

Successes and failures of institutional innovations to improve access to services, input and output markets for smallholder pig production systems and value chains in Uganda

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Acronyms

AASP	Agricultural Advisory Service Provider
aBi Trust	Agribusiness Initiative Trust
ARD	Agricultural Research for Development
ASF	African swine fever
ATAAS	Agricultural Technology and Agribusiness Advisory Services
BBIs	Best-Bet Interventions
BoU	Bank of Uganda
CAADP	Comprehensive Africa Agriculture Development Program
CARITAS	CARITAS Uganda
CIAT	International Centre for Tropical Agriculture
DDA	Dairy Development Authority
DSIP	Agricultural Sector Development Strategy and Investment Plan
DSIP	Development Strategy and Investment Plan
FHU	Food for the Hungry Uganda
FOs	Farmers' Organizations
GAP	Good Agricultural Practices
GOU	Government of Uganda
IAR4D	Integrated Agricultural Research for Development
ILRI	International Livestock Research Institute
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDIs	Micro Deposit-Taking Institutions
MFIs	Micro-Finance Institutions
NAADS	National Agricultural Advisory Services
NaCCRI	National Crops Resources Research Institute
NaLiRRI	National Livestock Resources Research Institute
NARO	National Agricultural Research Organization
NDP	National Development Plan
NLC	National Livestock Census
PHH	Post Harvest Handling
PMGs	Producer Marketing Groups
PPM	Pig Production Marketing Uganda Limited
QMS	Quality Management Systems
ROSCAs	Rotating Savings and Credit Associations
SACCOs	Savings and Credit Cooperative Organizations
SMEs	Small-scale and Medium Enterprises
SPS	Sanitary and Phytosanitary Standards
SPVCD	Smallholder Pig Value Chain Development Project
SSA CP	Sub Saharan Africa Challenge Program
UBOS	Uganda Bureau of Statistics
UNADA	Uganda National Agro-input Dealers Association
UPO	Uganda Piggery Organization
VEDCO	Volunteer Efforts for Development Concerns
VSLA	Village Savings and Loans Schemes
WCS	Wambizi Cooperative Society

Glossary

Institutions: are the norms, rules, and organizations that “govern” transactions. They are the mechanisms for mitigating the collective action problems (among sectors, among workers, among firms, between firms and workers, between firms and officials) that lie at the heart of economic development.

- Institutions may include arrangements that range from property rights, microfinance, business associations, and public agencies.
- Institutions are “the rules of the game in a society”(North, 1990)
- Institutions are "a set of humanly devised behavioral rules that govern and shape the interactions of human beings, in part by helping them to form expectations of what other people will do." Lin and Nugent (1995, 2306-2307).
- Can be *formal* (laws, regulations) or *informal* (patterns of behavior, conventions, moral codes) rules of the game in a society.

Innovation is more complex process that often requires technical, social, and institutional change that results from the interaction among multi-layered sources of knowledge and its transformation into new things, products or practices, applied in specific institutional and cultural context (Gottret, 2006).

Institutional Innovations: is a process or practice of changing the rules in a way that makes the seemingly impossible outcome become possible. In other words defying the norms and crossing the boundaries. Institutional innovation requires “tough times” during which local or national leaders see themselves as highly vulnerable to internal pressures and external threats but lacking the means to address such pressures. Various types of crises therefore tend to precede and to stimulate the institutional changes in question.

Supply chain: The links that connect inputs to farm and then on to storage, processing, transport and distribution to consumers for a given product through a single chain.

Value chain: A combination of several supply chains for a particular product. It includes the supporting services that allow the supply chains to operate and also the factors in the economic environment.

Clients: These are people or organizations that receive the services, and may include smallholder pig farmers, other produce farmers, informal or formal groups, micro and small-scale enterprises, and community-based organizations.

Service providers: These are individuals or organizations that deliver the business services to the clients, and may include: private companies, public-sector organizations that are part of the national or local governments, NGOs, or farmers’ organizations.

Breeding herd: Sows, gilts and boars used for breeding purposes and serve as parents of the pigs being readied for market.

Sow: Female pig (a mature female pig) that has given birth to at least one litter.

Market herd: type of pigs that are raised for the sole purpose of selling them in the market to produce pork

Carcass weight: the post-harvest yield of pork (the weight of the slaughtered pig, after removing internal organs, head and feet).

Executive summary

Pig farming is widely practiced in all regions of Uganda with high concentrations around the Central region. Unlike other key agricultural enterprises, pig farming has experienced fundamental improvement in the number of pigs reared and households that rear at least one pig over the last three decades. This has been possible despite the limited government support to the pig subsector and the fact that pigs are not considered among the 20 priority sub-programs of the country's Agricultural Sector Development Strategy and Investment Plan (DSIP). This notwithstanding, about 17.8% (i.e. 1.1 millions) of all households own at least one pig in Uganda. The number of pigs increased from 0.19 million in 1980 to 3.2 million in 2008.

The current daily consumption of pigs (pigs slaughtered per day) in Kampala city alone is estimated to be between 300 and 500. These include about 75-80 pigs that are slaughtered at the main pig abattoir of Wambizi cooperative society in Nalukolongo in Kampala city. The per capita consumption of pork is 3.4 kg/person/year, the highest in the region. This level of consumption is reported to have increased 10 times more than it used to be 30 years ago. The market for pig products along the pig value chain is however disorganized, has many value chain actors, and many service providers, whose activities are not well coordinated.

Most smallholder pig farmers and other pig value chain actors have limited access to: inputs, technical advice, insurance, credit and other financial services, and reliable output markets. This is attributed to various constraints in the pig value chain that range from lack of: local processes that create capacity through enabling and facilitating learning; necessary local architecture that includes catalysts of change; appropriate forums to consider and address specific problems; mechanisms to ensure farmers' and other value chain actors' group action; strategies that help to overcome unforeseen obstacles, and; organization strategies to achieve economies of scale.

Other constraints to improved performance include: poor access to market information, low farm-gate prices, high transaction costs, poor quality and adulterated feeds, lack of functional partnerships with other committed partners, poor access to extension services, lack of access to financial services, limited (agri)-business development services, limited scale of market oriented pig farming, lack of trust among value chain actors, lack of innovation and policy advocacy platforms. There is need for institutional innovations and interventions that address and help overcome these market failures, if actors in the pig value chain are to overcome these constraints and have improved access to better services and market for inputs and pig outputs.

In particular, the underlying factors that often lead to the lack of functional partnerships with committed partners in any research for development intervention may include, among others the failure: of research service providers to draw upon institutional innovation that minimize inefficiency; to appreciate that the traditional approach of linear agricultural research for development, extension, and adoption often creates underperforming partnerships; to test and validate the best practices in a multi-stakeholder agricultural research approach (the inability to embrace active research mode in partnership with other willing stakeholders); to build partnerships that aim at creating capacity in the agricultural sector based on trust and knowledge sharing; to agree on important issues such as the roles and objectives of different partners, by-laws, common priorities of development, and the nature of implementation of action plans, and; to create space for boundary partners to come in with their experiences, resources, and skills that all vital in catalyzing the formation of vibrant and self-sustaining partnership.

The International Livestock Research Institute (ILRI) through its Kampala based office is implementing an IFAD funded Smallholder Pig Value Chains Development (SPVCD) project in Uganda. The main objective of the SPVCD project is to improve livelihoods, incomes, and assets of smallholder pig producers, particularly women. The question is whether this objective can be achieved in a manner that is sustainable, through interventions that increase productivity, reduce risk, and improve market access in pig value chains.

Specifically, the SPVCD project aims at: (i) identifying market opportunities for pork in Uganda, and the multiple factors preventing smallholder pig producers from exploiting existing opportunities, with focus on constraints caused by among others: animal disease threat, feed resources, and performance of markets and services; (ii) developing and pilot testing a set of integrated packages for smallholder pig production and market access for specific production systems, resource profiles and market settings in Uganda, and; (iii) documenting, communicating and promoting appropriate evidence-based models for sustainable, pro-poor pig value chains.

In the last one and half years, ILRI Kampala office has made a milestone toward the effort to achieve the above SPVCD objectives. For example: the situational analysis of the smallholder pig value chains in Uganda has been accomplished; research sites for the project have been selected; there has been a successful scoping of committed partners and actors' landscape; stakeholders have and continue to be engaged in sharing experiences and the way forward; appropriate research methods and tools for conducting the pig value chain assessment were selected; literature reviews and the in-depth assessment of the smallholder pig value chains in Uganda has been accomplished. This report therefore makes a contribution to the process of identifying relevant best practices through the desk review of literature. A number of existing best practices that have been tested in similar environments can be modified, adopted, adapted and piloted in the research sites of the smallholder pig value chains project. This helps to generate evidence of proof and potential of these concepts before recommending their scaling- out and replication.

Best-bet interventions (best practices) on activities of all actors in the wider pig value chains and service providers can help to make a significant contribution to the achievement of the project objectives and desired outcomes. This is true, if BBIs can stimulate: positive changes in the behaviour of value chain actors; new way of doing things; institutional reform to accompany relevant technological changes and transfer; new kinds of "horizontal" connectivity necessary for healthy innovation systems that cannot be resisted for cultural reasons; the need to maintain grades and standards within the pig value chain; improvement in farmers' bargaining power through the development of their human capital and social capital through sustained facilitation to form associations; training in modern marketing; fostering the emergence of farmer organizations, and the forging of new actions or relationships that increase benefits while reducing the embedded costs. Besides, the outcomes of the BBIs can provide a reliable justification for resource mobilization to enable further scaling-out of successful interventions that increase pig productivity, market efficiency, and value addition.

This report documents potential best-bet interventions (BBI) that can be tested in pilot research areas for the SPVCD project. It answers the following research questions: (i) what are the relevant institutional innovations undertaken at the local level by the private and public actors to enable improvement in access to: services, inputs, and output markets for smallholder pig value chains? (ii) what are the prevailing factors that contribute to the successes and failures of such innovations, and constraints of these institutional innovations and their general implementation in the country?, and: (iii) which of the past and prevailing institutional innovations for improving access to services and input and output markets can be adopted and adapted as potential best-bet intervention at the local level and in line with

the objectives of the smallholder pig value chains project? Noteworthy is that BBI's that promote access to services, inputs and output market, actually act as a catalyst to enhance adoption of some of the technological innovations.

Notice that BBIs or "the likely project interventions targeted for each project site or community" will leverage local efforts to address the likely constraints and opportunities faced by smallholder pig producers, especially women and other resource poor groups in the community. In this study, potential BBIs are derived from various sources. These include: the scanty social-economic literature on institutional innovation in sub-Saharan Africa; findings from the recent situational analysis on the smallholder pig value chains in Uganda, and; findings from the recent pig value chain assessment in Uganda. The BBIs highlights different actors that need to be targeted with capacity building, the type of capacities that need to be built, and how these capacities need to be built, in order to ensure a sustainable, profitable, and well-coordinated pig value chains and reliable business models for development.

The main findings of this study indicate that there is need for ILRI, its partners, and other stakeholders to build capacity of smallholder pig producers and other pig value chain actors by testing and providing evidence-based justification for scaling-up and scaling-out some of these best practices in the SPVCD project sites. These should be best practices and alternative business arrangements that impart vital skills to actors in the pig value chain. They should also work out the logic of better service delivery and market functioning through innovation or building of new strong market supporting institutions.

Some of the relevant BBIs may include interventions that create farmers' capacity to: enhance product quality, standardization, bulking, storage, and value addition for primary pig products; link pig farmers and other value chain actors to the market and service providers; encourage collective marketing of pig products; establish collective action and coordination units along the value chain in ways suiting differences in local characteristics; stimulate contractual arrangements between pig farmers and other value chain actors, and; improve governance issues and active participation within farmers' group to enhance motivation, good moral behavior, trust, and fair enforcement of exchange contracts.

Other best practices include interventions that help to attract more direct participation of the private sector and other committed partners with a comparative advantage in the development of pig farming; promote the mobilization, formation, and registration of pig producers' organizations in a way that utilizes collective action in production and marketing operations; build advocacy capacity and alliances with "*change agents*" that can together explore and harness through applied research the potentials of linkages, partnerships, and value addition through innovation platforms; mobilize and sensitize farmers' groups on key democratic principles of participatory group governance through free and fair elections.

It is also important that farmers and other pig value chain actors be: provided with a start-up capital that is essential in kick-starting pig farming and other value chain operations of the group; trained in business skills and supported with grants; encouraged to register their groups as legal business entities and not as self-help groups that often restricts their ability to access essential business services; supported to access working capital and affordable financial credit; supported in analyzing and understanding the prevailing constraints and opportunities along the pig value chain, including the mapping of partners and their corresponding strength, and; facilitated to create an active stakeholder policy advocacy forum that can influence policy reforms that are favorable to smallholder pig farmers and other actors in the pig value chains at district and national level.

Introduction

Economic development is generally defined as a policy intervention endeavour that aims to improve economic and social well-being of people (Sen, 1983). It is achieved when policymakers and community members strategically work together to promote sustained and concerted actions and processes that improve the standard of living, create incentives that drive the private sector, and; improve the economic health of a specific area. Economic development² is therefore a function of institutions that help societies reap potential gains from different interactions among independent actors (Hoff and Stiglitz, 2001).

Institutions are prerequisite for well functioning market. Distinctively, the market helps to organize the way private goods and services are exchanged and how interdependent agents interact along the value chain (Brooks 2012). Access of smallholders to well-functioning markets contributes to poverty alleviation and improvement of both food security and environmental sustainability (Trijp and Ingenbleek, 2010). According to Clark (2002) strong innovative institutional arrangements can improve the performance of markets and also enhance the efficiency of technology transfer from bodies that search for and validate knowledge on the one hand, and those that use such knowledge to increase their productivity and welfare on the other hand.

Strong institutions reduce transaction costs of market exchanges between actors; transmit market information; stimulate a system of fair negotiation; facilitate the transfer and enforcement of property rights and contracts; manage the degree of competition, and; increase internal differentiation in wealth accumulation. Good market supporting institutions facilitate efficient and equitable market exchange outcomes. In turn, well functioning markets support competition, lower the costs of doing business, provide a mechanism to coordinate supply and demand, and also provide incentives that foster local trade and further investment.

The lack of ideal local conditions of market exchange creates market failure, a phenomenon that tends to be pervasive (persistent) in rural areas of developing countries. In particular, market failure limits the ability of farmers and other actors in the agricultural commodity value chains to derive gainful exchange in the market. For example, participants in the market of livestock and livestock products in Uganda face the challenge of high transaction costs, credit constraints, and imperfect information on prices and technologies. In turn, the high transaction costs create opportunistic behaviour that tends to manifest in form of cheating and free riding by some of the actors.

Faced with the challenge of poor access to markets and services, institutional innovation³ can help communities to develop good market supportive institutions and well-functioning markets in the long term. According to Doner (2010), institutional innovation may encourage community members to experiment and develop market opportunities that help to improve market exchanges at reasonable transaction costs. Institutional Innovation can also create a fundamental change in the way formal research and development (R&D) service providers'

²Economic development cannot be explained by solely mere levels of investment, education, culture, policies, or type of government (Doner, 2010).

³Institutional innovations may include internal and autonomous process implemented by a group, a community or a structure to reform organizational approach. They may also constitute new type of partnership implemented between groups/communities and actors/stakeholders working in institutional, economic or social fields to improve their living conditions.

function. This is true when attempting to define clear roles of stakeholders and behavioural change in areas of: learning, experimenting, and formation of new partnerships that are crucial in facilitating fair interaction, and other equitable outcomes of economic development.

Background of livestock and pig production in Uganda

Livestock and livestock products play an important role in income generation and are a source of high quality protein to many households. Specifically, livestock contributes about 15% of the agricultural GDP (FAO, 2005). In the last two decades, there has been a 3.0% increase in the number of livestock and poultry in Uganda (MAAIF, 2011). The increase in the number of livestock is attributed to the routine interventions in the livestock sub-sector, which has helped to control animal diseases and to improve the livestock production systems (Tatwangire, 2012). Consequently, there is an increase in the number of households that are rearing livestock. About 4.5 million households (70.8%) in Uganda rear at least one kind of livestock or poultry. Furthermore, the 2008 Uganda Livestock Census reveals that the number of livestock is: 12.5 million for goats; 3.4 million for sheep; 3.2 million for pigs, and; 37.4 million for chicken flocks, of which 2.5 millions represent the exotic layers.

There has been a significant increase in the number of pigs in Uganda from 0.19 million in 1980; to 1.7 million in 2002, and; to 3.2 million in 2008. Pig production is therefore widespread in the country and is increasing at a high rate. The average number of pigs owned is highest for livestock farmers in urban areas than is the case for their counterparts in rural areas. According to Tatwangire (2012), the proportion of households owning pigs is highest in the Central region (56%), followed by 30.1% in the Western region, 28.8% in the Eastern region and 14.2% in the Northern region of Uganda. This notwithstanding, there is still very low levels and quantities of pigs (and pig products) that are exported out of the country and also imported in the country. This low performance can be attributed to high domestic demand, poor quality of meat products, lack of export standard abattoirs, and the low levels of production as a result of various diseases and other constraints.

Importance of the pig enterprise to the poor

Pig farmers generate income from the sale of piglets and sale of live adult pigs. Pigs are also a source of wealth; manure; waste disposal; nutrition and food security. That said, a recent study in Uganda shows that pigs and crop production are ranked highest by men and women groups in all pig value chain domains, including the “rural to rural” and “rural to urban” value chains (SPVCD, 2013, SPVCD, 2012). The two Smallholder Pig Value Chains Development project (SPVCD) reports classify the pig value chain domains in Uganda’s pig system based on location and purpose. Three different value chain domains are identified as: “rural production for rural consumption (*rural-rural*)”, “rural production for urban consumption (*rural-urban*)” and “urban or peri-urban production for urban consumption (*urban-urban*)”. These pig value chain domains vary across the four regions of the country. Especially in term of pig population density, household poverty levels, and access to market.

