggested size grading, purity of variety and the proper hardening of tuber skin for this purpose. Higher-quality seed is also required as part of quality improvement. To improve the bargaining power of small-scale farmers, on-farm storage or communal storage was suggested. Contract farming by a crisp (chips) processor was also indicated as an option to ensure higher and stable farm-gate prices. Resistance to some of these changes could be expected from the side of brokers, transporters and traders, which would require support and enforcement of change by the local administration.

Ethiopia

The stakeholder workshop in Ethiopia identified 14 AKIS–potato stakeholders, including researchers, farmers, potato traders, consumers, district bureaux of agriculture, transporters, casual labourers, NGOs, farmer co-operatives, brokers, store owners, the media, agricultural-input suppliers and supermarkets. Marketing was identified as the activity with most interaction between stakeholders. The main providers of information to farmers were identified as research, extension and agricultural-input suppliers.

The analysis of constraints in interaction showed that researchers were particularly disappointed in the uptake of technologies by farmers, in spite of much-increased efforts to involve farmers in technology development. The flow of information from trained farmers to others in the community was also considered to be limited. With few public extension workers in the district bureaux of agriculture, working under time constraints, collaboration with researchers was said to be difficult.

The farmers indicated the low quality of agricultural inputs to be a constraint. The extension staff shared this opinion and blamed the suppliers for low-quality products at inflated prices. Farmers also identified low potato prices and dishonest brokers as problems. It was noted that extension staff also sought their own interests in activities undertaken with farmers.

The traders indicated low-quality produce at farm-gate level as their main problem and identified this as the reason for low prices offered to farmers. Furthermore, they saw the absence of large buyers as a constraint. The product is retailed in small quantities, which takes longer to sell the stock, with higher risk of spoilage.

The public extension workers indicated a lack of good interaction with researchers. NGOs indicated a slow response from the side of research to requests from practice, resulting in outputs not reaching the end users in time. Extension staff felt that farmers ignored advice given to them and

Table 10.1 *Constraint ranking and suggested solutions for potato production and marketing in Kenya*

<i>Constraint</i>	<i>Suggested solutions</i>
Lack of high-quality seed	Train seed multipliers Teach positive selection Farmer-group seed multiplication
Minimal contacts between market and knowledge chain actors	Use church gatherings and other meetings to introduce new technology Demand-driven technology that does not require capital investment Initiate study groups with farmers and extensionists to improve interaction and provide a platform for technology testing
Extended bags	Standardization (by the time of the second workshop, efforts for standardization were being initiated)
High prices/low use of fertilizers and chemicals	Credit scheme to be run by KPG&MA
Minimal exchange of price information between farmers	Improve price communication between farmers through the formation of common-interest groups
Low prices for potatoes	Conduct research into simple ware-potato storage Contract farming for the crisp (chips) industry Better timing of production on the basis of price information supplied by the MoA Improve quality of potatoes (see suggested solutions in Table 10.2)
Poor roads	Community road maintenance paid through levies collected by local government Setting up levy collection points by communities on feeder roads
Bacterial wilt	Train seed multipliers Teach positive selection (selection of healthy-looking mother plants in ware-potato farmers' fields as a source of seed for the next season)
Low quality of potatoes offered to market	Harmonize size grading to standardize prices with the assistance of KPG&MA, the Community Development Agency (CDA) and the local administration Improve quality of ware potatoes by using high-quality seed and limited training Harvest crop when mature (hardened skin)
Lack of credit facilities	Credit scheme to be run by KPG&MA
Low yields	Improve seed quality; credit scheme to be run by KPG&MA to increase fertilizer and fungicide use
Lack of storage facilities at farm level	Farmer-managed research into simple on-farm storage

did not adopt newly introduced technologies despite being trained. NGOs believed that farmer participation in different development activities was below expectation. The extension service acknowledged a limited interaction with NGOs.

