MAKERERE  **UNIVERSITY**

CAPACITY FOR SUSTAINING AGRICULTURAL INNOVATION PLATFORMS IN RWANDA: A CASE STUDY OF "RESEARCH INTO USE" PROJECT

BY

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DECLARATION

"This study is original and has not been submitted for any other degree award to any other University before".

Signed…….Date……

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"This thesis/dissertation has been submitted for examination with the approval of the following supervisors".

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DEDICATION

This work is dedicated to my wife, Mukamwiza Elisabeth, whose love is singular and to our five children: Dusengemungu Léonce, Dusengemungu Didier-Robert, Dusengemungu Jean-Luc, Dusengemungu Marie-Elise and Dusengemungu Jean-Christian for their patience and, all the moral support they gave me during my studies.

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ABSTRACT

Research Into Use (RIU), is a DFID funded project (2006-2011), aiming at strengthening capacities for uptake of agricultural innovations by end-users through Innovation Platforms (IPs). In Rwanda, RIU IPs are focusing on maize, cassava, potato and farmers associations respectively in Nyagatare, Gatsibo, Gicumbi and Karongi districts. The funding is coming to an end whereas capacity building is vital to sustain these platforms beyond the project duration. This study was designed to establish the contextual factors, institutional arrangements, incentives and competences required for effective functioning and sustainability of agricultural IPs in Rwanda. Based on relevant literature review, the methodology used included focus group discussions, individual interviews, observations and capacity needs scoring by IPs actors. Results indicate the success of RIU in establishing the four agricultural innovation platforms and strengthening social networks between various actors (farmers, cooperatives, local leaders, NGOs, etc.). Contextual factors conducive to agricultural IPs development include local resources, local actors and hard work. Institutional arrangements identified comprise the memoranda of understanding (MoUs) and the collective action plans elaborated by the IPs actors with RIU support. The RIU incentives portfolio includes trainings, improved seeds, inorganic fertilizers, equipments and study tours. The competences needed by various actors vary from a category of actors to another in relation to their functions. Most of them were with respect to crop management techniques, post-harvest technology, seed system, skills in machinery, knowledge on agriculture lows and business plan. The lessons learnt allow concluding that RIU should continue scaling up IPs in Africa or elsewhere in spite the challenges faced. The results will be used by DFID, RIU managers, the Ministry of Agriculture and rural development agencies.

Key words: capacity, innovation, agricultural innovation platforms, sustainability and RIU

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ACRONYMS AND ABBREVIATIONS

AIS : Agriculture Innovation Systems

AJEMAC : Association des Jeunes Emancipés de Mushubati pour l'Agriculture et le Commerce (Mushubati Youth Association for Agriculture and Commerce)

ANOVA : Analysis of Variance

ARD : Agricultural Research and Development

ASARECA : Association for Strengthening Agricultural Research in Eastern and Central Africa

BERR : Business Enterprise and Regulatory Reforms (in Britain)

BRD : Banque Rwandaise de Developpement

CAADP : Comprehensive Africa Agricultural Development Programme

CAPMER : Centre for Support to Small and Medium Enterprises in Rwanda

CELLINO : Cellule d'Innovations in AJEMAC

CERAI : Centre d'Education Rural et Artisanal Integré

CGIAR : Consultative Group on International Agricultural Research

CIAT : International Center for Tropical Agriculture

CIP : Cassava Investiment Group

CMD : Cassava mosaic Desease

COOPEC : Cooperative d'Epargnes et de Credits.

DFID : The UK's Department for International Development

DRC : Democratic Republic of Congo

FACAGRO : Faculté d'Agronomie (NUR)

FAO : Food and Agriculture Organisation of the United Nations

FARA	: Forum for Agriculture Research in Africa
FFS	: Farmer Field Schools
FGD	: Focus Group Discussion
GFAR	: Global Forum on Agricultural Research
ICT	: Information Communication Technology
ICRAF	: International Centre for Research in Agroforestry-World Agroforestry Centre
IK	: Indigenous Knowledge
IMPUYAKI	:Impuzamashyirahamwe y'Abahinzi ba Kibali (Farmer Cooperatives in Nothern province of Rwanda)
IPs	: Innovation Platforms
ISAE	: Institut des Sciences Agronomiques de Busogo (a High Agriculture Institute in the Northern Province)
ISAR	: Rwanda Agriculture Research Institute (Institut des Sciences Agronomiques du Rwanda)
M&E	: Monitoring and Evaluation
MINAGRI	: Ministry of Agriculture
MINICOM	: Ministry of Commerce, Industry, Investment Promotion and Cooperatives
MoU	: Memorandum of Understanding
MVD	: Mosaic Virus Disease
NARS	: National Agricultural Research Systems
NEPAD	: New Economic Programme for Agricultural Development
NGO	: Non Governmental Organisation
NIC	: National Innovation Coalition

NRM : Natural Resource Management

NYAMIG : Nyagatare Maize Investiment Group

NUR : National University of Rwanda

OECD : Organization for Economic Co-operation and Development

PAID : Partnership in Agricultural Innovation for Development

PASNVA : Projet d'Appui au Système National de Vulgarisation Agricole

PCA : The Principal Component Analysis

PDRCIU : Projet de Développement des Ressources Communautaires et des Infrastructures de l'Umutara

PROLINNOVA : Promoting Local Innovations

PSF : Private Sector Federation

RDO : Rwanda Development Organisation

RDI : Rwanda Development Investiments

RUFORUM : Regional Universities Forum for Capacity Building in Agriculture

RADA : Rwanda Agricultural Development Authority

RARDA : Rwanda Animal Resources Development Authority

RHODA : Rwanda Horticulture Development Authority

RIU : Research Into Use, funded DFID Project

RNRRS : Renewable Natural Resources Research Strategy

ROPARWA : Rwanda Farmers' Organisations Umbrella

SACCO : Savings and Credits Cooperatives

SCARDA : Strengthening Capacity for Agricultural Research and Development in Africa