Pigs provide food, income, and an asset that is often utilised to weather down the negative effects of unexpected shocks and need for school fees. In Uganda, it is only pig meat among other types of livestock meat products that is registering a steady increase in the level of per capita consumption. While the consumption of other livestock meat such as bovine meat is reducing, the consumption of pork is on the increase (Tatwangire, 2012). In fact, pork ranks fourth in terms of per capita consumption of meat products in the country. The importance of pigs as a priority livestock enterprise among Ugandan households that keep at least one

of the various animals, has also improved from a fourth position to a third position, after cows and goats in the last 10 years (Tatwangire, 2012).

Daily consumption of pigs (pigs slaughtered per day) in Kampala is on the increase. According to the Senior District Veterinary Officer of Kampala City Council (KCC), daily consumption of pigs (pigs slaughtered per day) in Kampala city is between 300 and 500 (*personal communication with Dr Emilian Ahimbisibwe*). The total number of slaughter slabs or slaughter places is however unknown. Only five illegal pig slaughter places are known to operate in the city. At Wambizi, the only pig abattoir that is considered to be legal and able to meet minimum standards, only 75-80 pigs are slaughtered per day. The abattoir is owned by the Wambizi Cooperative Society (WCS) Limited that is also involved in pig rearing, pig slaughter, processing and distribution of pork and pig by-products. In the same line, the average pig meat consumption in Uganda is relatively high and estimated to be above 750 Kg/Km²/year (Tatwangire, 2012). This is partly explained by the increase in size of human population, level of urbanization, purchasing power, and change in tastes and preferences.

Unlike in domestic homes where pork consumption is still low, the demand for ready to eat pork in social places known as “pork joints” is increasing. This is true whether such social places are in urban or rural areas. The average retail price in Uganda shillings (USh) per Kg is reported to be: 4,800 for large piece of pork with bones; 5,500 for ready to roast or fry chops; 8,500 for sausages; 11,000 for ready to eat pork (“*commonly known as Muchomo*”) that is often consumed by people with higher income (Jagwe et al., 2012). The average household expenditure on food items in Uganda is about 28.3%. Only 22% of the food expenditure is allocated to food of animal products (Bashaasha et al., 2012). According to Van Campenhout et al. (2012), the average household budget share for pork reduced slightly from 6.26% in 2005/06 to 5.77% in 2009/10.

The development of pig enterprise is not yet fully aligned in the national development plans and strategies for poverty reduction. It is indeed surprising that almost all policy documents are silent on the pig sector. It is also true that pigs are not yet considered among major or priority enterprises selected for strategic investment and promotion in the country (Tatwangire, 2012). Only the National Agricultural Advisory Services (NAADS) and some few NGOs have some activities that promote pig production in some districts. Few districts have development plans that highly rank the pig sector. However, these activities are yet to address the constraints of marketing live pigs and pig products in the entire country.

Smallholder pig farmers face significant challenges that hinder them from benefiting from the rising demand of pork through better marketing opportunities. These challenges include: limited access to inputs, especially technical advice, extension service, agricultural insurance, credit and other financial services; poor husbandry and farm management practices; poor quality feeds and pig nutrition practices; lack of genetic and breeding strategies; poor swine health due to some diseases like ASF; poor slaughter technologies and limited value addition; low production and productivity levels; low farm-gate prices and distress selling of pigs; lack of organized producer groups and organizational strategies to achieve economies of scale through collective production and marketing; low bargaining power; lack of fair and efficient market linkages of smallholder farmers; high transaction costs of searching for technical and market information; and; poor access to marketing, commercial, and technical information (asymmetries in information, especially on quality and standards of the pig products).

Other challenges faced by smallholder farmers include: the lack of technical and organizational support; poor enforcement of standards and legal requirements; lack of the

necessary linkages to ensure healthy technological development; lack of innovation networks in the pig sector; high risk of experimentation with alternative solutions to limited access to markets and services; many and disorganized pig producers and other actors in the pig value chain; inability to exploit the potential of the pig sector; rampant exploitation and lack of trust among value chain actors; lack of reliable local drivers to champion the creation of incentives to engage in commercial pig production and to create functional innovation platforms.

It is anticipated that one way for smallholder pig farmers to overcome market failures and maintain their market position is through organizing into farmer groups or producers organizations. When smallholders succeed in acting collectively, they stand a better chance to: reduce transaction costs for their market exchanges, obtain necessary market information, secure access to new technologies, and tap into high-value markets, which allows them to compete more effectively with large producers (Markelova et al., 2009). Besides, producer groups can simplify long marketing chains by connecting smallholder pig farmers directly to markets and to by-pass various marketing intermediaries.

Description of existing pig production systems

Different pig production systems and levels of institutional involvement exist in the pig value chains. Pig production types include: (i) breeders, who keep replacement females and sows (breeding herd) that produce piglets for sale; (ii) growers, who keep pigs for slaughter (market herd). These buy, rear, and fatten piglets. They also sell grown-up pigs for slaughter, and; (iii) a mixture of breeders and growers that keep sows for production of piglets and keep pigs for slaughter. In general the proportion of growers is higher than is the case with breeders. It is also evident that there exist limited pig farmer groups, even when more institutions have started to work on pig value chains in some districts (SPVCD, 2013). The production of pigs in Uganda is characterised by quick turn-over, which makes the enterprise appropriate for smallholders, who tend to operate using small short-term loans. Pig keeping in Uganda can also be categorized based on the three basic production systems, namely the: (i) intensive, (ii) semi-intensive, and (iii) extensive (small scale subsistence) production systems.

i) Intensive pig-production system

In the intensive production system, pigs are kept housed all the time in a small confinement where they are provided with feeds, water, and protection from extreme weather (Mutetikka, 2009, Pezo and Waiswa, 2012). This system provides higher farm output that is crucial for commercial production and is characterised by: higher demand for labour; higher demand for inputs; significant amount of capital requirement; higher endowment of management skills and; highly functional marketing arrangement. Furthermore, this intensive production system is known to account for a very small proportion (less than 10%) of pig production in Uganda. The level of adoption of intensive (total confinement) system of pig feeding is on the increase in the country. This development can be attributed to such factors as land scarcity and improvement in access to information related to commercial production of pigs.

There are also pig farms that are categorised as: (i) industrial (or modern); (ii) large-scale, and: (iii) small-scale (smallholder) depending on the number of pigs produced for the market. In Uganda, there are few industrial pig farms that also practice intensive commercial production of more than 500 pigs. The few industrial farms that exist are mostly found near Kampala. They provide pork to the formal sector that includes: commercial butcheries, larger restaurants and hotels, and the processing sector (Tatwangire, 2012).

Pig farms that are considered to be large-scale are also few in Uganda. These farms keep more than 30 pigs. The majority of pig farms are considered to be medium-scale pig producers, who also keep between 5-30 pigs. These medium-scale pig farms are often more organized in small groups and supported by NGOs, government and donor programs (Mutetikka et al., 2009)

Smallholder farms on the other hand, represent small-scale pig farms that keep less than 5 pigs and often under poor management conditions. These are widespread and dominant in almost all areas of Uganda. In fact, it is the smallholder pig farmers in the country that have continued to sustain pig production. The system is however associated with low costs of investment; poor disease control practices; higher risk of disease spread; improper feeding; poor productive performance; slow growth, and; inferior carcasses.

ii) Semi-intensive pig-production system

This is a system of pig production where pigs are partly housed and partly kept outdoors on the pasture (Mutetikka, 2009). The system is not very common in Uganda, but can be found in areas where the price of pork is highly remunerative and also close to urban areas. The system provides opportunities to improve: pig feeding, growth rate, disease control, control of heat stress, enhancement of mating (*boars become active when not housed full time*), and to have better quality animals (Pezo and Waiswa, 2012). Pig farms that adopt this system also tend to invest in higher inputs (compounded feeds and mineral supplements), demand high amounts of labour, and enjoy relatively high farm output. This system is different from the intensive system in that, pigs are allowed to stay outdoors for some time as opposed to being fully confined.

iii) Extensive/tethered/small scale pig-production system

The extensive pig-production system is the simplest in terms of costs of investment and is the most common system in Uganda. Almost 90% of the pigs are kept under this system, where they are kept out-doors and on pasture all the time. It can be the '*free range scavenging type*' where pigs are allowed to freely move around the homestead as they feed on their own, or the '*tethered type*' where pigs are tied on the rope to limit their movement in a restricted space. According to Pezo and Waiswa (2012), waste food and crop residues are usually provided to tethered pigs and labour input is needed to keep moving the animals from one place to another. This system is often practiced in rural areas, by the very poor pig farmers, who tend to invest in a low cost and low output farming system, which characterizes subsistence production in Uganda's livestock sub-sector.

Immediate gaps in service delivery and access to input and output markets

The pig sector in Uganda still faces major challenges that continue to constrain its competitiveness. These include: the lack of organisational strategies to achieve economies of scale at farm level; poor access to market information; limited use of fair and meaningful quality standards; shortage of skilled manpower in areas of value addition; the prevailing weak legal and regulatory framework that is also compounded by poor enforcement of food safety requirements; limited access to financial services for most smallholder farmers; poor husbandry and farm management practices; poor quality (adulterated) feeds and feeding practices; lack of genetic and breeding strategies; poor swine health due to ASF and other diseases, and: poor slaughter technologies. Nevertheless, the potential of piggery in Uganda is increasing countrywide. The pig sector has enjoyed robust increase in production and consumption of pork in the last three decades that are vital for poverty reduction. However, there is a lot to be desired when it comes to access to services, and market for inputs and farm level output.

Most of the pig farmers and their associations are operating informally. They have not succeeded to operate collectively due to the lack of incentives and external support to help them innovate on the marketing front. Most of the transactions of live pigs and pork products take place in the informal markets that include on-farm exchanges, informal slaughter places, road side butcheries and informal ready to eat pork joints. However, formal markets have also started to develop and are dealing in good quality premium products that are highly demanded by rich consumers. These formal markets include organised shops that sell fresh cuts, fresh pork, and frozen pork products. That said, the market for pork is still dominated by informal trade.

The market of live pigs and piglets is more eminent in rural areas and at farm level, while that of the adult live pigs for slaughter is bigger at collection centers (wet markets) that tend to be located in peri-urban and urban areas. In these markets, traders purchase live pigs from rural areas, they transport them to collection centers, which are also directly linked to slaughter houses. Pig carcasses and pork pieces are then sold to consumers from road-side butcher shops, supermarkets, and ready to eat pork joints. At the moment, there are no well-defined export markets for pork in the country.

For many years, agricultural research in Sub-Saharan Africa has registered limited impact on the intended beneficiaries. The underperformance in Agricultural Research for Development (ARD) and failure to improve livelihoods especially those of the poor is attributed to the dominant use of the traditional approach of linear research, extension, and adoption (SSA CP, 2010). There is now a growing consensus that traditional agricultural research approaches have failed to deliver as earlier predicted, partly due to: the prevailing low rates of adoption of agricultural technologies, poor linkages between agricultural value chain actors, and the chronic non-profitability of farm enterprises in sub-Saharan Africa (SSA CP, 2010). The question is what should be done to overcome this situation, especially in pig value chains of Uganda.

In an attempt to better address the challenges of the traditional approach of ARD, namely the “limited impact of African agricultural research on the intended beneficiaries”; the sub-Saharan Africa Challenge Program⁴ (SSA CP) introduced an Integrated Agricultural Research for Development (IAR4D) approach in the last one decade (SSA CP, 2010). The IAR4D draws upon innovation, uses a systems perspective as its organizing principle, and needs to be articulated, tested, and validated to ascertain the conditions under which it works. The question is whether the IAR4D can deliver greater impact than traditional approaches of ARD, but also whether lessons learned from this type of multi-stakeholder ARD approach can be useful and adaptable to the ILRI’s smallholder pig value chains project in Uganda. The IAR4D promotes the active participation of local stakeholders in a framework of innovation platforms. Stakeholders may include: farmers, farmers’ groups, local extension workers, local input dealers, traders, NGOs, district and local government authorities.

⁴ The SSA CP is a research program that focuses on (i) delivering international public goods concerned with best-practices in relation to multi-stakeholder engagement in the generation and wide-scale adoption of agricultural innovations, and (ii) evaluating whether IAR4D works and is more cost(benefit) effective relative to conventional approaches. The SSA CP promotes the adoption of IAR4D and also acts as a platform for sharing information and knowledge concerning agricultural innovation and multi-stakeholder (partnership) engagement in ARD. The Program was implemented in the three Pilot Learning Sites (PLS) covering 8 countries in the ASARECA, CORAF/WE CARD and SADC-FANR sub-regions. These include: Niger, Nigeria, DR Congo, Rwanda, Uganda, Zimbabwe, Malawi, and Mozambique.

In particular, institutional innovations can help minimize gaps in the service delivery and access to input and output markets. There is need therefore, to understand different intervention models that can be tested, evaluated, and implemented with an aim of improving the quality of service delivery and efficiency of input and output market in the country. Institutional innovations create positive changes in behaviour, which can further increase the performance of the wider pig value chain and other development outcomes.

For example, successful and functional institutional innovations can help smallholder pig farmers to among others: get organized in producer groups that are able to exploit the pig value chains in a way that generates reliable and sustainable income; adopt the recommended technologies that increase productivity; minimize information asymmetry, especially when determining the live weight of pigs during the market exchange; forge functional partnership with different stakeholders that are committed to transforming the performance of the whole pig value chains; access affordable and high quality inputs and feeds; access affordable and high quality extension and financial services; increase trust among each other; champion the creation of local incentives for collective action and group discipline; minimize transaction costs and incidences of distress selling; get connected to the wider pig value chain actors; and create functional innovation platforms that advocate for improvement in pig value chains and fair policy environment.

In the same line, institutional innovations can help other non-poor value chain actors to take advantage of the well-coordinated pig value chain. These actors who often include traders and processors, will be in position to enjoy: the affordable services of bulking centres that ensures consistent supply of live pigs; adequate supply of farm output; legal and policy mechanisms that reduce risk to investment; high demand for their products and services; institutional arrangements that are effective at reducing such factors as transaction costs, distrust, and incoherence of value chain actors, and to some extent reduced negative environmental effects.

Research institutions and development practitioners therefore need to embrace active research mode in partnership with other stakeholders. They should also consider the adoption of efficient use of ICTs in agriculture and related fields, in order to improve the sharing of traditional knowledge and evidences of farmer benefits of this institutional innovation. Market based incentives can also be provided to smallholder pig farmers to adopt appropriate animal husbandry practices that increase productivity. Key policy interventions should therefore aim at improving: access to markets; access to extension services; access to quality feeds; animal feeding practices; type of housing; animal health, and breeding practices (Tatwangire, 2012). The marketing infrastructure and its efficiency also needs to be improved to enable an increase in: access to market information; supply of marketable production; supply of good quality pig products; support with access to credit and veterinary services, and ability of different actors to organise, get connected, and upgrade their involvement along the value chain.

There can be significant challenges and constraints to the successful identification and promotion of institutional innovations that work in a specific local setting. Many of the proposed best practices have failed to deliver positive changes in actors' behaviour as indicated by various case studies. The proposed best practices should therefore satisfy a certain criteria and should take key considerations of factors that may lead to failures of these innovations. For example, the selected institutional innovations and their implementation should: be appropriate and achievable in a realistic time frame of the project; based on research evidence about their potential to stimulate positive change in behaviour; should generate significant level of collective action and discipline that reduces

risk; increase the capacity or capability of value chain actors in taking key decisions of what, where, how, and how much to produce and market; and be inclusive in the sense of promoting active participation of women, the marginalised resource poor, and all willing partner, especially those with significant comparative advantage in community organisation.

This study therefore documents various institutional innovations in the agricultural sector that contribute to the improvement of access to services, inputs, and output markets in communities. In addition, it provides a review on the factors that may be attributed to the success and failures of these innovations or BBIs. The documented best practices (BBIs) can be adopted to better address the prevailing constraints and opportunities faced by smallholder pig farmers and other pig value chain actors in pursuit of better access to efficient markets and service delivery. The SPVCD project aims to improve livelihoods, incomes, and assets of smallholder pig producers, particularly women, in a sustainable manner, through increased productivity, reduced risk, and improved market access in pig value chains. The project targets smallholder pig producers, other value chain actors, government officials responsible for development of livestock sector, small-scale traders, butchers, input traders, and other service providers.

Objectives and research questions

This report addresses the following research questions: (i) what are the relevant institutional innovations undertaken at the local level by the private and public actors to enable improvement in access to: services, inputs, and output markets for smallholder pig producers and other farmers in Uganda? (ii) what contributes to the success and failures of these institutional innovations; (iii) what major constraints are faced in the general implementation of various institutional innovations, and: (iv) which of the past and prevailing institutional innovations can be adopted as potential best-bet intervention (or best practices), in order to improve value chain performance and access to the market in the research sites of the smallholder pig value chains project in Uganda?

In this study, best-bet interventions or best practices are derived from the findings of the recently conducted situations analysis of smallholder pig value chains in Uganda (see Tatwangire 2012); a recent ILRI report on the rapid impact assessment of pig value chains in Uganda (See SPVCD 2013); the review of economic literature, and; outcomes of deliberations from various workshops organized and attended by ILRI's staff, selected boundary partners, and actors in the pig value chains.

Methodology

The study relies more on the desktop review of relevant reports on the on-going institutional innovations and marketing of pig and other agricultural commodities in Uganda. Key Informant interviews on access to services, input and output marketing, and the processing of pig products were also conducted. These were conducted with selected representatives of pig farmers, private sector, and local government institutions, including the district veterinary officers and extension workers. The two districts of Mukono and Wakiso were purposively selected to represent a case study area. Evidences from the review of literature are utilised to triangulate key information collected with qualitative research methods.

The qualitative data collection approach in this study comprised of Key Informant interviews (KIs) with selected representatives of: 1) pig farmers, 2) input traders, 3) output traders, and 4) technical personnel from government departments. The focus of the discussion was more on policy issues, institutional issues, the prevailing opportunities and constraints in the pig production. Whether or not, farmers, other value chain actors, and stakeholders have the capacity to introduce new ways of improving access to services and markets for inputs and outputs. Relevant insights were generated from reviewing literature on the past and on-going innovation projects in Uganda and neighboring countries. These include reports of such organizations as: the East Africa Dairy Development Project (EADD), Sub Saharan Africa Challenge Program (SSA CP), Foodnet, VEDCO, and aBI-Trust.