Similarly to Kenya, different types of innovations are needed to improve the AKIS–potato in Ethiopia. Table 10.2 summarizes the most important

Table 10.2 *Constraints and suggested solutions for potato production and marketing in Ethiopia*

<i>Constraint</i>	<i>Suggested solutions</i>
Limited interaction between research, extension, NGOs and farmers	<p>Enable researchers to transfer information faster</p> <p>Existing stakeholder forum should be strengthened and new forums set up</p> <p>Improve training to transfer more information to farmers</p> <p>Create a desk at the agricultural office for exchange between research and extension</p> <p>Make leaflets, manuals and other training materials available to development agents and farmers</p> <p>Cultivate a culture of collaboration among development organizations</p>
Low prices for ware potatoes at farm gate	<p>Strengthen farmer organizations</p> <p>Joint marketing</p> <p>Improve exchange of price information</p> <p>Encourage farmers to construct improved ware-potato stores</p>
Bad roads	District and zonal councils should repair roads
Unavailability of inputs	<p>Open more input-supply shops in rural areas</p> <p>Farmer unions could play a role in the supply of agrochemicals</p> <p>Train farmers on alternative low-input management strategies</p>
Low-quality products	Introduce federal control of the quality of chemicals
Limited adoption and further dissemination of technology by farmers	<p>Improve training</p> <p>Select early adopters to assist in facilitating innovation</p> <p>Develop demonstration sites</p> <p>Collaboration between researchers and extension staff in training farmers</p> <p>Research should develop cost-effective innovations</p>
Limited skills of extension staff	Train extension staff continuously and increase the cadre
Low quality of potatoes	<p>Train farmers on how to improve quality, especially on harvesting (at maturity)</p> <p>Set quality standards for potato production</p>
Weak credit schemes	<p>Raise awareness about credit and payback mechanisms</p> <p>Extend the periods of loans</p>
Lack of high-quality seed potato	Train and list reliable seed-potato producers

constraints identified and the solutions proposed. Discussions among the participants revealed that the linkages between many of the stakeholders in the potato production and marketing system are weak. This hampers the flow of information and development of knowledge in the system.

Creative ways of improving the interaction between farmers, agricultural extension providers and researchers should be sought. Organizational innovation on the part of farmers is identified as crucial if the system is expected to be enhanced as a whole. The strengthening of farmer organizations was widely recognized as imperative for improving linkages with farmers in terms of technology dissemination, as well as for improving input supply and output marketing. The lack of a forum for exchange between all stakeholders in the potato innovation system was noted. Such a forum could be an instrument to improve linkages between stakeholders and could help in improving the flow of information through the system. This would assist in increasing production and improving the marketing chain of potatoes in Ethiopia. The lack of high-quality seed potatoes featured prominently in the discussion. Training and promoting specialized seed producers was suggested as a solution.

Uganda

In Uganda, the interactions between stakeholders in the AKIS–potato were mapped out (see Figure 10.2).

The different knowledge system interactions in the potato value chain were ranked according to their current importance in managing information. The mass media were considered to play the smallest role, while the farmers and the national research and extension institutions were ranked highest.

The type of innovations needed to improve the potato sector in Uganda (see Table 10.3) were similar to those required in the cases of Kenya and Ethiopia. The highest priority was given to improved interaction between stakeholders in the potato chain and mechanisms for better coordination of interventions. Inappropriate packaging of information was identified as a major problem, especially the language in which information material was produced. Moreover, most of the material was considered inappropriate for illiterate people. A limited flow of information was noticed between the wealthy and poor sectors of the communities.

The local mass media (radio) are poorly connected to information suppliers (researchers and public extension services). Input dealers are not considered as information suppliers by extension and research, while they are considered an important source of information by farmers. NGOs and extension appreciated the research organizations for their participatory research activities, but considered their outreach limited. The outreach of the NGOs was also considered to be limited. Privatized extension (National Agricultural Advisory Services, or NAADS) was noted as having a wider reach, but with limitations in terms of agricultural extension skills.