SNA : Social Network Analysis

SPSS : Statistical Packages for Social Sciences

SSA : Sub Saharan Africa

UN : United Nations

UNDP : United Nations Development Programme

USAID : United States Agency for International Development

UK : United Kingdom

WAEMU : West African Economic and Monetary Union in Burkina Faso

WFP : World Food Program

CHAPTER 1: INTRODUCTION

1.1. Background

Development and diffusion of technological innovations has been a subject of interest throughout the world over the last century. Agriculture technologies have been developed by research institutions such as National Agricultural Research Systems (NARS), Consultative Group on International Agricultural Research (CGIAR) and Non-Governmental Organisations (NGOs) ; though, their adoption by the end-users (i.e. farmers) especially in Africa has been very low to date (Sanginga, Waters-Bayer, Kaaria, Njuki and Wettasinha, 2009). In Rwanda particularly, the institutions of technology dissemination have gone through a number of reforms since colonialism. Several extension approaches were tested; but, none of them has been able to transform agriculture. The system was too authoritative and farmers had to comply blindly to improve production of cash and food crops, especially to fight against historical famines (Hakizimana, 2007).

On the basis of the above scenario, the Department for International Development (DFID) in the United Kingdom (UK) has been supporting a program to enhance the uptake of relevant agricultural technologies through a project known as "*Research Into Use*" (RIU) since 2006. The RIU project promotes uptake of relevant technologies to poor farmer and among these are; policies and processes directed towards crop science, forestry, fisheries management, livestock production and animal health, crop post-harvest technology and natural resource management (RIU, 2009).

RIU currently operates in 12 of the poorest countries of Africa and Asia. The African countries include Zambia, Malawi, Nigeria, Sierra-Leone, Tanzania and Rwanda while the Asian countries are Bangladesh, Cambodia, India, Nepal, Pakistan and Vietnam. In implementing the project, RIU established innovation coalitions and innovation platforms in all those countries. Innovation coalitions are wider platforms and or clusters of various actors in agriculture at national level while innovation platforms are smaller platforms at local level.

RIU's vision and mandate are to promote Innovation Platforms (IPs), maintain them and spread innovations. An innovation platform, in agriculture for example, consists of farmers, processors, marketers, traders, transporters, local leaders and scientists all working together to enhance agricultural productivity (Gawer, 2000). Managing such an arrangement of actors working in that mode is relatively new and calls for new capabilities in terms of knowledge, skills and attitudes among all the participants, the "actors". Developing requisite capacities for innovation platforms to work is fundamental to the success and sustainability of RIU project's initiatives in Rwanda.

Rwanda however is still recovering from the effects of the horrible genocide of 1994 which destroyed all social networks and mutual trust within the communities. Besides being new, the concept of innovation platforms is founded on principles of social networks, trust and collaboration (FARA, 2007), thereby probably posing a greater challenge in Rwanda compared to the other African countries. Rebuilding the spirit of cooperation among the various actors to work together to innovate is therefore most critical in this case.

Inadequate capacity of the use of new scientific knowledge and technologies by the demand side has been identified by DFID as a bottle neck to agricultural innovations uptake. DFID argues that while the Renewable Natural Resources Research Strategy (RNRRS) has enormous potential to alleviate poverty, promote economic growth and mitigate environmental problems, that potential

is realized only within small pilot projects (RIU, 2009). Therefore, RIU seeks to empower the poor and marginalized groups so that they can participate in dynamic innovation systems. Though this is true, the capacity of the other actors to innovate must not be ignored. It is assumed that the inadequate capacity of farmers to adopt new agricultural innovations may result from inability to network, limited training suited to their needs and lack of funds for agricultural investments especially by Governments in agriculture sector (RIU, 2009).

Whereas it is logical to emphasize capacity building for the demand side, the innovation platforms arrangement demands capacity building across the board – the farmers are only one type of actor in the game. Further, the capacity required may go beyond the capabilities of individual actors to the larger policy frameworks that provide the space and incentives for innovation platforms to function.

1.2. Problem statement

In Rwanda, in spite of the many efforts made by the Government, projects and several NGOs, adoption of agricultural technologies by farmers has not been very successful (Hakizimana, 2007). Inadequate cooperation of the key players in agriculture has been partly responsible for the limited uptake of new knowledge and technologies by the end users. RIU project came into play to fill this gap. The innovation systems approach and innovation platforms in particular seek to establish a mutual relationship among all actors to work together to utilize the available knowledge, technologies and services for economic and social benefits.

Since 2008, RIU project initiated four agricultural innovations platforms to foster technology diffusion in Rwanda. The platforms focused on maize, cassava, round potato and hillsides'

irrigation to boost fruits and vegetables production. Use of innovation platforms is a new approach that requires developing capacities not only of the farmers but for other actors namely; seeds multipliers, inputs suppliers, cooperatives, processors, traders, local leaders, research and extension to work together in a coordinated and mutually beneficial manner. Though this is true, RIU has put special emphasis on building the capacity of the demand side (farmers) to participate in innovation platforms and under looked the arrangement to develop capacity for other actors in the platform. In fact, the concept of innovation platform is built within the value chain of agricultural products namely crops and livestock products.

It is however not clear what capacities are needed by the various actors to make the innovation platforms function well and to sustain them after RIU project ends in 2011. Furthermore, the current status of the established innovation platforms and the extent to which the required capacities have been built for their sustainability is uncertain. This study therefore seeks to assess the current status of innovation platforms introduced by RIU and to establish the capacities needed for their effective functioning and sustainability.

1.3. Objectives

With respect to the problem statement described above the following objectives are assigned to this study:

1.3.1. General objective

The overall objective of this study is to establish the requirements for effective functioning and sustainability of agricultural innovation platforms in Rwanda.

1.3.2. Specific objectives

The specific objectives are:

1. To describe the current status of RIU innovation platforms and determine the extent to which the platforms have fulfilled their intended objective of spreading innovations in Rwanda as stipulated in the RIU project;
2. To identify the contextual factors, institutional arrangements and incentives required to influence and or support the effectiveness and sustainability of innovation platforms in Rwanda;
3. To establish the capacities that different actors need to effectively participate and sustain themselves in the innovation platforms.