Literature review

The meaning and evolution of institutional innovations

Institutions are the rules of a society or of organizations that facilitate coordination among people. Institutions are the norms, rules, and organizations that “govern” transactions. In other words, mechanisms for mitigating the collective-action problems that lies at the heart of economic development. Institutions help people to form expectations which each person can reasonably hold in dealing with others. According to Ruttan and Hayami (1984), institutions provide assurance of respecting the actions of others and also give order and stability to expectations in the complex and uncertain world of economic relations. However, institutions, like technology, must also change if development is to occur. Institutions in a community may range from property rights, norms, and the corresponding relationships between individuals that define the participation as buyers, sellers, renters, landlords, tenants, workers and other stakeholders along a particular value chain. Noteworthy is that strong institutions stimulate a system of fair negotiation, trust, and enforcement of contracts that foster further investment, innovation, and local trade.

The theory of the new institutional economics (NIE) considers economic outcomes, especially in the developing countries, to be largely dependent on the combined effects of market imperfections and the fundamental forces of resources, technology and preferences (Hoff and Stiglitz, 2001). The NIE relaxes the unrealistic assumptions of neo-classical⁵ economic theory such as perfect information, zero transaction costs, unimportance of institutions, perfect enforcement of contracts, and full rationality. Instead the NIE emphasizes the importance of transaction costs, environmental factors, the endogenous nature of institutions and institutional arrangements that determine economic exchanges and performance in any given community (Bardhan, 1993, Kherallah and Kirsten, 2002, North, 1990, Vandenberg, 2002).

Institutions therefore, whether economic, political, or cultural in nature, emerge and evolve as a product of social interactions. And while at times, institutions result from deliberate initiatives, on other occasions they may arise more or less by accident, and unintended byproducts of behaviors that become routinized over-time. Institutional innovation is in this case about re-conceiving a strategy and adopting better ways to improve relevant collaborations that can further increase: productivity, access to services, and access to inputs and output.

Institutional innovation is about changing the rules that make the seemingly impossible become possible. In other words, defying the norms and crossing the boundaries, often through a product of interaction, joint work, and collaboration of a large number of actors (Spielman et al., 2009). Institutional innovation helps to restructure the foundations of

⁵ In the narrow perspective and just for convenience, neoclassical theory of economics can be described to represents economic models that postulate maximising agents, who also interact through a complete set of competitive markets (Hoff and Stiglitz, 2001). It also includes the early work in institutional economics that perceived institutions to be crucial in creating efficiency by filling in for missing markets. It asserts that economic outcomes are determined by the fundamental forces of resources, technology and preferences, yet its implications in the real world with diffuse externalities are found to be quite misleading due to the inability to explain key aspects of behavior and development process(Hoff and Stiglitz, 2001)

society in meaningful ways and discovering new rules that enhance technology, process, and product or business model innovation. For example, Markelova et al.(2009) reiterates that the opportunity for smallholder farmers to raise their incomes from agricultural production, natural resource management, and related rural enterprises increasingly depends on their ability to sell their goods not just at local, but also regional and even international markets.

The logical link between interventions with best practices and subsequent changes in behavior and capability of smallholder pig farmers largely depend on various factors that are either anticipated or unanticipated. For example, there can be a joint negative effect of transaction costs, covariate risk, and asymmetric information (moral hazard and adverse selection problems) that lead to market imperfections. These market imperfections may include: missing markets; thin markets (imperfect competition); partly missing markets (rationing, seasonality); limited access to credit; access to informal credit at high interest rates; constrained access to off-farm employment; price bands on output and labor supply; inter-linkage of input, credit and output markets; and constrained access to rental markets of such assets as land (Holden et al., 2005, Holden and Binswanger, 1998, Holden et al., 1998).

The combination of market imperfections and uninsured risk create inefficiencies in market exchanges and fluctuations in household income, and can also limit the ability of households to take on profitable activities that reduce income poverty (Dercon, 2002, Dercon, 2005). As a result, constraints are imposed on input demand, output supply, investment in asset building, and consumption smoothing processes. To the extent therefore, that significant market imperfections exist in the local markets, including markets for insurance and external credit, rural households respond by establishing new institutional arrangements that promote fair interactions of actors and also by accumulating buffer and productive assets, including pigs to provide safety nets. This strengthens the ability of households to maintain and expand their welfare over time. The question is how these household coping strategies can be enhanced to promote commercial and sustainable pig production in this context.

Linkages therefore between policies, institutions, markets, technology, vulnerability issues and access to assets are all vital for sustainable development. These interact to define effective supply and demand for market and non-market outputs as well as opportunities and constraints that rural households face. The presence of effective service delivery and markets⁶ for inputs and outputs can create a broad-based rural development through better exchange of assets, goods and services. Conversely, the joint combination of imperfect markets and information asymmetries in rural areas create high transaction costs in virtually all output and input markets (de Janvry and Sadoulet, 2005). High transaction costs in turn, creates direct interrelations (nonseparability) between production and consumption, which further limit quantities that can be exchanged and the level of market participation (de Janvry et al., 1991, Key et al., 2000, Sadoulet and de Janvry, 1995, Singh et al., 1986). In this case, institutional innovation can be utilized as an efficiency-based response to tough times when farmer market participation and the associated benefits are at the lowest level.

⁶The absence of markets and the effects of markets in rural areas influence livelihood opportunities and constraints that arise from market processes. Conversely, institutional change may determine pro-poor market development (Dorward et al. 2003), whilst market development is also part of institutional development.

Review of past literature on institutional innovations

Different sets of explanations have been proposed in literature to justify institutional innovations. For example, change can emerge out of bottom-up efforts to help navigate formal constraints through the creation of informal arrangements (Doner, 2010); institutions can also emerge to solve collective-action problems where mechanisms are put in place to help interdependent parties to achieve efficient outcomes (Thelen, 2001), and; the impact of cultural variables (such as norms and networks) and more historical, path dependent dynamics such as the perceived crises, these can help convert old institutions and their functions by layering new functions onto existing arrangements (Doner, 2010). Institutions therefore, keep getting converted to serve new functions that are considered to be more efficient. However, the process of innovations requires: (i) research; (ii) development (up-scaling, testing); (iii) production; (iv) marketing, and; (v) use.

Institutional innovation is about formulating and entrenching alternative arrangements that help to minimize existing constraints to improved access to services and market for inputs and output. These must be new in the context of geographical area, scale of operation, field, discipline, and type of culture or type of businesses. Institutional innovation must therefore bring solutions to particular constraints or problems, and; should have an up-scaling potential in terms of its sustainability and efficiency beyond the test period. However, the process of innovation requires the need to understand how existing institutions work, and how individuals react, if activities and products that serve peoples' need are to be introduced. Institutional innovation therefore starts as a concept that is refined and developed before application. Furthermore, determinants of innovation and its dynamic potential should not be viewed individually, but rather within the context of a complex agricultural innovation system that involves many actors and interactions (Larsen et al., 2009).

The relevance for collective action

Research evidence indicates that new kinds of institutional arrangements are needed in order to: overcome market failures, reduce transaction costs, and to maintain market position in rural areas of developing countries (Shiferaw et al., 2008). Some of these institutional innovations involve organizing farmers and other value chain actors into producers and marketing organizations; strengthening of these producer or marketing organizations, and; formation of collective marketing groups as instruments to remedy the pervasive market failures in developing countries.

In Uganda for instance, most smallholder pig farmers are not members of the any farmer groups. There are also limited local champions and initiatives towards the formation of well functioning pig producer groups based on genuine collective action (SPVCD, 2013). The creation of active pig producer groups can therefore be a reliable way of improving access to output markets, inputs, and services, but also vital in the acquisition of skills that are vital for improved pig production and management.

Producer marketing groups (PMGs) can enhance market opportunities for small pig producers by coordinating production; facilitating access to better markets; reducing marketing costs, and; synchronizing buying and selling with seasonal price conditions. However, collective action is critical to realizing this potential and is only likely to occur when expected gains outweigh the associated costs of complying with collective rules and norms. For example, findings of a case study from Eastern Kenya show that marketing groups pay 20-25% higher prices than other buyers to farmers, while participation is also positively

correlated with adoption of improved dry-land legume varieties, crops that are not targeted by the formal extension system (Shiferaw et al., 2008). This implies that PMGs can exploit seasonal price differentials through bulking and storage. This notwithstanding, higher prices can be paid by the PMGs to member farmers at a cost of delayed payments, while competing buyers tend to pay on delivery or shortly thereafter, a factor that may compel cash-stricken small farmers to sell their farm output through alternative channels.

No doubt, cooperation is a crucial factor for poor smallholders to overcome challenges presented by unfavorable policy and market conditions and to create sustainable livelihood options. However, collective action is not automatic and requires specific enabling conditions (Markelova and Meinzen-Dick, 2009). Factors that are likely to affect collective action may include: characteristics of the resource (or markets and products); characteristics of the user groups, and; institutional arrangements. The effectiveness of these factors depends on an enabling external environment that also includes the nature of relationships between farmer groups, state, market, and civil society.

Market-supporting institutions and their importance

Market institutions can be defined as rules of the game, enforcement mechanisms, or the kind of organizations that facilitate: market interaction, coordination, contract formation and enforcement. Distinctively, well-functioning markets ensure gainful exchange. Strong market institutions therefore, minimize “transaction costs” to a reasonable cost.

In the case of smallholder pig value chains, strong institutions are those that ensure: (a) excludability; (b) clear ownership or property rights; (c) compliance and enforcement of contracts; (d) access to information, especially on prices and other observable attributes of the product; (e) a stable and reliable medium of exchange; (f) a physical (or virtual) market place to bring parties together through modes of transport and communication, and; (g) adequate peace and security. To the extent therefore that some of the above conditions are not met, this increases the level of transaction costs. Transactions costs may also increase with the volume of exchange. They can also disrupt exchange and create costs of opportunistic behavior in form of cheating.

Arguably, various types of institutions support the development of the market by reducing transaction costs. These include: (i) informal institutions that characterize the cooperative behavior sustained through reciprocal exchange and repeated interaction (these range from informal credit markets, village markets, community initiatives); (ii) belief systems that represent behavior driven by internalized ideas about what is right, morals, religion, ideology etcetera; and (iii) state institutions that ensure the type of cooperation achieved through “third-party enforcement” of rules and contracts, as well as implicit use of force of state punishment.

Market failures in the pig value chains may range from unequal access to information; excessive costs and risks of transaction; coordination failures that limit access to supply chains, and; existence of indivisibility (minimum transaction sizes). In this case, institutional innovations can promote such interventions as: market development of the private participation, development of collective action, and network development. Other relevant interventions may aim at: reducing risks, providing guarantees, developing the performance of value chain, initiating institutional innovations such as contracting, collective action, and lastly but not least, market facilitation and development.

Results of the review and interviews

The following summarises key findings from the desk review of literature and other relevant documents. Key responses from the Key Informant interviews are also presented.

Input and output marketing channels in Uganda

The market of inputs in the pig sector is considered to be improving. Pig producers with ability to buy have access to various inputs that are available on the local market, especially in urban areas. Nevertheless, the majority of pig producers are still unable to afford and utilise these inputs in adequate levels. This situation can be largely explained by the high cost of inputs. In most cases, there are complaints on issues of poor quality inputs and feeds. There is lack of quality assurance and regulation of the wider input system in the country. In this context, recent evidence from SPVCD (2013) indicates incidences of poor access to inputs by the smallholder pig producers in most rural areas, and these tend to be even more constrained financially.

There can be certain types of inputs whose availability in the country is very much limited. It is also true that most smallholder pig farmers do not have access to the necessary market information regarding the price and quality standards of inputs and pig products. The lack of adequate market information compels farmers to be in a vulnerable position and prone to exploitative tricks of quack input dealers, brokers, and traders, who often sell fake feeds and other poor quality inputs. No doubt, the use of commercial inputs on smallholder pig farms is to a large extent limited, and this is probably due to the lack of capital and market information.

Distinctively, operations on the supply side of input market require a lot of capital. This notwithstanding, a net-work of input stockists, including the relatively large-scale farmers is quite extensive in rural areas. These stockists purchase inputs from Kampala and transport them for sale to farmers in other districts. Nevertheless, most small-scale input traders find it hard to maintain operations due to such factors as: limited access to capital, high transaction costs, and unreliable supply of inputs in the country.

Access to extension services

Diseases and poor animal husbandry practices are the major constraints for improving pig production in Uganda. Nevertheless, farmers are increasingly becoming aware of the availability of veterinary extension services that have also increased lately in outreach. The government is running a parallel system of extension services, with the traditional extension service conducted by district veterinary officers, and NAADS providing core extension services. And while NAADS has largely succeeded in farmer groups' formation, and in giving out some material inputs, the majority of smallholder pig farmers in Uganda still have limited access to extension and veterinary services (Tatwangire, 2012).

The SPVCD(2013) reveals that pig farmers in Central Uganda and especially in Masaka district, rank highly the operations, importance and the contribution of NAADS in offering advisory services on modern agricultural practices and livestock management. As earlier indicated, NAADS has been supporting the formation of farmer groups, helping farmers to acquire inputs and piglets, and disseminating important advice on proper housing structures. In some cases, NAADS would supply some of the pig housing construction materials while farmers would supply labour.

Extension and animal health service in the country is therefore provided through a number of avenues that include: the NAADS program; the central government extension services

driven by Agricultural Advisory Service Provider (AASP) such as the veterinary officers at the district level; community based animal health service providers that are more pronounced in Karamoja region; drug shops; input traders (stockists); private extension and veterinary services; fellow farmer to farmer outreach propagation, and; some NGOs. These provide pig farmers with vital information and training on modern pig farming practices that also include: selection of breeds, feeding practices, disease control, general pig husbandry, and to some extent marketing. Interestingly, the most frequently used service providers are drug shops, who often help pig farmers to treat their animals.

The NAADS program is based on membership, implying that many smallholder farmers, who do not operate in organized groups, are rationed out of this crucial agricultural advisory service. In Wakiso district for example, only 20% of smallholder pig farmers are estimated to have access to extension services. However, the government of Uganda is currently making adjustments in the operations of NAADS with an aim of: strengthening the extension services, supporting agribusiness services (market-oriented agricultural advisory services”), and enhancing market linkages. Recall that the strategy and priorities of NAADS for 2013/14 financial year is to ensure modernization of the agricultural sector through increased production and productivity of 10 key commodities. These include: coffee, tea, dairy, fish, maize, beans, rice, bananas, cassava and beef cattle(Kashaka, 2013). That said, pigs are not considered among these key agricultural commodities of NAADS program.

Access to credit services and financial services

Credit⁷ market in Uganda is small and largely informal as opposed to being formal. Only 20% of the farm households have access to financial services that also includes insurance(GOU, 2012). These households mostly depend on semi-formal and informal institutions, which are not regulated by the Bank of Uganda (BoU). And while these institutions make-up the backbone of the rural financial sector in Uganda, they are considered to be weak, unable to guarantee reliable credit access, and provide low returns (low interest rate) to poor people’s savings. About 62% of all Ugandans (whether in farm or non-farm occupation) have limited access to financial services, while the majority (42%) of Ugandans that receive credit rely more on informal financial service channels(GOU, 2012). Only 20% of the population in Uganda have bank accounts.

The number of Ugandans that access financial services is reported to be on the increase. Pig farmers in particular have a low level of access to credit (Tatwangire, 2012). This aside, detailed information on the proportion of pig producers, pig traders, and pig processors that use credit in their investment is currently not available in the country. What is clear though is that most farm households access credit from self-help groups, followed by Rural Savings and Credit Associations (ROSCAs), and then Commercial Banks in that order of importance (Bashaasha et al., 2012). And while banks and microfinance institutions (MFIs) are the most active financial institutions in the peri-urban and urban areas, there are many MFIs that provide access to credit to individual farmers and farmer groups. Conversely, access to credit in rural areas is mostly through informal and lower tier MFIs such as: the self-help associations, ROSCAs, SACCOs, Village Savings and Loans Schemes (VSLA), stockists (inputs

⁷ The financial service providers are categorized into four groups, namely: (i) Tier 1 (includes commercial banks); (ii) Tier 2 (credit institutions); (iii) Tier 3 (micro-deposit-taking institutions (MDIs)), and; (IV) Tier 4 (all other financial institutions and associations that are not regulated by the Bank of Uganda (BoU)). These providers operate in a financial infrastructure that is generally considered to be underdeveloped.

on credit), friends, and relatives. The need to have collateral and some levels of savings limits the capability of some farmers to access credit services.

Pig farmers access credit from MFIs based on collective responsibility and group membership. Each farmer pays an entrance fee into MFIs. Loans are given out depending on clients' ability to repay as determined by the MFIs' managers. Eligible pig farmers are generally required to have at least 30% of the value of the loan already available (Data Innovation Project, 2012). The magnitude of the loan depends on the individual savings of the farmer into the group fund and his or her security credentials such as land and other asset endowments.

The informal institutions or the lower tier micro finance institutions mostly provide relatively small loans to individuals, groups, and institutions. Most traditional (commercial banks) financial service providers tend to hold back their service, often due to the fear of losing their investments in the rural sector. For them, uncertainty that comes with the business plays a key role in accessing their services. It is in this context that pigs are considered risky by some of the financial service providers, a phenomenon that is attributed to incidences of serious disease outbreaks, including the African swine fever (ASF) that can easily wipe out the breeding and marketing pig herds.

Access to market information

Pig farmers access market information from extension workers, fellow farmers, and traders who sometime operate as brokers and butchers. Drug shops are also utilised frequently as the source of the much needed information on animal health that is also vital for pig production (Tatwangire, 2012). Distinctively, the use of mobile phones by smallholder pig farmers to receive relevant market information is not yet well entrenched.

The Agri-Hub Uganda is an online platform⁸ (<http://apf-uganda.ning.com/>) that is helping to bridge the gap by promoting entrepreneurship of farmers, including pig producers. This platform has established an active website that allows pig producers and traders to post and access various market information that depicts the supply and demand of live pigs and other agricultural produce. Still, it is not clear as to how many farmers access and utilise this technology. Responses from the Key Informant Interviews suggest that only 15% of pig farmers are reported to participate in the market for credit services in Wakiso district, a proportion that is much less when compared to 80% of pig farmers that actively participate in the general marketing of pig products in the same district.