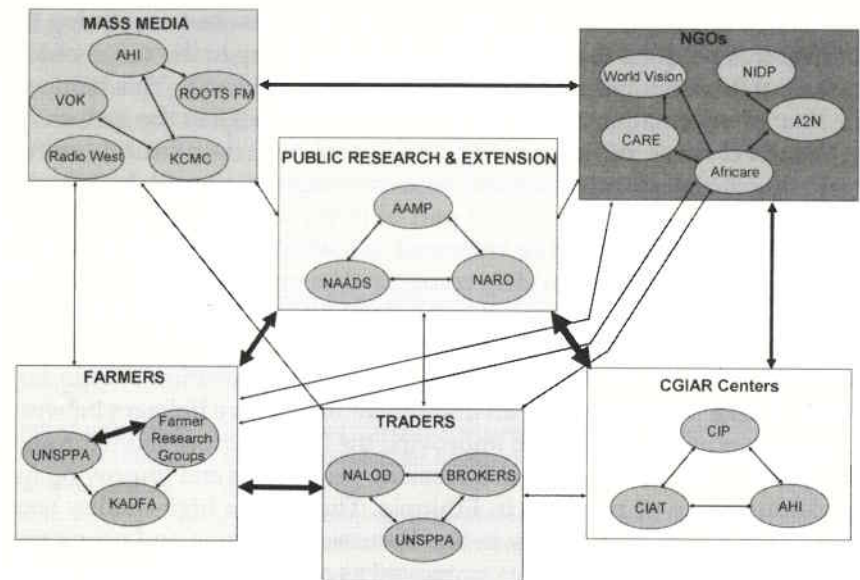


Figure 10.2 Interaction of AKIS-potato actors in Kabale, Uganda, 2004

Notes: The thickness of the arrows indicates the strength of the linkages and information exchange.

A2N = Africa 2000 Network; AAMP = Area-Based Agricultural Modernization Programme; AHI = African Highlands Initiative; CIAT = International Centre for Tropical Agriculture; CIP = International Potato Centre; KADFA = Kabale District Farmers' Association; KCMC = Kachwekano Community Multi-Media Centre; NAADS = National Agricultural Advisory Services; NALOD = NAMLOD Perfect Consult Ltd; NARO = National Agricultural Research Organization; NIDP = Nangara Integrated Development Project; UNSPPA = Uganda National Seed Potato Producers Association; VOK = Voice of Kibwezi.

Interestingly, farmers were said to provide limited feedback to development organizations. These organizations also complained that farmer-group continuity is unsatisfactory and that farmers show little initiative in seeking information. Farmer-group formation and cohesiveness were aspects that needed attention.

Suggestions for improving the flow of information were: capacity-building for research and extension in the development of appropriate training materials; and improving collaboration between research, NGOs and private service providers to use the higher skills available in NGOs and research organizations within the larger NAADS programme and the public extension service.

Table 10.3 Constraints and suggested solutions for potato production and marketing in Uganda

Constraints	Solutions proposed
Inappropriate packaging of training materials	Capacity-building in creating training materials for research and extension staff
Outputs of research and NGOs do not reach many farmers	Collaborate closer with NAADS service providers and public extension service Use radio Involve agricultural-input dealers
Some incompetent contractors in the National Agricultural Advisory Services (NAADS)	Collaborate closer with NGOs and research
Reluctance of farmers to be involved in learning new ideas; group sustainability weak	More focus on sustainable farmer-group formation
Adulterated inputs sold	—
Lack of credit facilities for input dealers	—
Limited funds for radio stations	Collaborate more closely with researchers, extensionists and NGO staff

CONCLUSIONS

The participatory workshops proved very effective in identifying AKIS bottlenecks and options for intervention. It was a rare opportunity for the different stakeholders of the potato innovation system to come together and discuss issues. This was, in itself, a key output. The matrix of interactions was an appropriate tool to identify constraints in the AKIS-potato. The construction of the matrix led to a better understanding on the perceptions of different stakeholders about each other and improved mutual understanding. This could be the beginning of a process to improve collaboration between stakeholders in the potato value chain. The workshops alone, however, are not enough to spark action and to induce positive change towards a more effective innovation system through improved collaboration. Further follow-up and facilitation would be required to continue the process.

Although the exercise set out to map imperfections in the information flow, the workshops eventually identified potato value chain constraints in a wider sense, especially in Kenya and Ethiopia. Giving special attention

to knowledge flows is not easily accepted by the different stakeholders as it is just one factor in the innovation system that cannot be separated from other interactions. In a conceptual sense, this is possible for a researcher; but, in practice, the distinction of the information and knowledge system from the wider potato production and marketing system is artificial and, thus, not practically useful in a multi-stakeholder setting. Especially when a relatively large number of farmers are engaged in the process, the direction of discussions will naturally be geared towards solving practical problems in the value chain, rather than focusing on information exchange.