1.4. Justification of the study

Innovation platforms are new and relevant for Rwandan agriculture development because they involve several actors who mutually benefit from their interaction. The results of this study can be used by:

- The implementers of RIU project for continuation, restructuring and/or replication of the approach;
- The Government of Rwanda, specifically the Ministry of Agriculture for scaling-up IPs in order to reduce poverty;
- The innovation platform actors for their own profit and wellbeing;
- The policy makers for diffusion of innovations into Rwanda and other African countries.

1.5. Definition of terms

The key terms that need to be defined and clarified in the context of this research are: capacity building, innovation, innovation platform, agricultural innovation platform and sustainability. These terms may carry different meanings in different contexts, however for purposes of this research they should be interpreted as follows.

1.5.1. Capacity building

This study adopts a definition of capacity building by Philbin (1996) as the "process of developing and strengthening the skills, instincts, abilities, processes and resources that organizations and communities need to survive, adapt, and thrive in the fast-changing world". Capacity building also encompasses human resource development, organizational development, institutional and legal framework development.

1.5.2. Innovation

According to RIU (2007), innovation refers to “the first significant commercial use of new ideas, new technologies or new ways of doing things in a place or by people where they have not been used before”.

1.5.3. Innovation platform

An innovation platform is a forum where various actors discuss problems, explore opportunities and together find solutions (FARA, 2007). For this study, it refers to a network of partners working on a common activity and using news ways of doing things. The two definitions complement one another and provide the real image of an innovation platform. An agricultural innovation platform is any developing network of various actors in agriculture sector and related activities. It can include providers of agriculture knowledge (research, extension and education), private sector, farmer's organizations, individual producers or cooperatives, agro-inputs dealers, local leaders and media owners (RIU, 2008-2009c). It may focus on certain crops value-chain or being locally based. In this study, the platform is nested in crop value chain.

1.5.4. Sustainability

This is the process where an IP demonstrates the capacity to continue or extend its activities in duration and space by its own after the end of support from different donors. The core of the RIU project is the establishment of agricultural IPs and ensures their sustainability (RIU, 2008-2009 b).

1.5. Limitations of the study

The study focused on the four agricultural innovations platforms established in Rwanda by RIU (2008-2009a) and located in different agro-ecological zones. The major limitations were:

- The scope of this study which was extended to all initiated IPs by RIU,
- The research units which were big enough and difficult to cover,
- The time and the financial resources available to the researcher which were not sufficient,
- The access to some categories of IP actors which was challenging especially for those who dropped out of the IPs,
- The dispersion of actors throughout the districts in a mountainous country “Rwanda” which made difficult the data collection and finally,
- The miss keeping of records and reports by respondents which did not help the researcher.

CHAPTER 2: LITERATURE REVIEW

This chapter presents a review of the literature related to agricultural innovation platforms. It is divided into five sections that include (1) the concepts of innovation, innovation systems and innovation platforms, (2) the capacity for innovations, (3) the relevance of innovation platforms in agricultural development, (4) the practices of innovation platforms in the developed countries, and (5) the innovation platforms in Africa and Rwanda in particular.

2.1. Concepts of innovation, innovation systems and innovation platforms

2.1.1. Innovation concept

An overview of the innovation concept is given by Roling (2009) who illustrates how it has evolved over the last half century. Roling outlines the lessons learned from research on innovation and from the practical application of this concept in the field. As pointed out earlier, "innovation" can represent very different perspectives and hence it can be a confusing term. Long and Long (1992), once described innovation as a real "*battlefield of knowledge*" because people can be engaged in immense fight for misunderstandings of the word "*innovation"*. In the American Mid-West (Michigan State), Rogers developed one of the most influential theories of innovation in 2003 based on a study on diffusion of hybrid maize in Iowa during the early 1940s (Ryan and Gross, 1943 cited by Sanginga et al., 2009). To that effect, Rogers (2003) is called the father of the diffusion of innovations. He illustrated the process that leads to a wave of innovations with his well-known diffusion of innovations curve. Davila, Tony, Epstein and Shelton (2006) in their paper "Making innovation work" stressed that once innovation occurs, it may be spread from the innovator to other individuals and groups.

This process has led to the proposal that the life cycle of innovations can be described using the "s-curve" or diffusion curve. The s-curve maps growth of revenue or productivity against time as illustrated by Davila et al. (2006). In the early stage of a particular innovation, growth is relatively slow as the new product establishes itself. At some point customers begin to demand and the product growth increases more rapidly. New incremental innovations or changes to the product allow growth to continue. Towards the end of its life cycle, growth slows and may even begin to decline. In the later stages, no amount of new investment in that product will yield a normal rate of return. The s-curve derives from an assumption that new products are likely to have "product Life", e.g. a start-up phase, a rapid increase in revenue and eventual decline. In fact the great majority of innovations never gets off the bottom of the curve, and never produces normal returns. Innovative companies will typically be working on new innovations that will eventually replace older ones. Successive s-curves (Figure 1) will come along to replace older ones and continue to drive growth upwards.

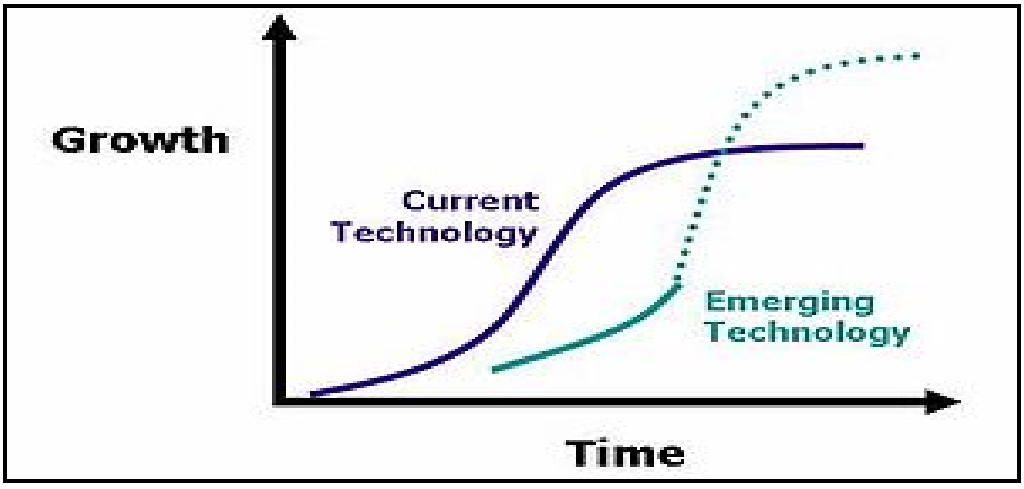

Figure 1: Diffusion of innovations (Davilla et al., 2006)