It is well known that very long marketing chains present greater disadvantages for smallholders, who prefer to rely on efficient "local to local" and "local to urban" pig value chains. While smallholders can access local markets and related information more easily, these markets offer relatively low gains from organizing, since each farmer tends to sell individually (Markelova and Meinzen-Dick, 2009). On the other hand, collective action can offer more significant benefits in allowing well organised smallholders to access relevant market information that enables them to reach out to larger domestic urban, regional, and

⁸Agri-Hubs are multi-actor arenas in support of farmer entrepreneurship. Agri-ProFocus Uganda is a growing network of farmers' organisations, NGOs, financial institutes, research institutes, private and public sector actors and Dutch and other international development agencies. These are working together to stimulate the enhancement of farmer entrepreneurship in Uganda and are also collaborating around 6 themes: farmers' organization; farming services; access to finance; market information; policy advocacy; gender in value chains, and; food security.

international markets. Access to market information on growing urban markets represents a particularly attractive option for farmer groups. Acting collectively may enable smallholder farmers to deal with risks of transportation and storage. They may also find it easier to acquire key technologies and certificates to comply with required quality standards and even reach the necessary scale to supply the desired quantity of pig products.

Export markets on the other hand, present many more challenges in terms of access to information, quality control, transport, and market risks. Even if they overcome some scale and quality issues with collective action, smallholders may still be unable to compete with agribusinesses or to comply with international quality and food safety standards. Despite these challenges, Markelova and Meinzen-Dick (2009) reveals that there are some documented examples of smallholder groups that supply export markets largely due to access of necessary information.

Smallholder pig producers and their participation in marketing channels

The functioning of the market is generally constrained by high transaction costs and coordination problems along the pig production-to-consumption value chain. This means that new kinds of institutional arrangements are needed to reduce costs of: transport, loading, off-loading, and access to market information. Still, smallholder pig farmers face new market opportunities and constraints that are created by such factors as: growth in supermarkets, increase in hotel services, and an increasing demand for high quality pork products by the up-coming affluent consumers. These developments clearly justify the need to link smallholder pig farmers to markets through innovations that increase productivity, income growth, and overall economic growth.

Pig producers in Uganda utilise various marketing channels. Some of the pig farmers engage in the marketing of live pigs, while others sell pig products in form of pork and sausages. Market participation by smallholder pig farmers is sometimes conducted collectively, very often on an individual basis, and occasionally with pig products that have additional value added. And while collective marketing may increase the number of live pigs and volume of pig products sold, selling on individual basis is associated with fewer of these products sold. Noteworthy is that prices for live pigs does not vary so much across time and space. Farmers therefore earn more money when dealing in transformed primary pig products that are characterised by more value added through such activities as: better slaughtering, pork dressing, roasting, and processing into sausages.

Primary pig products include: piglets, live pigs for breeding, live pigs for slaughter, and pork carcasses or pork pieces with and without bones. The market of inputs is also small, given that only a small proportion (30%) of smallholder pig farmers is able to purchase and utilise inputs. These include: drugs, pesticides, and better quality feeds (maize bran, silver fish, and etcetera). No doubt, the targeted flow of resources and technologies in the pig sector can increase market participation of poor smallholder pig farmers, including women (Tatwangire, 2012). The increase in market participation of smallholder pig farmers in the last decade has led to the increase in the local supply of pork to satisfy high domestic demand. Improvement in the efficiency of farm level productivity, marketing, and performance of pig value chains is therefore vital, if domestic and regional markets for pork products are to continue registering growth.

This notwithstanding, pig farmers in Uganda tend to maximize their pig sales and income in specific periods of: Easter season (March-April); Christmas season (in December), and; in between June and July, when household income from coffee is highest in most districts (SPVCD, 2013). It is during these periods that traders from Kampala purchase pigs from smallholder pig farmers at relatively high prices. Farmers are therefore aware of these periods and are not willing to accept low prices for their pigs. On the contrary, children return to school during the period of January and May. During this period, the distressful need for school fees often compels smallholder farmers to sell their pigs, even at prices considered to be low. During the dry season, which falls between the months of June and August there is scarcity of feeds that further compels farmers to sell more of their pigs at low prices.

Smallholder pig farmers use different marketing channel for pig carcasses and pork pieces. Pigs that are largely castrates, injured, worn-out, or considered to be old are selected by farmers for sale using any of market channels summarized in Figure 1.

Local butcheries (market channel 1) are commonly utilized by smallholder farmers, followed by channel 2, and lastly channel 3.



Figure 1: Different marketing channels for the grown-up pigs reared for slaughter/pork in Uganda

Adult pigs sold for slaughter normally fetches lower price than is the case with adult pigs sold for breeding. Figure 2 presents different marketing channels for live pigs. Local small-scale traders buy live pigs from other small-scale traders and farmers. They further help to hoard the purchased pigs from smallholder farmers for sale to large-scale traders that often come from urban areas like Kampala. The large-scale traders only go to the village when they are assured of enough pig supply and one that that can fill a truck of not less than 1000kg of live weight.

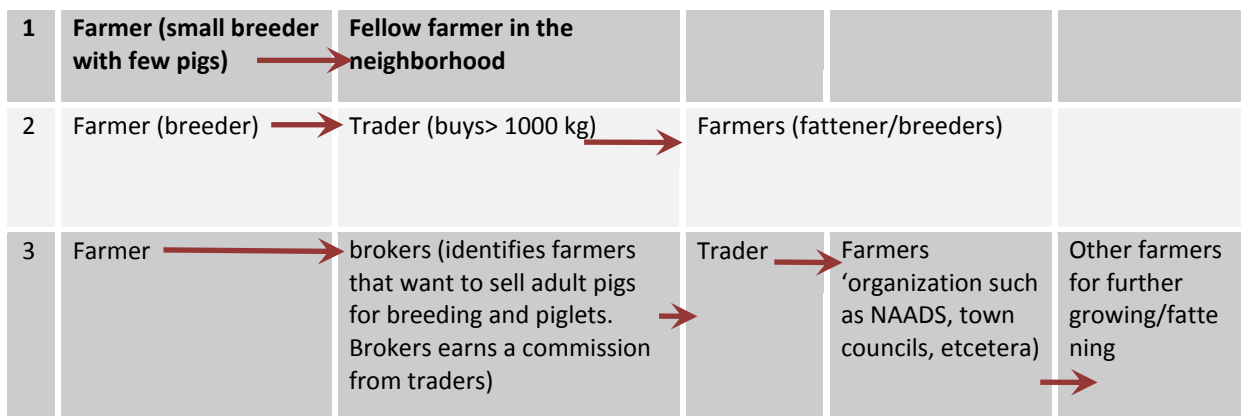


Figure 2: Different marketing channels for live pigs in Uganda

Conversely, smallholder pig farmers buy inputs from either a local input trader or big input traders that also have adequate capacity to formulate and mix feeds. Women pig farmers are more likely to be constrained in participating in input market and accessing relevant inputs, often due to the lack of financial capacity. Maize mills are considered to be the most utilised outlets for better quality feeds, including maize bran.

It is therefore evident that marketing channels in Uganda and other developing African countries are characterized by long and complex marketing chains and high transaction costs, which to some extent lowers the farmers' share of the consumer price (Shiferaw et al., 2006). Producer marketing groups have the potential to simplify and shorten the marketing chain by directly connecting small producers to secondary and tertiary markets. This is vital if smallholder pig farmers are to experience well-coordinated production and marketing activities that enhance access to production inputs at fair prices.

Average revenue and costs associated with the channels

The average revenue of pig farmers and traders per live pig sold depends on the: breed type, quantity sold, demand available, and transaction costs involved in the exchange between the buyer and seller. Table 1 presents estimates for the local prices for live pigs of varying ages. Live pigs are often sold right from the age of 2 months (weaners) up to more than 6 months when they are considered to be mature. On the average, the difference between the value of live pigs at the farms in Wakiso district and their corresponding farm gate selling price is USh 20, 000.

Estimates in Table 1 further show that a 2 months piglet is valued at USh 40,000 and is sold at Ush.50, 000 depending on the breed type.

Table 1: Farm level value, buying price by traders, and selling price of live pigs in Wakiso district

<i>Age of the live pig</i>	<i>Value at farm level^a</i>	<i>Local farm gate selling price^b</i>	<i>Buying price by PPM</i>	<i>Selling price by PPM</i>
<i>2 month old piglet</i>	<i>40,000</i>	<i>50,000</i>	<i>80,000</i>	<i>100,000</i>
<i>3 month old piglet</i>	<i>70,000</i>	<i>100,000</i>	<i>130,000</i>	<i>150,000</i>
<i>4 month old piglet</i>	<i>100,000</i>	<i>120,000</i>	<i>150,000</i>	<i>200,000</i>
<i>5 month old pig</i>	<i>150,000</i>	<i>170,000</i>	<i>200,000</i>	<i>250,000</i>
<i>6 month old pig</i>	<i>200,000</i>	<i>220,000</i>	<i>250,000</i>	<i>300,000</i>
<i>Pregnant Pig</i>			<i>600,000</i>	<i>750,000</i>

Source: from interview with Mr Chris Mulindwa, a trader and founder of Pig Production Marketing Uganda (PPM) limited in Wakiso District; ^aValue at farm level indicates the value of a live pig based on the total costs invested by the farmer; ^bFarm gate selling price includes the total cost plus the profit margin.

Similarly, a 6 months old pig is valued at USh 200,000 and is sold at USh 220,000. This creates an average farm gate profit per pig of USh 20,000 for smallholder farmer. This computation does not factor in the production costs per pig, whose data was not possible to access. The age of the live pig or piglet is considered to be directly correlated to the size and weight of that specific pig. The price of live pigs appears not to significantly differ whether the pig is castrate or a female.

A large-scale trader, who buys live pigs from smallholder farmers and small-scale traders, purchases a 2 month old piglet of an improved breed at Ush.80, 000 and sells it at USh 100,000. Similarly, a 6 month old live pig is bought at USh 250,000 and sold at USh 300,000. Based on the figure in Table 1 (above), it can be seen that the average gross profit margin (the difference between the purchase and selling price) per live pig for a large-scale trader is USh 38, 000 and USh 56,700 when a pregnant live pig is also included among the purchases. This finding therefore indicates that traders earn more on the live pigs than is the case with pig producers. This is true for live pigs of every age, breed type, and every marketing channel. The gross margin of a small-scale trader per live pig is arguably between that of smallholder farmer and a big trader.

This distribution of gross margin is keeping the operations of small-scale traders and brokers active in the value chain. These are also upgrading their active involvement in the hoarding (bulking) operations of live pigs as they wait for a large-scale trader to come from urban places to buy the live pigs. Some smallholder farmers have also started to transport their live pigs and to sell them directly to the main abattoir and private slaughter houses in urban markets. Although this new channel helps smallholder pig farmers to make more profit

compared to other channels, they are however discouraged by the high risks and exploitative practices that characterise the operation of slaughterhouses.

Table 2 shows estimated local prices for pig carcasses in Wakiso district. Notice that a 4, 5, and 6 month old live pig produces a carcass weight of 15-18 Kg, 20-25 Kg, and 30-35 Kg respectively. This implies therefore that the older the live pig the more carcass weight it produces, depending on such factors as; the nature of farm level husbandry practices, feeding practice, breed type.

Table 2: Buying and selling prices of pig carcasses by traders in Wakiso district

<i>Age of the live pig</i>	<i>Carcass weight (Kg)</i>	<i>Buying price per kg by PPM</i>	<i>Selling price per kg by PPM</i>
<i>4 month old piglet</i>	<i>15-18</i>	<i>5000/Kg for areas that are far.</i>	<i>7000/kg for purchases less than 20 Kg</i>
<i>5 month old pig</i>	<i>20-25</i>		
<i>6 month old pig (breeder)</i>	<i>30-35</i>	<i>5500/kg for areas that are near</i>	<i>6000/kg for bulk purchases (>20kgs)</i>

Source: from interview with Mr Chris Mulindwa

Most large-scale traders from urban areas also have their own slaughter slabs or houses that are not licensed and therefore considered to be illegal. Pork carcasses from these private slaughter places are not inspected, given the circumstances of the illegal operations and the fact that there not enough meat inspectors in local governments. Nevertheless, these large-scale traders soften slaughter their live pigs once they have arrived in urban areas from deep in rural areas. Some large-scale traders sell their pigs at the main pig abattoir located in Kampala (Wambizi Cooperative Society), while others have started slaughtering pigs at the farms, and only to transport pig carcasses for sale in urban areas.

After the slaughter, pork pieces and carcasses are distributed and sold to various butcheries and pork joints in the city. When buying pigs for slaughter, the live weight is estimated by traders through a mere observation and estimation, often at the disadvantage of smallholder pig farmers. For areas that are far and deep in villages, the price per Kg of pig carcass is USh 5000. This however increases to USh 5500 per Kg for areas that are near the main road and urban areas. Big traders such PPM sells pig carcasses at USh 7000 per kg for clients that buy in small quantities of less than 20kg per every purchase. However, clients that buy in bulk (more than 20 Kgs); the selling price is relatively less at USh 6000 per Kg.

Box 1: Qualitative responses from a Key Informant in Mukono District

Dr Kiwanuka works with Mukono district local government as a Veterinary officer. He is also a member of the Uganda Piggery Organization (UPO) that aims at organising pig farmers in Uganda under one umbrella- to collectively work together in areas of improved pig breeding, production, marketing and value addition.

In terms of institutional innovations, Kiwanuka notes that there has been limited or no intervention in the pig value chain in the country. Some NGOs such as VEDCO have been operating in Mukono district and have made a contribution towards the creation of farmer groups and access to livestock inputs, including piglets. He further reveals that the progress made so far in the marketing of pig products appears to have developed by itself and with limited external help.

Market information is often accessed from butchers. Pig farmers have not succeeded in utilising collective action to sell pig products in groups. These days traders use mobile phones to call farmers who are exploited in terms of: under estimation of pig weight, low prices, and other related false quality assessment by traders and middlemen. Smallholder farmers are also constrained by limited access to credit services.

Most pig producers market their pigs individually (sells less) while very few sell their pigs in a group (more is sold through collective marketing). Value addition is still limited and largely in form of selling: dressed pork, roasted pork, and sausages. Price for a kilogram of pork is more or less fixed, and selling pork products earns more than selling live pigs.

In Mukono district, some of the institutions that have contributed to some improvement in pig value chains include: NAADS, Uganda piggery Organization (UPO), pig farmers groups that are organised by DELO (a private organization that buys pigs from farmers and engages them in some sort of contract farming) at prices that ranges from 5000-6000/kg of pork, compared to 5500/Kg at the main pig abattoir of Wambizi. Other big private buyers of pork include a company of “Globa” that is popularly known as Goal. This company has invested in a technology of refrigeration and is able to buy slaughtered pig carcasses in large amounts. Other institutions are VEDCO and ILRI that is trying to conduct an in-depth research for agricultural development in the pig sector.

The way forward according to Kiwanuka is for ILRI and other development practitioners to support research efforts and interventions that can: increase the number of pig slaughter houses; introduce fast growing pig breeds; introduce appropriate feeding practices; initiate effective and organised farmer group marketing, and; innovations that can link farmers to the market.

Box 2: Qualitative responses from a first Key Informant in Wakiso District

Ms Winnie Babirye works as a private extension worker in Wakiso district and also a trader in Agro-inputs in down town Kampala. She reveals that the Uganda National Agro-input Dealers Association (UNADA) in partnership with Pharmaceutical and Veterinary Association and MAAIF has attempted to link farmers to traders and to the banks, with an aim of coordinating all agro-input dealers to efficiently supply inputs at affordable prices. Also active in Wakiso district is the organization called “Empowered Kampala Agro-dealers Association (EKADA)” that works in tandem with UNADA and MAAIF to among others: link crop produce farmers to banks, train farmers with improved management practices, improve access to inputs, and enhance quality control. However, there are a number of farmer groups that specialize in the production of different agricultural products. In particular, pig farmers rarely use commercial inputs due to the lack of capital.

In the case of input marketing channel, there is a net-work of input stockists and relatively large-scale farmers that purchase inputs from Kampala, only to sell them to farmers in other districts. Smallholder pig farmers access relevant market information from: extension workers, fellow farmers, and traders (brokers). These often rely on the use of posters and pamphlets as means of communication. Pig farmers are yet to receive relevant information using mobile phones.

In addition, it is only about 15% of pig farmers that participate in the market for credit services in Wakiso. This proportion is very low when compared to about 80% of pig farmers that participate in the marketing of live pigs and pork products. Credit sources for pig farmers in Wakiso include: SACCOs, stockists who provide inputs on credit, friends and relatives, MFIs, and lastly formal banks in that order. The lack of collateral, high level of poverty and the risk of fatal disease still limit access to credit.

Pig farmers sell their live animals and pork at different markets, for instance:

- Selling live pigs to agents or traders from Wambizi cooperative society (WCS) pig abattoir is at USH 70,000 per live pig.
- Selling pigs in the village (though rarely) at USH 70,000 per pig.
- Selling pigs to butchers who come to collect them in villages at USH 50,000 per pig.
- Selling pigs to middlemen and agents of fresh cuts at USH 100,000 per pig.

At Wambizi (the main pig abattoir), pigs are collected, slaughtered, and carcasses weighed before paying about USH 5000 - 6500 per Kg of pork. Noteworthy is that an average pig of carcass weight of 45 Kg, each at USH 6000 yields to a farmer about USH 270,000 gross income, including the cost of slaughter. Distinctively, a fattened exotic pig or cross-breed may weigh about 60 Kg of carcass that is worth USH 360,000. Selling a live fattened cross-breed pig on the other hand fetches USH 350,000, has an average farm gate level value of about USH 300,000 after a production period of 5-6 months. A local live pig fetches USH 180,000 and has a farm gate level value USH 80,000.