The limited presence of extension (both governmental and non-governmental) is a major impediment to the effective flow of information, and clear strategies need to be developed by the different stakeholders to mediate this and to improve extension coverage. In the first place, agrochemical dealers need to be considered as agents for delivering information to farmers. They have close contacts with farmers and could serve as hubs for providing written and oral information on improved technologies to farmers. Second, research organizations have to engage more in developing mass dissemination strategies for their information and developing communication materials in collaboration with extension partners. Research organizations need to gain specific expertise for this purpose. The mass media, especially radio, are underutilized in all three countries. It may not necessarily be the best tool to improve knowledge and induce change in farming practices, but it can arouse the interest of farmers and change agents in new technology.

More research is required on how to improve farmer-to-farmer flow of information, which is an important form of exchange. Information on innovations from trained farmers to the rest of the community does not flow automatically, as is often assumed. Farmer facilitators or farmer organizations could be used as agents to transmit information as an alternative to formal extension workers.

The study of the AKIS-potato in the three countries gives clear direction on how the potato-related innovation system can be made more dynamic, efficient and responsive to the needs of the different value chain actors. In the first place, it can be concluded that improved organization of farmers will allow them to become more active actors in the innovation system. This, in turn, would provide the other stakeholders with stronger and better-defined feedback on opportunities, needs and constraints in the potato value chain. As a result, research institutions and both governmental and NGO extension services could become more responsive to farmers' needs.

Second, the meetings showed a clear need for building a more durable forum for information exchange and collaboration towards technological, methodological and organizational innovation in the potato sector in all three countries. A potato stakeholder forum would ensure a more holistic and coordinated effort in potato-sector innovation. It would

provide research, extension, producers, trade and industry with the much required arena for closer interaction and would create synergies through combining the comparative strengths of different stakeholders. Increased intensity of interaction would improve information flow between potato stakeholders and make them aware that they are part of the same system and that their actions are interlinked. This would enhance the capacity of the potato sector to innovate effectively. In short, the potato stakeholder forum could serve as a catalyst for the better functioning of the potato-related innovation system.

The question arises as to who should champion the establishment of such a potato stakeholder forum. National research institutes may be best positioned to initiate this forum in spite of the fact that they have, in the past, shown reluctance to shift from the old linear mode of research and extension to innovation systems thinking. Making this shift towards an innovation systems perspective in agricultural research and development will hopefully be facilitated through their involvement in building the forum. Compared to the national extension services, research organizations are better able to draw in expertise from different disciplines internally, bridging between social, organizational and technical sciences. The national research organization will be more sustainable than NGOs, which often operate for shorter periods and are more susceptible to shifts in the priorities of donors. Furthermore, research would be more impartial than extension, the staff of which are more directly involved with all other stakeholders and, as mentioned earlier, are in the difficult position of being in the middle between research and the farming community.

ACKNOWLEDGEMENTS

The research project upon which this chapter is based was part of work in Uganda and Ethiopia sponsored by the International Fund for Agricultural Development (IFAD) and work in Kenya sponsored by the Organization of the Petroleum Exporting Countries (OPEC) Fund for Development.

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CHAPTER 11

Enabling Rural Innovation: Empowering Farmers to Take Advantage of Market Opportunities and Improve Livelihoods¹

Susan Kaaria, Jemimah Njuki, Annet Abenakyo, Robert Delve and Pascal C. Sanginga

BACKGROUND

Agricultural markets can play significant roles in reducing poverty in poor economies, especially in countries that have not achieved significant agricultural growth. Dorward et al (2005) highlight three broad mechanisms through which agricultural growth can drive poverty reduction:

- 1 the direct impacts of increased agricultural productivity and incomes;
- 2 the benefits of cheaper food for both the urban and the rural poor; and
- 3 agriculture's contribution to growth and the generation of economic opportunity in the non-farm sector.

However, experience has shown that markets can fail the poor, especially the poorest and marginalized groups, including women. In his review on how to make market systems work better for the poor, Johnson (2005) argues that, in remote rural areas, markets may fail because they are too 'thin', or the risks and costs for poor people to participate may be too high, or there may be social or economic barriers to participation.

Other factors can also influence the role of agricultural markets in reducing poverty in poor economies. For instance, market-oriented production may result in the capture of new economic opportunities that were previously undertaken by the poor (DFID and OPM, 2000) or create a privileged group of farmers with access to a new technology. Evidence also shows that, in some instances, increased access to market opportunities can open up competition by other producers, driving local producers out of production (Dorward et al, 2003).