In the figure 1 the first curve shows a current technology. The second shows an emerging technology that currently yields lower growth but will eventually overtake current technology and lead to even greater levels of growth. The length of life will depend on many factors such as adoption rates, benefits for the users of the technology, etc.

Apart from social scientists such as Rogers, economist also examined the phenomenon of "*technology diffusion*". Cochrane (1958 cited by Sanginga et al., 2009), added to the existing theory of diffusion of innovations with the economic notion that the few early adopters make a windfall profit but, as more farmers adopt, the total production increases and prices begin to drop. Hence, he concluded that the diffusion process is propelled by market forces and he called this the "*treadmill*". Cochrane goes on to explain that those who adopt and survive in the system have usually to work together, get more organized and embedded in a network of supporting institutions, including input service cooperatives, saving and credits, farmer unions, truckers, processors, retailers, veterinarians and so on. This kind of multi-stakeholder organization and institutional arrangement signifies the emergence of innovation system. Rogers (1995) established that in agricultural research and extension, the perceived drivers of innovation have a high internal rate of return explained by the multiplier effect of diffusion and the macro benefits from the market propelled treadmill.

Basing on the above discussion, Roling (2009) made an important observation that: "diffusion of innovation was a research tradition based on empirical studies that looked at what happened in the past (*linear model*)". The macro benefits of the treadmill, as perceived by economists, transformed it into a "*policy model*" for what is desirable in the future – the model emphasizes technology transfer (technology supply push) and free markets as recipes of agricultural

development. The treadmill became the dominant guideline for how innovation should be promoted. But this study looks at innovations far beyond technology to include organizational and institutional arrangements for various actors to collaborate for mutual benefits.

2.1.2. Innovation system concept

In contrast to most economic frameworks, which focus on innovation systems related to production (output), the new framework of innovation system focuses on innovation processes (Lundvall, 1992). The innovation systems framework stresses that innovation is neither research nor science and technology, but rather the application of knowledge (of all types) to achieve desired social and/or economic outcomes (Edquist, 1997). This knowledge may be acquired through learning, research or experience, but it cannot be considered as an innovation until it is applied – for example technologies that are 'on the shelf' are not yet innovations' (Edquist, ibidem). The processes of learning and acquiring knowledge are interactive, often requiring extensive links between different sources of knowledge. This implies that institutional settings play a central role in shaping the processes that are critical to innovation: interaction, learning and sharing knowledge. The innovation systems framework distinguishes institutions from organizations. The author (Ediquist, ibidem) clarifies on this by stating that organizations are bodies such as enterprises, research institutes, farmer cooperatives and governmental or non-governmental organizations (NGOs), whilst institutions are the sets of common habits, routines, practices, rules or laws that regulate the relationships and interactions between individuals and groups.

Policies also influence the way people behave. An environment that supports or encourages innovation is not the outcome of a single policy but relies on a set of policies that work together

to shape innovative behaviour (Mytelka, 2000). Furthermore, habits and practices interact with policies, so when designing effective policies, the habits and practices of the people affected need to be taken into account (Mytelka, ibidem). For example, the introduction of a more participatory approach to research is often ineffective unless scientists change their habits and working practices. There is a need of actors' involvement and demands to foster the innovation system (Chakravorti, 2003).

Hall, Sivamohan, Clark, Taylor and Bockett (2001) have done a lot to explain innovation systems. They argue that innovation system framework stresses the importance of including actors and making organizations and policies sensitive to stakeholder agendas and demands. Demand shapes the focus and direction of innovation. It is not articulated simply by the market, but includes non-market drivers, such as collaborative relationships between the users and producers of knowledge. Demand for certain kinds of innovation can also be stimulated by policy, for instance by providing incentives to adopt a certain technology or management practice (Hall et al., 2001). This can be especially important when key actors are poor and have limited social and economic power or when the negative environmental impact of development needs to be addressed (Hall et al., ibidem).

Innovation systems have a dynamic nature and continuously need new approaches and new partners in addition to new ways of working. One of the characteristics of successful innovation systems is the creation of new partnerships and alliances when facing external shocks (Hall et al., 2003). Examples of external shocks include new disease and pest problems that require collaboration between a different set of scientific disciplines; new technologies, such as biotechnology, that need partnerships between the public and private sectors. It is not possible to determine the kinds of networks, links and partnerships that will be needed in the future, as the

nature of future shocks is, by definition, unknown. Dealing with future shocks could be made easier if organizations had both the flexibility and the types of networks needed for rapid formation of new patterns of partnership dictated by new or changing circumstances (Hall et al., 2005).

According to RIU (2008-2009a), the innovation system approach focuses on the creation of the linkages between the generators of the research knowledge, those with demand of the knowledge and intermediaries' service providers (brokers) of the research based knowledge. All of them come to the platform and collectively influence the innovation system itself.