She further revealed that she is not aware of any public institution, NGO, or private institution that has in the past or currently been promoting interventions that improve the marketing of pigs and pig products along the value chain. Only few institutions have been engaged with the re-stocking and the formation of farmer groups, and these include: NAADS, World Vision, Child Fund, and other fellow farmers. Nonetheless, the formation of farmer groups appears to have failed in generating the anticipated collective action. In particular, VEDCO does not operate in Wakiso district.

Box 3: Qualitative responses from a second Key Informant in Wakiso District

Mr Chris Mulindwa is a trader and founder of the Pig Production Marketing Uganda (PPM) limited in Wakiso district. He started piggery in 2009 with few pigs on a small piece of land offered to him by his grandmother. He quickly faced the problem of limited or no market for live pigs. After the unsuccessful attempt to organise pig farmers in the neighbourhood into a group, he chose to take on a piggery business as an individual and not in a group.

Pig farmers in the district largely operate on their own without any external (any body's) help or assistance. Traders normally cheat pig farmers at their pig farms and at the Wambizi Cooperative Society (WCS)'s main pig abattoir, where payment is only made on per kilogram basis of the pig carcass. This is after the head, legs, and the belly have been removed from the main pig carcass. This institutional marketing arrangement is exploitative and requires pig farmers to be well informed; otherwise, they are not able to secure good deals. According to Mr Chris Mulindwa, market participation by smallholder pig farmers within the pig production systems can be summarised as indicated in the Table 3, below:

Table 3: Market access and participation in different pig production systems in Wakiso district

Production system	Type of market or service accessed by smallholder pig farmers	Estimated levels of Market participation smallholder pig farmers services from different sources +++
Tethering	Input market	0%
	Extension services	10%
	Credit services	30%
Intensive	Input market	80%
	Extension services	50%
	Credit services	50%

Source: from interview with Mr Chris Mulindwa

There are different marketing channels in the district and these includes: (i) selling of live piglets; (ii) selling live pigs from a breeding herd (breeders), and; (iii) selling pigs for slaughter and pork (from a market herd), which often includes pigs that are castrates or grown-up stock. Contrary to popular views about market access for pig farmers in Matuga, Mr Mulindwa reveals that there have not been significant interventions aimed at improving the marketing and value chains of pigs and pork products. The only improvement in the functioning of the market for pig products is in terms of the mushrooming pork joints for pork roasts.

The market for inputs in Wakiso district is still weak and struggling given that only 30 percent of smallholder pig farmers participate in the input market of such items as: maize bran, silverfish, and pesticides. Some of the institutional innovations that are taking place include the fact that: most farmers have learnt to be self-sufficient by doing what the veterinary officers normally do in terms of treating their animals. Public Institutions that are conducting innovative interventions in the market for pigs are almost non-existent. This notwithstanding, NAADS used to provide selected farmers with piglets. Each farmer would be provided with USh 400,000. The program of NAADS had and still has nothing to do with relevant interventions that promote the marketing of inputs and pig products. Up to now there is no focus on traders, input dealers, and processors.

Some of the NGOs including that of Pastor Vincent Kasheija also provide beneficiaries with piglets, but have nothing to do with the improvement of the market access or market linkages. The Pig Production Marketing Uganda (PPM) limited is the main private company that links pig farmers to market of piglets, grown-up pigs, and pork. Despite of capital constraints, PPM is succeeding in using its contacts to sell most of the pigs. Recently, the PPM received a grant from African Rural Connect to expand their operations. The only challenge is that PPM has a small slaughter place still considered to be illegal by the authorities. This implies that their value addition is limited due to the lack of veterinary stamp. Pork that is produced at the PPM's slaughter slab is still considered by many as of poor quality, yet this can be attributed to the lack meat inspection services of the district veterinary officers.

In the case of access to services, a recent SPVCD (2013) report indicates that the proportion of male pig farmers that receive extension services from NAADS, NGOs, other farmers, and other Animal Health Service Providers (AHSP) is 27%, and is higher than that (20.7%) of their female counterparts. In the same line, the SPVCD (2013) report reveals that the proportion of male pig farmers that have access to credit services from SACCO, MFIs, Banks, village groups, and women groups is 11.2%. This proportion is not very much different from 11.6% of female pig farmers that access credit from similar sources in the three value chain domains of “rural to rural”, “rural to urban”, and “urban to urban”.

Institutional innovations undertaken by different organizations which can be adopted and adapted by smallholder pig farmers

This section presents a summary of various institutional innovations that are being promoted in different agricultural commodity value chains in Uganda and elsewhere. These can be modified and adopted in the smallholder pig value chains depending on the available resources and time-frame of intervention. Innovations can be grouped into those that transform local institutions and those that improve agricultural production technology. It is evident that institutional innovations promoting access to service and efficient market for inputs and outputs in the Uganda’s pig value chains are still at infancy stage. To a large extent these innovations are non-existent as indicated by the following qualitative responses from selected Key Informants:

“In terms of institutional innovations, there has been limited or no intervention in the pig value chain in the Uganda. Some NGOs such as VEDCO have been operating in Mukono district and have made a significant contribution towards the creation of farmer groups and access to livestock inputs, including piglets. The progress made so far in the marketing of pig products appears to have developed by itself with limited external help” **Dr Noah Kiwanuka, Veterinary officer, Mukono district.**

“There has not been any public institution, NGO, or private institution that has had interventions to improve marketing of pigs and pig products along the value chain in Wakiso district. Instead few organisations have been engaged with the restocking and formation of farmer groups and these include: NAADS, World Vision, Child Fund, and other fellow farmers. The formation of farmer groups has failed to generate the anticipated collective action. Also, VEDCO does not operate in Wakiso district” **Ms Winnie Babirye (a private extension worker in Wakiso district and also a trader in Agro-inputs in down town Kampala).**

“Some of the institutional innovations that are taking place in Wakiso district include the fact that: most farmers have learnt to be self-sufficient and can now do what the veterinary officers normally do, such as treating their animals. Public and private institutions that are conducting interventions to promote the functioning of markets for pig products and inputs are almost non-existent. This notwithstanding, NAADS used to provide farmers with piglets (each farmer would be provided with US\$ 400,000). NAADS has also not yet intervened in the promotion of marketing of inputs and pig products. Up to now, there is no clear focus on the operations of traders, input dealers, and processors” **Mr Chris Mulindwa, a trader and founder of the Pig Production Marketing Uganda (PPM) limited.**

There is need to seek institutional solutions to problems of limited access to market and poor service delivery. Recall that institutions provide multiple functions to markets.

Institutions can help to: (i) transmit information; (ii) mediate transactions; (iii) facilitate the transfer and enforcement of property rights and contracts, and; (iv) manage the degree of competition.

Specifically, market supporting institutions are defined as rules of the game (enforcement mechanisms) and organizations that facilitate market interaction, coordination, contract formation and enforcement (Shiferaw et al., 2006). It is in this context that public-private partnerships are widely considered to play a vital role in linking smallholder groups with other actors in the case of agricultural commodity value chains. Ultimately, these partnerships enable members of farmer groups to “upgrade” their facilities, skills, and production techniques.

There is also an increasing recognition that farmer research and enterprise groups can serve as engines for local development and poverty reduction in rural communities. The use of the participatory market chain approach and stakeholder platforms can help groups of different value chain actors to better explore alternative solutions to reach the network’s goals (Ekboir, 2012). For example, a participatory diagnosis involving many members of the community can help find out the type of priority crops, livestock and other products that a given community should produce for the market (CIAT, 2003). The markets are usually the large wholesale and retail markets in major towns and cities, but may also include food or other agro-processing businesses. Recall that adding value to the crop or livestock product is always through clear improvements in quality, better presentation or through transformation into products that are more attractive to consumers.

Institutional innovations to improve the efficiency of markets

Different organizations in Uganda and the rest of SSA are undertaking institutional innovations with an aim of improving access to services and market of inputs and outputs for actors in various agricultural commodity value chains. Brief descriptions of some of these best practices are presented in this section. It is important to note that these interventions in Uganda are being promoted in other agricultural commodity value chains and not necessarily in the pig value chains.

The Sub-Saharan Africa Challenge Program (SSA CP)

The SSA CP has established functional platforms, which have largely been used to promote institutional innovations, linkages with various service providers, and access to technological services. The SSA CP has succeeded in creating Innovation Platforms that have largely been useful in enhancing market linkages and technology transfer. These platforms constitute farmers, private sector, local government, NGOs, and researchers in Western Uganda⁹.

These innovation platforms have been useful in: creating many farmer self-help groups (SHG) at parish level that are also encouraged to develop and pursue relevant businesses; improving training of farmers; encouraging household savings; improving access to key technologies through the provision of credit top-up incentive to clients that realise a significant level of savings, and; improving access to information through use of mobile phones. This arrangement has been successful in improving production, value addition, and marketing of local porridge (*Bushera*) and Irish potatoes in the project area. In particular, porridge is now

⁹ In Kabale district (Bufundi and Bubale sub-counties), and Kisoro district (Kyahe sub-county and neighbouring areas of DRC and Rwanda)

well processed and packaged to the satisfaction of local consumers. More information on these SSA CP and other best practices are indicated in the table 4.

The East Africa Dairy Development (EADD) Project

Institutional innovations and policy reforms conducted through the East Africa Dairy Development project (EADD) project have led to the increase in milk production, development of the value chain in the dairy sector, and increase in the income for about 700,000 dairy farming households in the Uganda (Mbowa et al., 2012a). The EADD project aims at helping one million people (about 179, 000 families living on small 1-5 acre farms) to lift themselves out of poverty through a more profitable production and marketing of milk.

The project is promoting a “*dairy hub marketing*” that is fast in yielding fruits and higher levels of intensification through a clear understanding of barriers and opportunities of targeting. These are different forms of business concepts that help farmers to access input and output market and delivery of embedded dairy related services. Some of the services may be: effectively free (*paid by someone other than the final client or farmers*); subsidized (*partly paid by farmers and external promoter*); or fully-paid (*farmer pays direct cost of these services*). Inputs and services are provided and costs paid through a check-off system by the farmer after milk is delivered to the chilling plant. In other words payment for the inputs is deducted from the milk proceeds.

The EADD project is a regional industry development program led by Heifer International in partnership with ILRI, TechnoServe, the World Agroforestry Centre (ICRAF) and the African Breeders Service Total Cattle Management. The project is being implemented in Kenya, Rwanda and Uganda.

- Following the completion of the first phase of the project in 2011/12, the second phase is planned for 2013 to 2017, and is set to also include Ethiopia and Tanzania.
- Each of the three countries set up their own national dairy development institution to coordinate, promote and regulate the dairy industry by embracing a private-public sector partnership. The government plays a role in ensuring conducive environment to conduct profitable business in dairy farming, processing and marketing. The private sector is also supported to enjoy a level playing field.
- Innovation has been in form of the use of approved systems for milk handling and processing that has helped to improve the dairy industry. Besides, the promotion of better machinery (such as milk coolers, generators, milk testing kits, laboratory kits, milk cans, insulated milk tanks, and refrigerated trucks), improved technological capabilities have also been introduced. These have enhanced the availability of new lower-cost methods that enables the dairy industry to increase productivity, quality, and food safety.
- The East African dairy industry stakeholders employ a lengthy consultative, but participatory approach to establish dairy institutions that bring together public and private-sector players. These have to be capable of taking on both promotion and regulation of the dairy industry. Representatives of the private sector are selected to various semi-autonomous regulatory institutions.
- In the cases of Uganda and Tanzania, the advocacy aspect of these institutions is carried out by democratically elected representatives of farmers’, processors’ and other stakeholders’ organizations.
- Institutional innovative system has been in the form of the “*dairy hub marketing*”. This provides mechanisms to increase returns to investment through increased productivity levels, product handling, processing, and better marketing.

- Collective milk marketing, through co-operatives and farmer groups is encouraged due to such factors as: economies of scale, convenient payment arrangements and, access to input credit as well as other dairy related services.

The recent improvement in farmers' organisation and installed capacity of various milk processing plants in the country have contributed to a 47% increase in the latent potential to increase milk marketing and processing (Mbowe et al., 2012b). Large quantities of raw milk are now collected at bulking (collecting) centres, often operated by primary co-operatives. Raw milk is then transported to larger bulking centres at the district level (also operated by district co-operative unions). Here, milk is chilled and transported to the pasteurizing plants before distributing it to consumers in various end markets.

Institutional innovation in the dairy sector has been the fostering of the development of primary dairy farmers' cooperatives (Mbowe et al., 2012b). It is these primary dairy farmers' cooperatives in the area that are advancing deeper participation of farmers in the milk market and value addition. No doubt, quite a number of mini-dairies have been established in Uganda, and these produce some of the scale-neutral dairy products such as yoghurts, ghee, and cheese. Consequently, there is a robust increase in milk production, marketing, employment, and capital base of these primary cooperatives.

In the case of pig products, the hub approach helps to create collaborative supply chains and to market differentiated pig products with known source. The hub approach creates organization that actively manages the aggregation, distribution and marketing of source-identified pig products, primarily from local and regional pig producers to strengthen their ability to satisfy wholesale, retail and institutional demand of pig products (Matson et al., 2013). The hub marketing approach can also help pig farmers to access the local, peri-urban, and urban market, where pig traders, processors and consumers are enabled to purchase live pigs and pork in desired volume.

Hubs can also lower entry barriers to the market by helping to share information with end users on where or how live pigs and pork was produced, providing a greater connection between producers and consumers. According to Matson et al (2013), live pigs and pork hubs should be able to improve market efficiency; demand for diversified pig products; market access for local pig producers; information sharing; transportation and distribution of pig products; brokerage services; product bundling and aggregation; season extension; maintaining producer-consumer connections, and; pig producer-oriented technical assistance.

Agribusiness Initiative Trust (aBi Trust)

The agribusiness Initiative (aBi) Trust is a multi-stakeholder entity devoted to private sector agribusiness development. The initiative was set up by development partners led by the Governments of Uganda and Denmark to support agribusiness initiatives in the country. The initiative aims at achieving the objective of the Government of Uganda's Competitiveness and Investment Climate Strategy (CICS). In particular, (ABI) Trust supports the private sector to increase their contribution to the Agricultural sector by increasing productivity and competitiveness leading to poverty reduction through economic growth, wealth, and employment creation. The aim is to ensure a competitive private sector led Agriculture in Uganda with the mission of "promoting private sector Agribusiness development. The Trust has an endowment fund, and through delegated cooperation, the Trust has multi-development partner funding from Danida, USAID, EKN, EC, Sida and BEC, and support from KfW and DfID.

Somehow, aBi trust is an entity without the limited life of a project, implying that it is able to focus on the medium and long-term development goals. For example, its areas of intervention include: (i) value chain development to improve: performance efficiency of actors, selected value chains, and trade in secure and high quality products; (ii) the expansion, availability and use of financial services, and; (iii) the promotion of gender biased growth and investments, which leads to gender equality integration and mainstreaming in all ABI activities.

The trust provides both financing and technical support in selected agricultural value chains, namely coffee, oilseeds, maize, pulses, and horticulture. The aBi-trust is able to extend technical and financial support to implementing partners through cost-sharing partnership. It also offers an integrated approach on value chain development, where interventions are conducted with various implementing agencies. Furthermore, the Trust has a long term commitment to achieve scale in its investments through its partners, by catalysing support in agricultural sector and building partnerships that create capacity in the agricultural sector. All value chain actors are targeted and these include: farmers; input dealers; financial institutions; transporters; marketers; agro-processors; BDS providers, and; consumers.

The aBi Trust strategy supports market-driven enterprises using a value chain approach to promote: increased demand and availability of farm inputs; increased farmer and enterprise performance; increased access to new markets, and; better functioning of Sanitary and Phyto-Sanitary standards (SPS) and Quality Management Systems (QMS) in the country. The trust collaborates with key line ministries to strengthen QMS and SPS, especially in areas relating to the prevention of new infectious diseases, quality seeds, and enforcement of related regulations.

The aBi-trust partners include: national and regional level associations and platforms; producer organizations; small-scale and medium-scale enterprises (SMEs); gender and youth groups; rural financial services outreach (Banks, MFIs, SACCOs, VSLAs); provision of lines of credit and loan guarantees, and; business development service (BDS) providers. Ultimately, this intervention enhances the capability of all actors in the value chain to improve efficiency, effectiveness and competitiveness of the five selected commodities. Ultimately, these outcomes help to alleviate obstacles that hinder the smooth flow of produce from production to the final consumers.

In particular, the Trust supports: the operations of farmer groups, NGOs and SMEs in areas of agri-business development; increased awareness on the benefits of agro-inputs (seeds, herbicides etc.) to farmers, and processors; increased supply of agro-inputs; increase in demand and availability of appropriate agribusiness services; capacity building of farmers' organizations, NGOs and SMEs to become competitive, and; the improvement in the FOs and SME's compliance in areas of SPS standards and market quality requirement.

The best practices of aBi-Trust have helped to increase: the number of farmers' organizations, NGOs and SMEs supported; agricultural production; quality control and enhancement; employment, and; overall economic impact. And while a significant number of exporters in the country are beginning to access markets for goods whose SPS measures are stringent, the aBi-Trust's intervention are continuing to lay a firm foundation of making the cost of compliance cheaper. A substantial number of service providers have been trained and these are helping in the implementation of the requisite standards in the respective value chain SMEs and farmer organisations. Noteworthy, is that the application of QMS and SPS standards in trade is vital in ensuring harmony in trade globally and for Ugandan produce to attain credibility on the world market.

The business model of aBi-Trust involves the support of sustainable and profitable crop produce that is also subject to: good agricultural practices (GAP), post-harvest-handling (PHH), quality standards, value addition, and certification. The aim is not only to help smallholder farmers engage in sustainable production of selected crops, but also all value chain actors to secure a “win-win” solution in their operations.

In the case of coffee, aBi-Trust aims at increasing coffee exports from the current 3 million bags to 4.5 million bags in the short term (Drew, 2013). Here, producer organizations and higher tier structures are supported to engage in gainful participation in the supply chain and to improve the level of: GAP, PHH, output aggregation, value addition. Eco-washing stations (such as Kyagalanyi and Volcafe) are promoted as a business hub to support GAP, quality improvement through red cherries, a more consistent parchment and possibility of tracing the origin coffees. The Central washing stations (e.g. Kawacom and ECOM) are supported to certify organic coffee. The district farmers associations and cooperatives are supported to help conventional coffee farmers in replanting, GAP, PHH, FFS to improve yields and quality, engage in bulking and value addition.