2.1.3. Innovation platform concept

RIU uses the term innovation platform to mean a network of partners working on a common activity that uses research-based knowledge in new ways to produce improved goods and services for the direct or indirect benefit of resource-poor people. Such partners or actors in a particular value chain include producers, processors, marketers, traders, transporters working together as a chain. In this chain each actor has a role to play for the direct or indirect benefit of another actor in the chain. A platform can be formed around any commodity. Monty (2007) illustrates an innovation platform as in Figure 2:

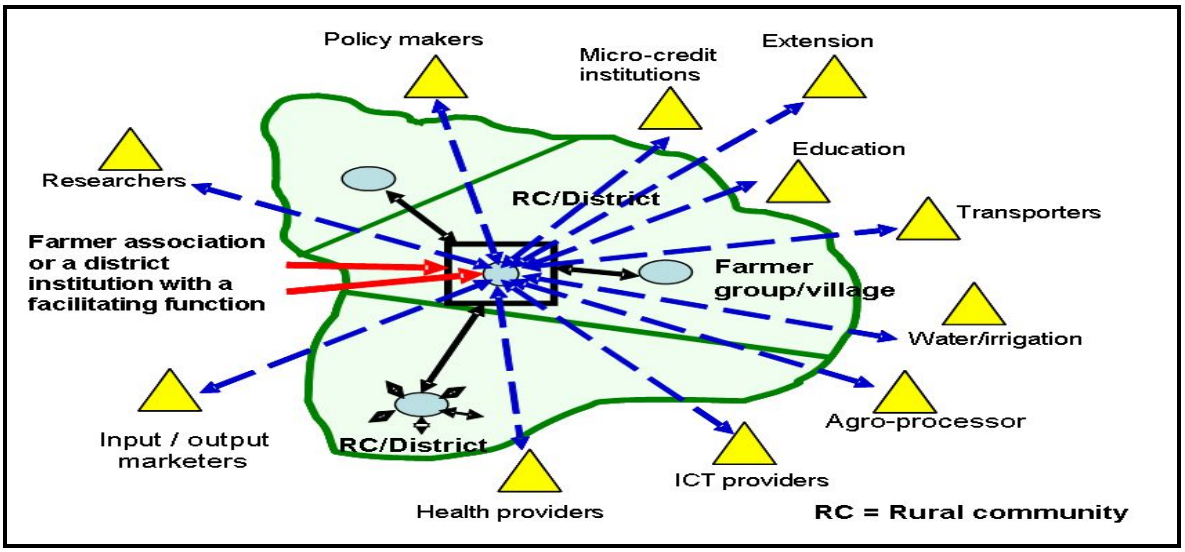

Figure 2: Innovation platform (Monty, 2007)

Figure 2 above displays the wide range of actors who may be part of the platform for an agricultural innovation in the context of Africa. The actors include: local leaders in the district, policy makers, research, extension and education, micro-credits institutions, transporters, farmers associations, water/irrigation, agro-processor, input/outputs marketers, health providers, ICT's providers, religious leaders among a long list of others. The aim is to ensure that all actors in the value chain benefit from their engagement. Innovation in agriculture comes from a variety of sources- and yet the contribution is not obviously equitable, but everyone has his counterpart (Critchley, 2007). Critchley cautions that we must not forget the contribution of farmers themselves. The source of innovations of has been an issue for discussion for quite sometime. He attempts to illustrate the possible sources of agricultural innovation in Figure 3.

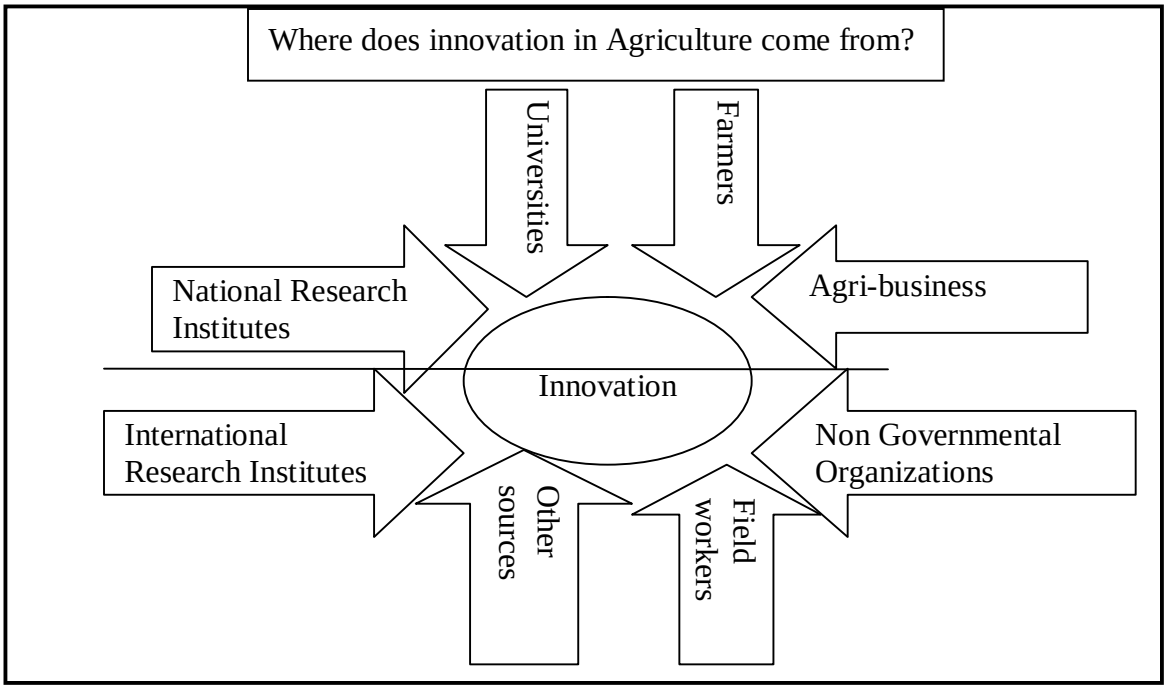

Figure 3: Various sources of agricultural innovations (Critchley, 2007)

Figure 3 shows main group of partners who generate agricultural innovations. All actors illustrated in the diagram above can be a source of innovation. Innovation is not a preserve of scientific research as it is conventionally understood.

2.2. Capacity for innovations

Capacity for innovations refers to the process through which individuals, groups, organizations and societies enhance their ability to innovate. Most capacity is built by societies themselves, sometimes in the public, sometimes in the non-governmental and sometimes in the private sector. Many international organizations, often of the UN-family, have provided capacity, so called “capacity building” as a part of their programmes of technical cooperation with their member countries. Bilaterally funded entities and private sector consulting firms or Non-Governmental Organizations (NGOs) have also offered capacity building services to promote

innovations and scale-up. The UNDP (2010) recognizes that capacity building is a long-term, continuing process, in which all actors participate (public-private organizations, academics and others).

Many people reduce capacity building to some sorts of trainings where people obtain, strengthen, and maintain the capabilities to set and achieve their own development objectives over time. However, capacity building (Urban Capacity Building Network, 2010) is much more than training and includes the following activities:

- Human resource development: the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.
- Organizational development: the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).
- Institutional and legal framework development: making legal and regulatory changes to enable organizations, institutions and agencies at all levels and in all sectors to enhance their capacities.

Given its broadest interpretation and direct implications for development, capacity building is often taken rightly as capacity development. Capacity development is a process of change which implies innovations, and hence is about managing transformations. It takes place at three different levels: the individual level, the organizational level and the societal level. These three levels are interlinked and interdependent. The impact assessment of capacity development at these multiple levels encompasses partnerships, organizational development and civil society strengthening. Partnership principles emphasize the importance of building just relationships

with local partners and strengthening their skills in areas such as strategic planning, advocacy, organizational management, and project development and management (Hilbert, 2007).

RIU, as a governmental project funded by DFID/UK, seeks to promote agricultural innovations through human resource development and partnerships. To that effect, RIU has a strong commitment to strengthening local partner organizations in agricultural Innovation Platforms. Since its formation, it has operated through partner agencies worldwide, including thousands of governmental and non-governmental organizations, community groups and host country governments. The nature of its shared vision and common values makes the RIU often to partner with local Ministries of Agriculture. In its unique partnership strategy, RIU rarely implements projects directly. The vast majority of projects are implemented through the local organizations involved in the Innovation Platforms with which it has ongoing relationships. Therefore, strengthening the organizational capacity of these partner organizations is fundamental to programs in every country in which RIU works (RIU, 2010). As a result of its focus on agricultural IPs, RIU recognizes that improving capacity of organizations and individuals is a key to sustain themselves in the long-run.

2.3. Relevance of innovation platforms in agricultural development

Platforms are set-up for reflection, analysis and learning about and promoting innovations in agriculture. Innovation is essential if producers and businesses are to survive and compete successfully in the rapidly evolving environment associated with the contemporary agricultural sector (World Bank, 2006). Reflection and learning are critical to promotion of innovations in the ever changing environment. World Bank outlined several reasons why the agricultural

environment is so dynamic and calls for collaboration and hence, creation of agricultural innovation platforms:

- Agriculture is becoming increasingly interconnected with regional and domestic markets, competitive pressures are rising, and consumer demands and standards are changing;
- Rapid social change is occurring, including urbanization and changing food preferences and systems;
- Intensification of agriculture is associated with rising pest and disease problems; and
- Environmental degradation is on the increase.

These and other reasons call for greater capacity to innovate among all actors in the agricultural value chain. Previous efforts to support agricultural sector innovation largely targeted agricultural policy and research organizations but the systems approach recognizes that innovation takes place through the interaction of a broader set of organizations and activities (Kaplinsky and Morris, 2001; World Bank, 2006). Through this interaction, institutional learning is central and the innovation platform provides the mechanism for the learning and subsequent change to take place.

Although agricultural research plays a vital role in the complex process of innovation, there is growing concern that its contribution is not increasing in line with demand (Spielman, (2005a). These concerns have led to application of the concept of an innovation system as a framework to help understand and improve the contribution of agricultural research to development (Spielman, 2005b). The origins of the innovation system framework lie in the notion of a national innovation system (Freeman, 1987; Lundvall, 1992). The innovation system concept sees innovation in a more systemic, interactive and evolutionary way, whereby networks of organizations, together

with the institutions and policies that affect their innovative behavior and performance, bring new products and processes into economic and social use (Chakravorti, 2003). The concept is now being used as a framework to understand and strengthen innovation at national, regional and sectoral levels (OECD, 1997; Mytelka, 2000), including agriculture (Hall, Sulaiman, Clark and Yoganand, 2003).

In summary, agricultural innovations platforms are relevant in a developing world especially in agriculture sector where networking, partnership and any relationship between various actors alongside the value chains are needed for one to get as much profit as possible.

2.4. Practices of innovation platforms in developed countries

Several innovations platforms exist in the world around ICT, construction, automobile industry and commercialization and agricultural commodities. Yonoshin (2009), in his article on Innovation Platform-based Silver Market in Japan, shows clearly the Innovation Platforms of YAMAHA, an electronic company and CALPIS, a beverages company. He clearly demonstrates that the requirements for innovation in the Silver Market learned from YAMAHA are completely different to those of CALPIS as the two companies deal with different outputs. But there were several similarities with regard to the functioning of the platforms such as good final products for clients (value), technology and skills in designing and manufacturing products (resource) and ability to foresee trends in the time and adjust the products onto the market (capability) in addition to strong partnership (networking).

Based on research conducted on businesses in British, Business Enterprise and Regulatory Reforms (BERR) emphasizes that an innovation platform should be taken to mean a mechanism

which provides an overall focus to encourage collaborative innovative effort supporting and enabling the exploitation of new ideas and the transfer of knowledge to business. According to BERR (2008), innovation platforms are a new way of working for government and business that enable the integration of a range of technologies and better coordination of policy and procurement, resulting in a step-change in performance. BERR defines the key features of innovation platforms as follows:

- Engage with business and the research community
- Bring together government actors/funders
- Identify the appropriate levers to use
- Seek to align funding streams from separate sources
- Links research to market through procurement opportunities