According to aBi Trust (2011) there is a joint sharing of information, experience, and lessons learnt; conducting of joint training sessions for partners; joint implementation of activities aimed at technology dissemination and up-scaling; collecting and disseminating market information; creating awareness on SPS and quality standards and developing training manuals. In particular, support areas to the value chain business unit within the Trust are financial services and Gender

Some of the challenges faced by the aBi-Trust include: (i) weak capacity in SPS management; (ii) weak competitiveness among the primary producers, processors and traders, and; (iii) risk of market access problems; (iv) limited participation of smallholders in a fully liberalized market; (v) low volumes and quality of farm produce; (vi); low levels of governance (trust) among farmers’ groups; (vii); high price risk; (viii); liquidity constraints (lack of cash), and (ix) less consumer willingness to pay more for high quality “premium” products.

Volunteer Effort for Development Concerns (VEDCO)

In particular, Volunteer Efforts for Development Concerns (VEDCO) is one of ILRI/IFAD’s project partners in the districts of Mukono and Kamuli districts. It is working in some of the villages, parishes and sub-counties on pig value chain activities that include: offering trainings to farmer groups on improved livestock and agricultural practices. It provides piglets, feed inputs, training on construction of pig housing, hygiene and sanitation interventions.

VEDCO is an independent, non-governmental, and not for profit agricultural organization that was founded in 1986. VEDCO envisages a prosperous agricultural sector in Uganda that is able to improve the quality of life of small and medium holder farmers. Its main goal is to ensure equitable and sustainable access to wealth creation among farmers (both female and male farmers). Furthermore, VEDCO helps to build capacity in areas that have a potential to equitably empower small and medium holder farmers achieve food security, nutrition security, gainful agricultural trade, and organizational Development.

VEDCO is also making a contribution towards the improvement in access to local, national, regional and international markets for priority agricultural products for female and male farmers using various best practices. In the same line, VEDCO is engaged in: in the collection, repackaging, sharing and dissemination of market information; training farmers in entrepreneurship skills and market oriented production; training farmers on the use of value

addition technologies; co-financing of farmers' initiatives to acquire technologies that increase product quality; establishment of bulking centres (small warehouses, grain silos); conducting learning farmer visits; conducting market chain analysis for selected enterprises and their value chain performance, and; facilitating farmers to participate in district level agricultural trade shows.

A number of pig producers belong to farmer groups that are largely supported by VEDCO. These groups however still need more support to strengthen their weak operations. According to the SPVCD(2013) most farmers that do not belong to the pig producer groups are more willing to join, if preconditions of a clear constitution is introduced to regulate the group activities and stimulate good leadership, fairness, and trust.

Membership to farmer groups is crucial, given that it helps to enhance: the acquisition of vital skills for improved pig production and management practices; access to services; and access to market for inputs and outputs. Farmer groups and associations provide a means through which individual farmers can easily be empowered and supported to enhance their capability to initiate meaningful action and good decisions on their own. Thus, these farmers' groups and associations represent products and engines of social transformation.

Other activities of VEDCO include: increasing the capability of female and male farmers to effectively participate in policy processes on issues that affect agricultural production and marketing at all levels using stakeholder platforms; increasing equitable and sustainable access to household energy services for improved farmers livelihoods; and increase the level of food and nutrition security across small and medium holder farmers.

The National Agricultural Advisory Services (NAADS)

Pig production is clearly not among the government priorities for development when compared to dairy and beef cattle, goats, poultry, and apiculture. Only the National Agricultural Advisory Services (NAADS) has operations that promote pig production to some extent. NAADS identifies leaders of pig farmers in a village based on institutional criteria such as ability to transform into commercial production; acceptance as a local champion of improved farming; and ability to organise other farmers in activities of farm demonstration. He or she then receives some animals and training. This is done, on the condition that the farmer trains other farmers in the village, and; allows her/his boar to serve gilts and sows of other farmers in the village, normally for small fee.

In some cases, there is some sort of "pass the gift" approach like is the case in the Heifer Project. However, the effectiveness of this NAADS scheme and the way recipients are selected has received serious criticism due issues related to political bias in the process. In the same line, NAADS offers advisory services on modern agricultural practices and livestock management. It supports the formation of farmer groups and helps them to acquire inputs (improved seeds and planting materials, especially for such crops as maize, beans, bananas and cassava); piglets; and; advice on proper housing structures. In some cases, NAADS supplies some of the house construction materials, while the farmers supply labour.

BRAC Microfinance, Uganda

BRAC is one of the largest NGOs in the world with over 100,000 staff and millions of microfinance clients. BRAC is dedicated to alleviating poverty by empowering the poor to bring about change in their own lives.

Value chain actors in Uganda struggle to access reliable financial services. This is often attributed to the limited presence of local micro-financing initiatives. BRAC is working with

local group organization to provide loans. Its operation is also creating opportunities of farmer and traders' group formation and collaboration at local levels. BRAC also works with people whose lives are dominated by extreme poverty, illiteracy, disease and other handicaps. With multifaceted development interventions, BRAC strives to bring about positive changes in the quality of life of the poor people. BRAC provides group loans to women and individual loans to men at a low interest rate. The main funding sources include grants and loans. BRAC also offers services in: giving out loans, training, consulting work, research, and development.

BRAC works with poor women who tend to be most affected by poverty. It also organizes the poor by operating through Village Organizations (VOs), each with 20-40 women who access BRAC's microfinance services, exchange information and raise awareness on social, legal and other issues in their daily lives. BRAC operates a highly successful, fully integrated model for poverty alleviation. This includes: services in human rights, legal aid, education, healthcare, social and economic empowerment, finance and enterprise development, agriculture, environmental sustainability and disaster preparedness. In addition to being one of the pioneers of the microfinance movement, BRAC has been a leader in advancing new strategies for improving the health and welfare of the poor.

BRAC targets village organizations with loans to conduct such investments as: business, farming, education, and health improvement. Members of farmers' organizations are supported with technical support. In particular, model farmers are trained in modern practices of agriculture. Local promoters are recruited, trained and supported in their business of supplying agricultural inputs and livestock (dairy cattle, sheep, goats, pigs, and poultry) vaccine. Farmer groups are then linked to local promoters, who take charge of training and equipping them with improved method of farming and use of recommended agricultural inputs. These activities are supervised by BRAC's coordinators at the village and regional levels.

BRAC also has a pig program in Masaka district in Uganda, where they have model farmers who are linked to community extension workers, etc. These farmers also have access to inputs through the community extension workers. BRAC is currently operating with 1,890 volunteer community mobilisers in 49 districts of the country to offer short term lending. Most loans from banks require collateral that is difficult for small holders to provide.

In Uganda and the rest of Africa, BRAC is facing numerous challenges, namely: (i) difficulty to reach the poorer communities in critical mass number; (ii) failure to balance the objectives of poverty alleviation and that of achieving sustainability; (iii) poor infrastructure especially in the rural areas that hinders easy accessibility to remote areas, (iv) low population densities in some communities thus slowing sustainability and limiting the impact; (v) lack of vaccine storage facilities; (vi) input prices that are unstable (fluctuating); limited supply of genetic material and supply of artificial insemination services, and; (vii) poor quality and adulterated agricultural inputs.

There also factors that are influencing the success of institutional innovations undertaken by BRAC, and these include: (i) a conducive climate for crop and livestock farming; (ii) the willingness of many farmers to invest in modern livestock husbandry; (iii) livestock population is increasing partly as a result of activities of local community promoters that are contracted by BRAC in about 90 districts in Uganda.

The table on the following pages summarizes details of other institutional innovations taking place in Sub-Saharan Africa, including Uganda.

Summary of institutional innovations in Africa, including Uganda

Market supporting institutions can help organize smallholders into farmer groups or producer organizations that help to overcome market failures and to maintain their market position. Rarely can large-scale firms in supply chains deal directly with individual small-scale farmers. This is probably because the costs of doing this are usually too high. Hence, farmers should be grouped, either directly in farmer groups, associations or cooperatives, or indirectly through local input dealers or appointed distributors, lead farmers or bank agents (Wiggins and Sharada, 2013). Although contracting is the most common linkage, this can take many forms. There is no one form of linkage that is ideal.

Farmer groups can simplify long marketing chains by connecting smallholders directly to markets in a way that bypasses various marketing intermediaries while also performing some value chain functions such as bulking, a kind of institutional innovation that help farmers to: act collectively; become better positioned to reduce transaction costs for their market exchanges; obtain necessary market information; secure access to new technologies, and; tap into high-value markets that allows them to compete more effectively. However, certain conditions need to be in place, if incentives for farmers to organize around marketing are to be created and sustained.

Table 4: Some of feasible and relevant institutional innovations that have been tested on different agricultural commodities in Uganda and elsewhere

Some of these can be adopted, modified, and tested in the smallholder pig value chain project.
<p>It is widely accepted that enabling the formation of active farmer and other value chain actors' groups can be a reliable way of improving access to input markets, output markets, services, and the acquisition of vital skills in the improvement of pig production and management. According to Wongtschowski et al., (2013), farmers' organizations are increasingly regarded as essential part of the institutional landscape of a healthy and balanced agricultural sector, and can range from small, informal groups, farmer field and business schools, formal cooperatives, associations or unions of cooperatives, to national-level federations.</p> <p>Enhancing collective action within individual farmer and other value chain actors groups' can help to ensure collective sourcing of the much needed inputs and collective marketing of the produce. However, this can be achieved when there is emphasis on individual discipline and enforcement of rules within the actors' group that encourage high level of cooperation.</p>
<p>1: Platform for sharing information and knowledge concerning agricultural innovation and multi-stakeholder (partnership) engagement in Agricultural Research for Development (ARD) - Innovation Platform corridors were established as a component part of the SSA CP activities, which were initiated at three Pilot Learning Sites (PLS) across sub-Saharan Africa.</p>
<p>The formation of farmer groups at village level sometimes referred to as village clusters can increase the level of collective action. This can even be scaled-up to a level of a district or local government Innovation Platforms (IPs) that helps to further generate and share knowledge among different stakeholders. These farmer groups need to be supported to become strong in terms of being fully inclusive and representative of their members, including women, but also to have the capability of empowering their members in product marketing that is sustainable.</p> <ul style="list-style-type: none"> • Innovation platforms (IPs) serve as the environment for diagnosing problems, exploring opportunities and investigating solutions. ▪ The IP actors are constituted in teams also in a manner that brings competency, skills, knowledge and incentives to jointly innovate and to bring about mutually desirable change. This can be in terms of addressing the problems, opportunities and/or entry-points that

<p>prompt its establishment (SSA CP, 2010).</p> <ul style="list-style-type: none"> ▪ Phase 1: identify stakeholders and build partnerships to analyze agricultural production problems, challenges/opportunities, existing linkages, interests and ideas for intervention in the selected areas. Invite the active participation of local stakeholders including farmers and farmers' groups, local extension workers, local input dealers, NGOs, district or local government authorities. <p>Phase 2: agree on the roles and objectives of different partners as well as the by-laws of some IPs. This clarifies common priorities, development and implementation of action plans.</p> <p>Phase 3: IPs assesses the performance of innovations in terms of new policies, new institutions, capacity needs, technologies developed, market linkages and information flows (SSA CP, 2010).</p>
<p>2: Creating Innovation Platforms that constitute farmers, private sector, local government, NGOs, and researchers in Kabale district (i.e. Bufundi and Bubale), and Kisoro district (Kyahe and neighboring areas of DRC and Rwanda).</p>
<ul style="list-style-type: none"> • This is useful in creating many farmer self-help groups (SHG) at parish level, and is encouraged and supported to develop relevant businesses based on collective action. • It has helped train farmers, encourage savings, and to improve access to information through use of mobile phones. • Farmers that realise a significant level of savings receive a top-up in form of credit to access key technologies. <i>This innovation has been successful in improving production, value addition, and marketing of local porridge (Bushera) and Irish potatoes in the project area.</i> • In South-Western region of Uganda, the R&D intervention has helped local processors to add value on the indigenous sorghum porridge (<i>Bushera</i>), by converting it into a non-alcoholic "Mamera" sorghum juice that is now sold in local supermarkets across the country. <p>Interventions that can encourage value addition on pork should therefore be encouraged.</p>
<p>3: Public-private partnerships have also been successful in linking smallholder groups with other actors in the marketing chains that enable these groups to "upgrade" their facilities, skills, and production techniques. Involvement in smallholder marketing of other members of the commodity value chain, such as processors and product developers can create valuable synergies.- A case study of Andean potato farmers</p>
<p>Encouraging active partnerships and corroborations between communities, research institutions, development partners, and government organisations that are essential in linking farmers to traders and to other useful service providers such as: banks and MFIs. This innovation can also help coordinate all agro-input dealers and produce buyers to operate at prices affordable by smallholder farmers. For example, there is an active partnership between Uganda National Agro-input Dealers Association (UNADA) and MAAIF that aims at linking farmers to input traders and to the financial banks.</p> <ul style="list-style-type: none"> • In a case study of Andean potato farmers, Markelova and Meinzen-Dick (2009) show that the involvement in smallholder marketing of other members of the commodity value chain, such as processors and product developers creates valuable synergies that improve the functioning of the market. • A participatory diagnosis involving as many members of the community can also help find out the type of crops, livestock and other products that a given community should produce for the market (CIAT, 2003). • Also in Uganda, there have been interventions of analyzing and disseminating market price information to help advance agribusiness through knowledge and improved decision making of stakeholders. This innovation is helping many actors in different agricultural commodities' value chain to understand price movements in the agricultural sector. • FIT Uganda makes market price information available to the public through the traditional and modern channels, including among others: the print media, emails, village notice boards, weekly web reports, and short-message-services (sms) on major telecom networks.

4: Better organization helps farmers to access markets - Improving smallholder farmer market access and profitability through increased productivity, quality, organized storage and participation- *Kawanda Agricultural Research Institute (KARI) was a lead organization.*

Ensuring that lead farmers within each farmer group or IP are appointed by members of the groups to help test, demonstrate, and even provide learning sites for alternative technologies suitable for dissemination.

- Smallholders can find a way out of poverty by increasing the competitiveness of their produce and strengthening public-private sector partnerships
- In Uganda, although liberalisation of grain marketing systems empowered maize farmers to sell their produce at competitive prices, they were not prepared to reap the benefits of this reform. This is probably due to their heavy reliance on traditional practices of handling and storage, which reduces the level and quality of their output.
- Today, grain farmers have improved market access by using appropriate post-harvest technologies and they are producing large volumes and sustainable supplies of high-quality produce. The public sector has helped to catalyze linkages between the private sector, smallholders, agricultural advisors and NGOs to create strategic coalition partnerships. Farmers have been able to apply this strategy to many other crops in each of the 63 pilot districts where the intervention was tested with maize.

- Also, a Ugandan-based business company “Divine Masters Limited” is involved in the production and marketing of soya beans, maize and rice. Since 2007, the company has managed to institute an institutional innovation of organizing farmers into farmer groups that also operate in a cooperative manner. They have their own leadership structures and also elect their own committee members who guide or lead their operations. Currently, about 300 out grower groups (about 12,000 farmer families) each consisting of between 30 and 500 farmers has been incorporated (Douglas, 2013).
- Divine Masters Company works directly with the elected leaders of the farmer group and provides other services, including the provision of inputs and credit facilities based on group membership (Douglas, 2013). Elected leaders of farmer groups ensure that: these services trickle down to the farmers; grains are collected from farmers, and that grains equivalent of whatever inputs given or credit facility extended to farmers is also recovered.
- Today, the company is working hard to improve discipline in various farmer groups in order to ensure: collective action on the use of high quality inputs such as quality pesticides and the produce of good quality. Divine Masters sells its produce to local processors in Uganda and Kenya, but the company also has plans to set up its own manufacturing plant.

5: New formulas for success are helping farmers to make vital choices - Gross margin analysis and marketing fact sheets for farmer groups and extension staff- *The lead organization was the Natural Resources Institute (NRI), UK, Uganda:*

- Facilitating and enabling university and college students to undertake strategic research requested by local communities. This innovation has to have a special focus of giving timely feedback of research findings and recommendations to members of the community. In particular, Ugandan extension workers and farmers now aim at identifying gaps in market information and skills, as well as options for filling them.
- Using information generated from farmers' own costs and revenues, they can calculate the initial investments, cash flows, speed of return to capital, risks, market access and environmental impact associated with an enterprise, making informed decisions on the crops to grow, buy or market.
- Fact sheets synthesizing this information provide knowledge that is easily applicable and with little challenges of adaptation, especially in situations where farmers are in transition between subsistence and market-oriented agriculture.