These features illustrate that the relationship between the business and research communities is crucial to the identification of appropriate actions for the creation of an Innovation Platform. Learning how to work successfully in an interconnected and collaborative world is a challenge that individuals and organizations cannot, today, avoid or ignore (Rodriguez and Salomon, 2007). Collaboration calls for new tools and methods. Organizations need to be able to take advantage of innovations that emerge from collaboration via a set of repeatable processes. Fortunately, there are many motivated and engaged people out in the world facing the same challenge as each of us and seeking new collaborative partners of their own. This is one way of engaging in innovation platforms worldwide. In Europe, TP Organics Technology Platform has put together 16 EU umbrella organizations and 14 enterprises with a big potential to integrate many more business partners, and national and EU-level public and private actors in the field (Schlüter, 2008). Members of the organic agriculture movement, the scientific community and

the wider civil society have already offered to contribute on a voluntary basis to the work of the Platform which is to promote organic innovations for sustainable food production. Technology platforms originate from industry initiated informal discussion networks. Today European Research Technology Platforms bring together a wide range of actors, including key industrial players, small and medium enterprises, the financial world, national and regional public authorities, the research community, universities, nongovernmental organizations and civil society (Ballari, 2008). Technology platforms are industry led. The first Technology Platforms (TP) have been founded in the years 2002-2003; and there are currently 35 officially acknowledged by the European Commission platforms. What makes the TP 'Organics' unique is the strong involvement of civil society organizations. Most of the current TPs have none or limited involvement of NGOs (Ballari, ibidem).

In Asia and Latin America, Braun, Thiele and Fernández (2000) show how Farmer Field Schools (FFS) and local agricultural research committees (CIALs: Commités d'Innovations Agricoles Locales) are participatory platforms for improving decision-making capacity and stimulating local innovation for sustainable agriculture. The two types of platforms complement each other and operate not only in Asia and Latino-America but also in Africa.

2.5. Agricultural Innovations platforms in Africa

In several countries in Africa, Asia, Latin America and the Pacific, diverse organizations have joined forces to promote local innovations in agriculture and Natural Resource Management (NRM). After analyzing their own experiences in Agricultural Research and Development (ARD), PROLINNOVA has set-up a Community of Practice on innovations built from the bottom up, in the spirit of the Global Forum on Agricultural Research (GFAR). PROLINNOVA

is an NGO-initiated program to build a global learning network to promote local innovation in ecologically-oriented agriculture and NRM. The focus is on recognizing the *dynamics* of Indigenous Knowledge (IK) and enhancing capacities of farmers (including forest dwellers, pastoralists and fisher folk) to adjust to change – to develop their own site-appropriate systems and institutions of resource management so as to gain food security, sustain their livelihoods and safeguard the environment (PROLINOVA, 2009).

According to WAEMU (2004), the "innovation" concept in West Africa has been used in a broad sense, integrating institutional, policy and organizational innovations. It brings together research organizations, extension services, private companies and agribusiness interested in crop varieties, animal breeds, producers' networks and various cultural practices to initiate platforms.

In Africa specifically, RIU (2010) has appointed country teams to work in partnership with organizations in Nigeria, Sierra Leone, Malawi, Zambia, Tanzania and Rwanda. RIU work focuses mainly on the initiation of National Innovation Coalitions (NIC) to lead the process for identification of the initial groups of platforms.

In Nigeria, agricultural platforms are formed around cowpea/soybean, cassava, and catfish value chains. A fourth coalition consists of policy actors on the specific innovation platforms. Local innovation Platforms are broad-based, with strong participation from different sectors, particularly the private sector.

In Sierra-Leone, RIU supported a Partnership in Agricultural Innovation for Development (PAID). PAID is a social business network comprising of public and private sectors, research institutions, NGOs, universities, civil society, farmers and farmers' organizations. In addition local platforms have been identified to deal with priority concerns identified through national

consultation. The fast-tracked Innovation Platforms work on Pilot Solar Drying and Poultry Feeds.

In Tanzania, the National Innovation Coalition (NIC) is working as a policy platform to collect lessons and experiences from all RIU interventions and filter them into the national policy formulation process. In addition, Local Innovation Platforms address farms equipments using draught power opportunities in Kilombero, Kilosa and Mvomero Districts, post harvest management for better quality rice and maize in Morogoro region and dairy development in Tanga and coast region (RIU, 2010).

In Zambia, the RIU strategy team for platforms establishment have identified research from CGIAR, National Agricultural Research Stations, and University of Zambia (UNZA) with RNRRS knowledge banks. The country team is working with the Zambian National Farmers Union (ZNFU), the National Association of Peasant Smallholder Farmers (NAPSF), and other institutions and agencies engaged in the natural resources sector to stimulate demand for knowledge and information for agricultural development through innovation platforms.

In Malawi, RIU project has facilitated the emergence of the NIC under the patronage of the Ministry of Agriculture and Food Security. The initial groups of platforms created by the Malawi NIC focus on seven commodities: legumes, soya beans, groundnuts, livestock, fisheries, horticulture and cotton (RIU, 2010). These groups are being facilitated to undertake diagnosis of the systemic blockages that impede innovation. The RIU activities target these blockages.

In Rwanda, the NIC is seen by the Ministry of Agriculture as the most important innovation platform, launched in February 2008 and it is an important arm for national agricultural development strategies (RIU, 2008-2009c). It works on institutional strengthening through networking of individual organizations in the public and private sectors dealing with innovations.

Local innovation platforms to deal with bottlenecks in value chains have come together for Maize, Cassava, Potato and farmer's organizations.

Maize innovation platform is based in Nyagatare District in the Eastern Province and comprises of farmers and organizations involved in the production, processing and marketing of maize – hence they seek to improve performance of the maize value chain. Some of the activities being pursued by this platform include: 'the introduction of post-harvest processing infrastructure for maize', and 'multiplication and dissemination of a new Quality Protein Maize variety M 081' in collaboration with ISAR. Also Renewable Natural Resources Research Strategy (RNRRS) products such as 'New market chain approaches' and 'Together to market' should follow in the implementation process of the maize IP.

Cassava innovation platform is located in Gatsibo District, Eastern province also. This platform involves actors along the cassava value chain (production-processing-marketing). Some of the activities promoted include the multiplication and dissemination of cassava cuttings free disease. Hence, Mosaic Virus Disease (MVD) resistant cassava varieties are planted with the help of ISAR and RADA.