6: What is new under the sun - Partnerships for poor fruit and vegetable farmers - Commercialization

<p>of solar drying technologies for micro and small-scale rural enterprise development- Natural Resources Institute (NRI), UK, Uganda:</p> <ul style="list-style-type: none"> • Poor farmers are avoiding waste and low returns associated with overproduction of fruits and vegetables thanks to simple solar-drying techniques. • This innovation helps to preserve the quality of produce and provides opportunities for farmers to add value for local, regional and international markets. • Enterprises known as primary marketing organisations (PMOs) are taking the lead in creating a commercially viable value chain, helping farmers to introduce the new technologies and access markets. In Uganda, more than 700 fruit farmers at 85 sites - mainly women are using 110 solar dryers.
<p>7: New market chain approach gives fast results - Participatory Market Chain Analysis (PMCA)- International Potato Centre (CIP), Peru , Bolivia, Ecuador, Peru and Nicaragua, in Latin America, as well as in Laos, Syria and Uganda</p> <ul style="list-style-type: none"> • The Participatory Market Chain Approach (PMCA) stimulates networking, links small farmers to markets and fosters productive partnerships based on trust and knowledge sharing. Active participation - or a lack of it - by the many actors along the food chain can make or break the system. • PMCA systematically involves people in identifying and assessing market opportunities and identifying commercial, technical and institutional innovations. • A poverty filter helps identify the greatest probabilities of pro-poor impact. In just three to six months, partners are typically able to get new market products and innovations into use.
<p>8: New sweet potato technologies make more the merrier - Sweet potato technologies for food markets and renewable energy- PRAPACE, Uganda</p> <ul style="list-style-type: none"> • This program is designed to help farmers make the most of surplus production and has identified 20 local and 300 potential global markets for fresh sweet potato grown in Kenya, Rwanda, Tanzania and Uganda. More than 2000 farmers were able to access new markets and cut their on-farm post-harvest losses by 20-30percent. • Previously, these farmers were unable to appreciate the benefits of new, high-yielding varieties that produce three times as much as the former ones. • The program promoted a range of orange-fleshed sweet potato-based products. At the industrial scale, at least three private firms now absorb over 80 MT of dried sweet potato chips per month. <p>Purdue University and its partners have also been promoting and disseminating improved technology of double bagging or packaging of grain to prevent weevil damage. In the case of pig products, this can be through the use of better technology of pork dressing and carcass handling.</p>
<p>9: New information takes farmers <i>'together to market'</i> - market information tools: combining radio and training to facilitate successful farmer group marketing; improved marketing; processing, and; storage (Uganda, Zambia).</p> <p>Generating and distributing market price and other related market information on the regular basis to all actors in agricultural value chain. The actors may include: farmers, traders, transporters, input dealers, processors, and consumers. Access to market information is critical in improving decision making on what to produce, how much to produce, and where to sell.</p> <ul style="list-style-type: none"> • For example, over one million farmers in Uganda alone have benefited from the radio program <i>"Together to Market"</i>. This series of 10 spots brings to life the main points and issues faced by farmers who seek to form groups to market their crops. • It is designed to assist service-providers in advising them on marketing strategies and use of

market information.

- It is estimated that one million more people have heard the program in Zambia, and an additional one to five thousand people through community telecentres in Africa, India and Latin America.
- CDs have also been widely distributed worldwide in response to requests.

10: Poor farmers in Uganda boost their income with new groundnut varieties - Commercial incentives for groundnut production and farmer led multiplication- Appropriate Technology (AT)- Uganda, Uganda

Promoting and institutionalizing the idea of having seed (or piglets') loans by seed (or pig breeders) companies repaid in-kind with seed or animal breed donations, but also having an arrangement where seeds or animal breeds are made to other farmers in form of "pass-on-seed" scheme.

- Farmers throughout Uganda are using new disease-resistant groundnut varieties - validated in on-farm trials - to overcome a rosette disease, a problem that was seriously limiting their yields.
- Chemical control which was previously the only remedy was too expensive for poor farmers.
- A farmer-led multiplication plan was developed under the supervision of parish development committees to increase seed availability.
- These committees oversee repayment and redistribution of seed to ensure that women and poor households receive priority.
- Farmer groups also learned improved groundnut production and seed handling techniques, as well as how to process the groundnuts using a manual grinder.
- Finally, collective marketing associations are building their links to markets.

11: Farmers' organizations (FOs) now increasingly voice the needs of their members in various fora on policy-making and orienting service provision. They play a key role in local development planning; by working with the private sector they enhance value chain development, and; are actively involved in agricultural (institutional, organizational and technological) development.

- Enhancing partnership with farmers' organizations, research, extension and training institutions in Benin, Rwanda and Tanzania. A case study in Benin focused on FUPRO (the national federation of village farmers' groups and associations, district and provincial unions). FUPRO is vital in the Benin cotton sector and was also created with assistance from the public sector services that previously managed the cotton strategic sector.
- FUPRO participates in a national private-sector platform that allocates resources to public-sector cotton research and agricultural extension through a central fund, which is derived from cotton levies. Both producers and ginners agree on the percentage of the market cotton price that is donated to this fund.
- This commodity-based farmers organization (i.e. FUPRO Benin and its member unions, and also cotton out-growers associations) have been created through the initiative and with assistance from parastatals or private enterprises.
- They have established contract-type relationships with private enterprises for input supply and marketing of produce. Innovation is mainly technological and oriented by the commodity market and the private sector.

12: Another case study in Benin concerns two FUPRO member district unions (UCPs): (1) two cotton producers' union in Kalalé district and Boukoumbé district (in the northwest), and; one cashew growers' union (ACooBéPA) in central Benin.

- The two cotton producers' unions receive management support from FUPRO, while the cashew growers' union is assisted by a national NGO that paid for its support services.

- Evidence indicates that technological innovations have spread rapidly, with the help of trained cashew growers and their local networks.
- New' market-oriented FOs with 'collaborative' relationships seeks to develop collaboration with chain actors, using assistance from externally funded projects and/or NGOs (which often initiated the creation of the FO).
- Innovation remains technological if the project and NGO manage relationships (i.e. Benin case) but becomes institutional (i.e. Rwanda case also explained below) when both NGO and FO clearly aim to build sustainable institutions.

13: The Rwandan case study covers the potato production and marketing chain in the northwest region. Farmers operate in cooperative structures, and storage facilities were built to organize multiplication of improved (registered) seed potatoes, to improve access to other inputs and to facilitate the marketing of potatoes- Rwanda, Uganda.

Linking smallholder farmers or producers to the processing and other major companies to work together as contract producers. Contract farming is reliable in reducing price risk and efficiency of marketing. In the same region, potato washing, grading, packaging using local materials and contract marketing in hotels and supermarkets has improved the way Irish potatoes used to be marketed.

- Service-system-oriented and network FOs (i.e. MVIWATA and MVIWAMO in Tanzania, but also IMBARAGA (the national farmers' syndicate) in Rwanda) emphasize self-reliance by promoting community-based farmers' groups that are also part of larger networks.
- Through collective action (social capital) and participating in local fora, they establish partnerships with other actors for service provision in various areas (information and training on technologies, credit and savings schemes, etc.). Innovation has a rather organizational and institutional character as a prerequisite for technological innovation: - improved varieties are now produced, graded, cleaned, packaged and marketed to hotels and super markets in Kigali.
- In cooperation with public-sector services and local NGOs, IMBARAGA facilitated farmer participation in research and extension. Researchers are encouraged to conduct on-farm research, while extension agents train farmers to conduct farmer-to-farmer extension.

Also in Uganda: The Excel Hort is a component of the FAO project that operates in three districts, two of which, are Kabale and Kisoro, where most farmers grow potatoes (Wongtschowski et al., 2013). Excel Hort helped the farmers:

- With free services paid for by donors (in this case FAO-managed grant) and governments. It provides services that are contracted and paid for by the client.
- Make a contribution only to the activity of farmers' interest, but not to Excel Hort.
- To draw up a constitution that sets membership fees and rules, a code of conduct and sanctions for group members, once the group is made.
- Increase their capacity by helping them form groups and second-tier marketing associations, who then sign agreements with other chain actors.
- To mobilize local resources and get outside support, something they cannot do as individuals.
- To add value through adequate sorting and packaging, and to some extent process their potato
- To be empowered through training and information sharing.
- Secure contracts between their marketing association in Kabale district and Nandos, a big fast-food restaurant in Kampala city centre.

Excel Hort has served at least 739 households, grouped into 24 groups in the two districts. This is an intervention that has led to a big increase in potato production and marketing.

14: Strengthening of producer organizations and formation of collective marketing groups as instruments to remedy pervasive market failures in rural economies- Kenya.

The analysis presented by Shiferaw et al., (2006) with a case study from eastern Kenya has shown that collective action – embodied in Producer Marketing Groups (PMGs) – is feasible and useful. However, external shocks and structural constraints may limit the volume of trade and access to capital and information. This requires investments in complementary institutions and coordination mechanisms to exploit scale economies.

Some of the technological innovations can be promoted to make significant contribution to improved access to markets among smallholder pig farmers.

- Ensuring that new high-yielding crop varieties or pig breeds are selected, tested, and adopted by farmers. Use can be made of Pilot Learning Sites (PLS) to test improved seeds of such crops as: cereals (maize, sorghum, millet, groundnuts and rice); legumes (cowpeas, groundnuts, and soybean), and; roots and tubers (cassava and potatoes). In the case of piggery, piglets of different breeds can be distributed to farmers to minimize inbreeding while promoting productivity.
- The use of organic and inorganic fertilizers on farms is being promoted by the development and sale of vegetable boxes by agro-dealers. These boxes contain seeds, fertilizers and chemicals sufficient for 0.1 hectare of farm-land with credit being available for their purchase. Similarly, a minimum package of essential inputs can be defined for smallholder pigs to buy and utilize in the study area.

15: A new innovation in Uganda is being tested to help smallholder farmers use mobile phones when making orders and paying for supplies. This powerful new mobile platform is based on the *AgriLife*- a cloud-based platform and combines agriculture information and financial services to collect data that can help smallholder farmers sell their crops, build a credit history, and receive other services, such as crop insurance (Yeoman, 2013).

- No doubt, transaction data can enable each smallholder farmer to build a credit history that will be used by other value-chain actors to provide credit and easy access to other purchases like seeds, fertilizers, and pest-control chemicals.
- This innovation provides two key, interconnected services: data collection and analysis about farmers' production capability and history. The aim is to have it serve as an integration point for financial institutions, mobile network operators, produce buyers, and their agents to more efficiently provide much-needed services to distant, rural farmers.
- The data analysis will drive the growth of services and products that benefit smallholder farmers based on a better understanding of their production capability. Service providers can use the new way of data analysis to better understand farmers' needs and tailor their offerings - like crop insurance, input payments, and savings accounts.
- Farmers Centre (U) Ltd. (FACE), a farmer-centric agribusiness enterprise is currently based in Lira District in northern Uganda and is an "*AgriLife*" early adopter in Uganda. FACE is already uploading information about its 10,000 farmer clients, who travel long distances to purchase inputs and aggregate their produce at FACE warehouses for processing and sale. Previously, FACE collected this information on paper and stored the data on a computer that recently crashed, highlighting the need for a farmer registration process via mobile and a cloud-based storage system.
- According to Yeoman (2013) "*AgriLife*", which was developed by Kenyan-based IT company *MobiPay Kenya Ltd*, aims at reducing the transaction time with smallholder farmers by encouraging: use of online quick service and less need to travel.

Factors contributing to successes of institutional innovations

The success of the above indicated best practices appear to depend on various factors that include among others:

- The level of collective action within the existing and newly created farmers or marketing groups. This can be in form of increased participatory decision making, member contributions, and initial start-up (and subsequent) capital to enable financial sustainability of the farmers group.
- An enabling external environment that also includes meaningful relationships between farmer groups and the state, other actors in market, and civil society. Here, the success in value chain innovation and agribusiness production depends critically on the structure of the whole agricultural innovation system and is highly context specific.
- Whether farmer or marketing group members are contented with the level of accountability in terms of having a say about the type, costs, and quality of outputs; the level of inclusiveness or the ability to reach out to all members of the community, including the disadvantaged ones, and; ability to build capacity by equipping members with information and appropriate skills for modern farming.
- The ability to establish functional partnerships and innovation platform that are crucial in ensuring effective sharing of information. This to a large extent depends on the presence of a well-coordinated process of building trust and understanding, good leadership, communication and networking skills, equity, buy-in, commitment and ownership.
- The presence of committed local drivers or champions that provide legitimacy to operational platforms. Local champions can include: local government leaders, community leaders, and traditional leaders. Different groups of value chain actors, including smallholder pig farmers need to have strong leadership with appropriate experience if they are to succeed in identifying and maintaining market links.
- The magnitude of positive spillover effects of networking, interactions, and information sharing through activities in the innovation platforms can create great inspiration to the “*non-beneficiaries*” to also engage in commercial production.
- The ability to boost new collective forms of action that reduce transaction costs, better bargaining power in the marketing of the produce, procurement of inputs, and to enable smallholder farmers overcome multiple market imperfections. This also depends on whether there is increased participatory decision making, member contributions (*membership fees*) to the farmers or marketing group, and initial start-up (and subsequent) capital to enable financial sustainability of the farmers group.
- Closer coordination of production and post-farm activities to ensure delivery of high quality and homogeneous products. This requires good leadership and development of new skills in business and agro-enterprise development.
- Group size and composition, types of products marketed and types of markets targeted, external environment, and the institutional structure chosen (Markelova and Meinzen-Dick, 2009).
- The number of elections held to choose new leader of the farmers/marketing’ group.
- The potential of prevailing group action in improving members’ expected net benefit streams above and beyond what can be achieved without such collective action.
- Ability to enhance farmer marketing group capacities (skills, experience, internal cohesion, and motivation to integrate), which are crucial for smallholder farmers to undertake joint activities and to forge effective business interactions with other value chain actors. The availability of fair laws of engagement and operational democracy that enhances trust, reciprocity, and cooperative behavior among members of the farmers’ group.

- The capability of linking smallholder farmers and other value chain actors to vital service providers such as microfinance institutions and formal banks. Here for example, is the question of whether the use of peer pressure can be utilized effectively as a substitute for collateral. Whether group members are likely to take action to prevent a fellow member from defaulting. Appropriate lead models in this regard have been demonstrated by Grameen bank in Bangladesh, and several examples in Africa.
- Motivating cooperation and viability of contract or out-grower schemes with processors, restaurants, hotels, supermarkets, or exporters depends on whether smallholder farmers (farmer groups) are operating as a business, with capacity to supply urban outlets with produce under agreed conditions in the contract. Improving incentives through contract farming can increase collaboration with private sector and also returns for both parties (Brooks and Torero, 2012). This however requires strategies to address asymmetries in information and building information and legal requirements into the contract.
- The extent to which smallholders are able to produce quality produce in the desired quantity and time frame. There can be information asymmetry especially on quality of the product. The buyers tend to assume that the product is poor quality and are therefore willing to pay low price due to the lack of information. There should be an effort to involve a third party quality assessment and monitoring actor in the pig value chain if this information asymmetry is to be overcome (Brooks and Torero, 2012). The innovation through third party enforcement is likely to increase efficiency.
- The nature and reliability of existing legal and institutional framework for contract formation and enforcement. This should be strong enough to avoid non-binding contracts and the lack of arbitration.
- The willingness of many farmers to invest in modern crop and livestock husbandry.
- Scaling-up and out the successful best practices should not be allowed to lie: in a particular and specific arrangement, a particular form of contracting, or an ideal agricultural cooperative. This is because approaches and not the form have been shown to lead to effective links (Wiggins and Sharada, 2013). What needs to be scaled-up, replicated, or adapted are the processes of enabling, facilitation and learning. This should also be supported by the necessary architecture that includes catalysts of change and forums that are keen to consider and address specific problems and mechanisms that affect farmer groups and other organised pig value chain actors.

Factors contributing to the failure of institutional innovations

This section summarizes some of the factors that determine the failure of institutional innovation that are being undertaken in Uganda and other developing countries. These are:

- When most farmers are not members of the farmer groups or producer marketing groups. In other words, when farmers are used to working as individuals, this creates a tendency to undermine the functioning of the newly created farmers' groups by making them inefficient and prone to mistrust and conflicts.
- Limited initiatives towards the formation of well-functioning producer groups based on genuine collective action, trust, and linkages.
- The necessary linkages to ensure healthy technological development often do not exist in developing countries, including Uganda. These however can be fostered based on available resources and needs. Functional linkage helps to create the kinds of "horizontal" connectivity necessary for healthy innovation systems that cannot be resisted for cultural reasons or because of perceived loss of control on the part of vested interests (Clark, 2002).

- Lack of capital and access to credit hinders the level of competitiveness of producer marketing group relative to other buyers.
- The lack of cash capital to pay in time for produce deliveries. In other words, the inability to pay immediately after grain or other farm produce delivery makes producer marketing groups less attractive to cash-constrained farmers. Cash-constrained farmers' find it difficult to delay cash payments; even when future prices would be higher. The failure to pay on delivery, resulting from lack of capital and access to credit, is a major constraint that stifles competitiveness of marketing groups relative to other buyers.
- The number of villages covered by the produce marketing groups; average distance to the market and; group size can have negative effect on farmers' or producer marketing group performance.
- The inability of smallholders to expand their understanding of market operations and prevailing economic opportunities hinders sustainable operation of farmers' groups. According to Wongtschowski et al (2013), this is true even when farmers attempt to be innovative and entrepreneurial, when actually they are lacking the know-how to do so. It also justifies the need to provide advice and services from other actors with a comparative advantage.
- When men dominate all the trade in farm produce without any consideration to gender issues For example, women in Uganda participate more on such crops as cabbages and beans, and they do not engage in beef or pork trade at all.
- Individual cooperative behavior may not be translated into collective action unless other potential beneficiaries (other actors in the value chain for example) agree to cooperate and do likewise.
- Negative effects of external shocks and structural constraints that limit the volume of trade and access to capital and information (Shiferaw et al., 2008). This may require further investments in complementary institutions and coordination mechanisms to exploit scale economies.
- Failure to use research based evidence about the potential of a best practice before they are scaled-up and out. In this context, the best practice or intervention should have the potential to create an increase in at least market participation, quantity marketed, household income and other desired development outcomes across pig farmers and other actors along the value chain.
- The failure to consider the cultural differences and spatial variation in the potential to adopt farm level technologies and other innovations along the value chain. The purpose and implications of the best-bet interventions should be culturally accepted and able to fit the context.
- When the intervention is less inclusive in relation to other actors in the value chain, but also unable to explore willing partners that can support the new technological or institutional innovation. The willing partners may include boundary partners, traditional institutions, private sector, the local and central governments.
- The weak capacity in SPS management; weak competitiveness among the primary producers, processors and traders, and; the low levels of governance (trust) among farmers' and other value chain actors' groups.

Constraints to the implementation of pig sector innovations

The following are some of the key constraints that limit the capacity of smallholder pig farmers and other value chain actors to produce and supply quality and differentiated pig products with desirable market traits. These constraints also enhance the inability of value chain actors to penetrate high value niche markets.

1. The market for pig products is highly disorganized and unable to provide a win-win situation for all the players in the value chain. There is lack of linkage among value chain actors, including financial services providers.
2. Lack of efficient distribution systems for moving live pigs and pig products into mainstream markets.
3. Limited access to market information and sources of vital technology. The cost of accessing inputs is high, often beyond the reach of most smallholders. Besides, most actors in the value chain don't have necessary skills; motivation to learn; value addition strategies; business skills, and reliable providers of good quality inputs and services.
4. The enterprise of pigs is not yet considered to be among major or priority¹⁰ enterprises selected for strategic investment and promotion in the country, hence the lack of targeted policy for the pig sub-sector. Nevertheless, pig production has continued to grow largely on its own, and is now a reliable instrument of poverty reduction and economic growth.
5. Limited access to credit and high cost of acquiring credit are major impediments for adoption of important technological and institutional innovation. The lack of finance, both short and long term, limits the ability to invest and procure and use productivity-enhancing inputs, thereby contributing to low and uncertain output.
6. The quality and food safety of smallholder pig farmers' produce is low, probably due to the disease burden, poor animal husbandry and slaughter practices. All these combine to limit quantity of pork that is supplied to urban market.
7. High transaction costs in terms of price risk and cash flow problems characterize the available markets of livestock products. And while these markets exist, they operate in a disorganized manner due to the many players in the value chain. Most of these value chain actors are quacks selling fake inputs and products to unsuspecting smallholder farmers.
8. There is a low level of participation of cooperatives, associations and farmer groups. There is need for creativity when choosing a business model that can effectively organize smallholder pig producers, if they are to innovate and market good quality pork products in the country
9. The price variability, low volumes, lack of buyers, and low business skills, especially in "rural to rural" and "rural to urban" value chains in the country.
10. Lack of widely accepted standards for pig products marketed in Uganda. This can be linked to the lack of knowledge and information among stakeholders, especially consumers.
11. The failure to transform the raw foods into some form of processed, branded, easy to move products that can fetch better prices. There is need for capacity building among actors to enable the transformation of pig products in a way that takes advantage of prevailing infrastructure conditions.
12. Lack of government investment in basic infrastructure such as roads, spot markets, and abattoirs. There is limited ability to transform the raw pork into some form of well processed, branded, and well packaged pork that can fetch better prices.
13. Limited or no skills of the various players in the farmers group and pig value chain.
14. Low desire to demand high quality pig products by consumers and for the pig producers' to maintain high grades and standards of pig products.

¹⁰ Livestock policies in Uganda currently focus more on animal enterprises (cattle, goats, sheep and chicken) requiring high cost of production when compared to pigs (Tatwangire, 2012). Only NAADS is promoting pig production. Some NGOs try to fill the gaps.

Ways forward: Best bet interventions for testing

1. **Conduct capacity building that encourage systemic and institutional change in the way: market for pig products and inputs operate; actors and service providers along the value chain function; farm records are kept, and; resources utilized.**

Here, market-based incentives can be introduced and used to leverage the pig enterprise's contribution to value chain development. Appropriate and useful organizational models in the pig sector can be promoted especially in areas of linking pig farmers' organizations to large-scale traders and processors (abattoirs). An example of such models is the "hub marketing approach" to live pig and pig carcass marketing as in the case of EADD. This can suffice in improving market efficiency. It involves deciding on a major pig product and then spinning it off into multiple channels that can supply it to potential consumers.

Several live pigs and pork hubs can be created, namely: (i) cooperative-structured pig hubs that are created through cooperatives. These can either be producer-led, retailer-led, or with consumer members. It has to have strong roots in pig farming that is owned and democratically controlled by its members: (ii) .For-profit live pigs or pork hubs that aim at helping farmers to connect to a market outlet, and sell their pig products in desired quantities. When pig farmers are helped with direct marketing of their products, this can exponentially expand business opportunities of other pig value chain actors, especially the processors.

The hub-marketing approach therefore improves the performance of value chain. It can increase the participation of poor pig farmers and women in the value chain. It also allows capacity building to enhance issues of: product quality assurance, standardization, bulking, storage, and value addition for primary pig products. Linkages can be created between rural farmers, urban traders in ways that encourage collective marketing and efficient distribution of pig products from butchers and processors to consumers.

2. **Establish collective action, linkages and coordination units along the pig value chain that suits differences in local characteristics.** These can then be utilized as a basis to facilitate the emergence of reliable organizational models to enhance value chain coordination in a way that effectively promote: variants of collective action among actors; use of contractual arrangement between pig farmers and other actors; efficient distribution pig products (and inputs) between different value chain actors, and; the operation of existing farmer and women groups.

Greater connectivity among the component nodes of the pig systems can therefore help reinforce closer linkages between (and among) economic and technological agents in the value chain. While the lack of agricultural financing and research skills continue to limit the emergency of commercial agricultural production in Uganda, this can be altered, if new institutional structures are put in place to permit the effective symbiosis of knowledge search with knowledge use.

3. **Promote interventions that improve governance issues and active participation within farmers group and other value chain actors' groups. This can be in form of establishing reliable mechanisms for improving access to operating capital; effective strategies for risk management, and; enhancing the business skills of the pig farmers marketing groups.**

Here credit service providers and pig traders can be targeted with precise incentives and training in skills that limit exploitation of pig producers. The issue is about interventions that enhance: motivation, good moral behavior, trust, and fair enforcement of exchange contracts. All these are important in reducing transaction costs and increasing income. Interventions should also help value chain actors' to focus on value chain activities as an opportunity to conduct profitable business.

4. **Promote pig value chains that are sustainable by attracting more direct participation of the private sector and other appropriate boundary partners that have a comparative advantage in the development of smallholder pig value chain operations in Uganda.**

This may require the need to redefine objectives and finding new ways to expand farmers' access to services, funding, training opportunities, and market for the pig products. Space should be created for boundary partners to come in with their experiences, resources, and skills that can catalyse the formation of vibrant and self-sustaining pig value chain. A participatory market chain approach can be employed when piloting on "rural to rural", "rural to urban", and "urban to urban" pig value chain actors, in order to improve the quality of pilot testing, intervention outcomes, and impact on efficiency, effectiveness, welfare, and capability of actors in the wider pig value chain in the country.

There is also need to support the emergence and consolidation of innovation networks in the pig sector. Innovation networks are vital in: minimizing the transaction costs of searching for technical and market information; minimizing risk of experimentation with alternative solutions; adding flexibility; increasing collaboration; ensuring effective coordination, and; better development of new ideas and skills. Very often, innovation networks tend to be informal in their operations. This should however be recognized, and care taken to avoid imposing organizational arrangements that are formal.

5. **Promote the mobilization, formation, and registration of pig producers' organizations that can utilize collective action to boost their production and marketing operations.** Participation in pig farmer groups should be guided by clear needs and interests that should be identified. This may require the entry and membership fees that are key to the sustainability of collective marketing and long-term pro-poor development (Markelova and Meinzen-Dick, 2009).

Marketing sustainability and the stability of pig farmers' group can therefore be achieved when: the registration process of pig farmers and other actors' groups is very much simplified; value chain actors are able to forge strong relationships by learning from one another, and; the formation and operation of farmers and actors' group is quite smooth. This should be true even when there is a requirement of formal registration before accessing inputs and services. Pig traders can also be organized into buying cooperatives to enhance the coordination of other value chain actors from input traders, farmers to consumers.

6. **Build advocacy capacity and alliances with "change agents"** This may require effective dissemination of relevant information to various committed actors in the value chain. This implies the need to explore and harness through research the potentials of linkages; partnerships; policy platforms, and; innovation platforms that can help exploit the potential in pig sector. Various incentives need to be put in place for smallholders to organize around marketing of a particular commodity as opposed to individual selling.

There should be advocacy to among others: develop a long-term vision for the pig sector; improve rural infrastructure; provide affordable extension services; distribute improved pig breeds; promote appropriate feeding practices; make credit markets accessible to the poor; make relevant market information available to farmers; connect pig farmers to a wider pig value chain; create incentives that can stimulate willingness of diverse actors in research and learning institutions to actively participate in the innovation network, and; and ensure that the voice of farmers and other value chain actors is heard. These interventions can lower the costs for marketing pig products, and can also create additional incentives for pig farmers to organize around pig marketing activity.

- 7. Build inclusive innovation networks that can help create and disseminate best practices:** Strong innovation network should aim at creating interventions that can: eliminate excessive bureaucratic requirements for business; develop basic infrastructure; advocate for good policies to consolidate the innovation capabilities of networks; support effective action-research projects and decentralized experimentation with alternative solutions; support the centralized learning to identify and diffuse new instruments and best practices.

Innovation networks should also help to link local networks to international sources of information and resources; provide resources to strengthen innovation capabilities in private firms and civil society organizations and; build the capacity of actors or dedicated organizations that are willing to be catalytic agents through courses and mentoring; facilitate the formation of partnerships with the aim of triggering an increase in training human resources, exchange visits, meetings, and facilities; create incentives (in terms of change in mentality, management and culture) that stimulate willingness of diverse actors in research and learning institutions to participate in these innovation networks.

- 8. Mobilise and sensitize farmers' groups on key democratic principles of participatory group governance through fair elections and giving accountability.** In the long term, this should help lead to the establishment of strong farmers' organizations and the union or umbrella of pig producers and marketing groups in the country.

The union of pig producers and marketing groups helps to coordinate, promote and regulate the development of pig industry. This innovation can quickly improve access to market and use of improved technology in terms of new pig abattoirs, good breeds, new machinery, and capabilities that increase productivity. The formation of an umbrella or union of producer and marketing groups may also help to address the problems of low marketable volumes, price variability, and the lack of credit. This union should be lead by democratically elected representatives, a phenomenon that is called participatory governance.

- 9. Promote interventions that can help provide initial start-up capital of farmers or marketing' group to help kick-start their farming operations.** Members of the group should be encouraged with interventions that increase their registration fees for membership, annual contributions, and mutual insurance premiums, in order to raise the necessary minimum capital. Furthermore, savings groups can be created to help generate money for use through borrowing during the periods of stress and peak markets.

Individuals pig farmers can deliver their pig products to a pig farmers' group, which may or may not be in a position to offer any immediate payment. The pig farmers' group then bulks from farmers before delivering pig products to a trader. Prices and volumes

can be negotiated before and the trader should pay for the pig farmers' group delivery. The pig farmers' group then deducts member fees and distributes the payment between pig farmers. Enabling farmers' groups to make partial payments on delivery to its members helps to reduce the cost of selling through the group, and can also increase the volumes sold collectively and the ability to negotiate better prices.

10. **Train and equip pig farmers and leaders of PMGs with grants and business skills to facilitate effectiveness and accountability in running their value chain activities as a business.** Offering group members specialized training in technical and marketing skills can provide incentives to increase production and allow the group to be successful and sustainable in their value chain activities.

For example, under the District Livelihoods Support Program (DLSP) that is funded by the International Fund for Agricultural Development (IFAD) and the Ugandan government, grants are provided to eligible farmers' group to help them overcome various hurdles faced in enterprise development (Wongtschowski et al., 2013). Since its inception in 2007, the DLSP program has provided grants to more than 600 farmers, and has also created capacity among farmers groups. Through the DLSP program, farmers have improved their business skills; are now able to run their enterprise as a business; can, plan a business; are able to access market information; and have improved their record keeping to promote trust and further cooperation. Similar interventions can be promoted in the pig sector.

11. **Encourage the registration of producer marketing groups as legal business entities and not as self-help groups that often restricts their ability to access essential business services.** In the long term, farmers groups can also be trained and supported to invest in quality small-scale slaughter houses and pork processing plants, depending on their comparative advantage. There is also need to facilitate smallholders' access to modern infrastructure, including the ICTs, services for business registration, and incorporation to enable development of contractual relationships with other actors in the wider value chain and niche markets.

Promote interventions that enhance the ability of the PMGs to access working capital, affordable financial credit, and insurance. This can be achieved by facilitating linkages between pig farmers, other value chain actors, their organizations, and financial institutions. MFIs and formal financial institutions can be attracted or contracted to extend pig inventory credit services to PMGs. Main actors in the pig value chain can be supported to improve access to credit by acting as intermediaries between banks and farmers. Smallholder farmers should also be facilitated with capability to obtain bank accounts, register a business, and transact with other business, and even to enter legal, contractual arrangements with other value chain actors.

There can be an arrangement where some of the value chain actors and service providers are contracted by financial institutions to work as promoters by supplying inputs and services or purchasing farm output from pig farmers under a guaranteed loan schemes. Members of the PMGs can be supported in preparing business plans, applying for loans from financial service providers and lenders, and managing their businesses in a professional manner. The idea of external support to farmers' groups over too long a period should be discouraged. Too much dependency can undermine the group's sustainability and long-term effectiveness.

12. **Promote the analysis of constraints and opportunities along the pig value chain. This information helps to map partners along the value chain and their individual strengths.** An advisory board of key partners can be created to oversee the evaluation and improvement of the smallholder pig value chain in terms of smooth coordination of actors, performance, profitability, and upgrading.

This intervention can help support and improve the underlying trust issues between pig farmer groups and other VC actors including, input traders, feed mixers, MFIs, butchers, traders, and consumers. The intervention should also support strategies to develop market intelligence or analytical skills that provide the status and trends of current market information and market development; encourage the operation of “business linkage” programs (such as business round tables and conventions), and; support travel to those programs by farmers and government officials.

13. **Identify local champions and catalysts to make the market links in the pig value chains and also to help group smallholder pig farmers and other value chain actors, in order to overcome diseconomies of small-scale.** This has an advantage of making use of forms of market linkages that are appropriate to local and market conditions (Wiggins and Sharada, 2013). The approach should be more on: enabling and facilitating; not replacing existing arrangements per se; planning for temporary support, and; planning for an exit strategy. The aim should be about enhancing learning and putting in place strategies that help to overcome unforeseen obstacles.

14. **Facilitate the emergence of active stakeholder policy advocacy forum that can influence policy reforms that are favorable to smallholder and other actors in the pig value chains at district and national levels in Uganda.** The pig enterprise can effectively develop more in terms of productivity, product quality, and issues of food safety, when the government finally chooses it to be among the priority agricultural commodities for public investment and value addition.

Pigs should be included among the priority agricultural commodities that are of strategic importance to the country as defined in the main sub-programs of the Agricultural Sector DSIP commonly known as “Non-ATAAS. These are often drawn from an elaborate consultative process with stakeholders (MAAIF, 2012). The stakeholder policy advocacy forum should be encouraged to further advocate for the: improvement of storage facilities, slaughter houses, value chain investments in cold storage; modernized wet markets; improved buildings of butcheries, and; better communications and roads.

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Appendix A1: Institutions/projects that are improving service delivery, input and output market access in smallholder pig systems

No public institution, NGO, or private institution is known to be undertaking robust intervention in the improvement of marketing of pigs and pig products along the pig value chain in Uganda. Few organisations are engaged with pig restocking, improvement of pig breeds, and formation of farmer groups. These include among others: NAADS, World Vision, Child Fund, MADDO, VEDCO, and CARITAS. Nevertheless, the process of forming farmer and other value chain actors' groups appear to be failing to generate the anticipated collective action. In particular, NAADS has not attempted to promote the actual marketing of inputs and pig products. Besides, NAADS is yet to start improving the performance and efficiency of pig value chain actors, who include farmers, traders, input dealers, and processors.

Other institutions that have made some contribution to smallholder farmer group formation include: the East Africa Dairy Development Project (EADD), Foodnet, VECO, aBI-Trust, the Sub-Saharan Africa Challenge Program (in conjunction with CIAT-Africa, Agricultural Research Institute Kabanyolo, Africa Highlands Initiative (AHI), Huntex Industries Company Limited-Kabale, Kabale Local Government, NARO-KAZARDI, Makerere University, and ICRAF). Institutions that are improving access to credit for pig farmers include some MFIs such as BRAC. Others include informal pig farmers' associations that have not succeeded to operate collectively due to the lack of incentives and external support to help them innovate on the marketing front.

World Vision and Food for the Hungry Uganda (FHU) provides support to the vulnerable groups such as orphans through school fees payment, purchase of scholastic materials, while also providing families with livestock such as goats and pigs for free. Other key institutions that have attempted to improve the marketing of livestock products including pigs are: the Danish funded Agri-business initiative Trust (aBI Trust) for agriculture; ASARECA that is supporting agro-enterprise activities through the regional marketing and agro-enterprise network FOODNET.

Some informal farmer associations are also trying to innovate from within and with a bias to gender issues. For instance, SPVCD(2013) reveals that in Katwe-Butego sub-county in Masaka Municipality, there are women groups involved in some form of collective pig production with NAADS offering extension support.

Appendix A2: List of Key Informants in Mukono and Wakiso districts

Names	Address	Contact
Mr Denis Ssemakula	Innovation Platform Project, Makerere University	0701339302
Mr Gabiri Geoffrey	Innovation Platform Project, Makerere University	0782855414
Dr Noah Kiwanuka	A veterinary officer, Mukono district	0772427236
GLOBA/GOAL investment	Proprietor of a private company that deals in large scale buying of live pigs and pig carcasses, Kampala.	0772419377
Dr Kibuka	District Veterinary officer, Mukono	0712985181
Mr Sabika	A Pig producer and trader, Mukono	0782985181
Mr Mugerwa	A Pig producer and trader, Mukono	0772496153
Ms.DoreenKatama	A Pig producer and trader, Mukono	0704947578
Ms.WinnieBabirye	A private extension worker in Wakiso district. Also a trader in Agro-inputs in down town Kampala.	0750893925
Mr JimmyMabanja	Farmer, Wakiso district	0772318452
Mr WakaimaNsereko	Farmer, Wakiso district	0774216720
Mrs.AnnetNampera	Farmer, Wakiso district	0774377754
Mrs.JaneNakiwara	Farmer, Wakiso district	0771820399
Mr Irumba George	Farmer, Wakiso district	0777202542
Mr Mulindwa Chris	A private trader in pigs and proprietor of the Pig Production Marketing Uganda (PPM) - Matuga, Wakiso.	0773422445
Mrs. Hilda Mbabazi	Farmer and trader, Wakiso district	0756347369
Mrs.Kyeyune	Farmer and trader, Wakiso district	0751800463
Mr Brian Dungu	Farmer and trader, Wakiso district	0772853539
Mr Vincent Nsereko	Farmer and trader, Wakiso district	0784331902