Potato innovation platform is located in Gicumbi District of the Northern Province and put together farmers and organizations involved in the potato production. Due to the accurate lack of potato seed in Rwanda, all the activities turn towards introduction and dissemination of high marketable potato varieties from neighboring Uganda or ISAR-Kinigi. Some of the technologies disseminated by Potato IP include RNRRS products such as "new techniques to multiply potatoes", "positive seed selection", and "farmers learn to profit from saving seed".

Karongi Rural Innovations Platform has brought together small size farmer organizations of Karongi district in Western province, engaged in production and agro processing of fruits and

vegetables. Given the availability of water in the hilly area, the activity being promoted is the hillsides' irrigation to boost a year round fruits and vegetables production using locally made manufactured pumps (RIU, 2010).

This chapter attempted to review available literature related to agricultural innovation platforms and describes briefly their status in the case of Rwanda. Implicit in the literature is the knowledge gap on the essential requirements for sustaining the innovation platforms. The conceptual framework that guided this study is derived from the literature review.

2.6. Conceptual framework

This conceptual framework (Figure 4) illustrates the variables under investigation. In this study, the dependent variable or explained variable is the sustainability of IPs whereas the independent variables or explanatory variables are the four elements with arrows. Figure 4 attempts to illustrate these two different variables and how they relate to each other. Positive relationships between variables denoted by (+) indicate a positive influence while possibly negative relationships are denoted (-). However, each of the independent variables can be either positive or negative depending on circumstances. The signs put in Figure 4 constitute just an illustration of influences which can happen in the initiated IPs in Rwanda.

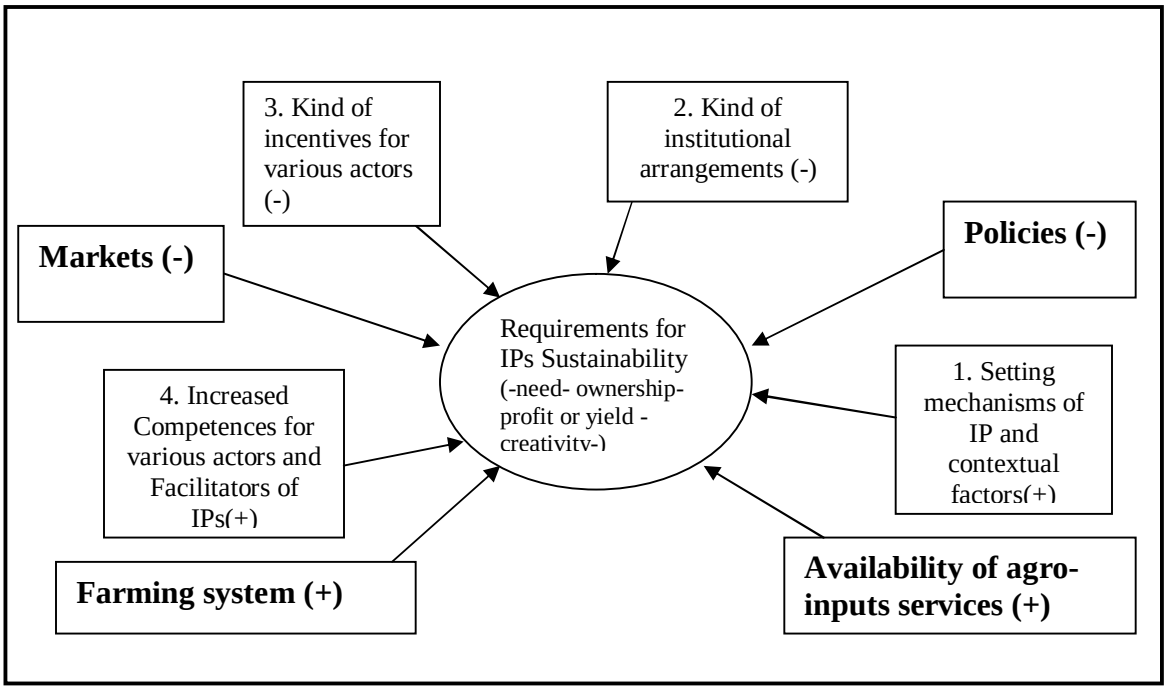

Figure 4: Requirements for sustainability of RIU initiated IPs in Rwanda

Key: +: Positive influence of independent variable on the dependant variable

-: Negative influence of independent variable on the dependant variable

The diagram presents the requirements for an IP to be sustainable. It is hypothesized that the IP sustainability depends on the setting mechanisms and contextual factors, the institutional arrangements put in place, the incentives needed for various actors, and their competences to perform their assigned or expected roles. These elements constitute explanatory variables or independent variables. Other independent variables, not deeply analyzed in this study, are put in bold. They are external or environmental factors that can influence the sustainability of the IPs. They include markets, policies, farming system, agro-inputs availability, etc.

CHAPTER 3: METHODOLOGY

This chapter describes the methodology used from the design through data collection to analysis. Specifically it describes the study area, research design, target population, sampling procedures and samples selection, data collection and analysis tools.

3.1. The study area

The study was conducted in Rwanda involving four agricultural Innovation Platforms (IPs) initiated by RIU project (see Appendix 2). Two of the IPs are located in the Eastern province (Nyagatare and Gatsibo districts), one is in the Northern Province (Gicumbi district) and the other is in the Western Province (Karongi district). The four IPs are located in three different agro ecological zones namely: low, high and very high altitudes and also focus on different crop enterprises as indicated in Table 1.

Table 1: Innovation Platforms established by RIU Project in Rwanda

Name	District	Agroecological zone	Innovation in use
Maize IP	Nyagatare	Low altitude (East)	Maize farming methods
Cassava IP	Gatsibo	Low altitude (East)	Cassava farming methods
Potato IP	Gicumbi	High altitude (North)	Potato farming methods
Karongi IP	Karongi	Very high altitude (West)	Hillsides' irrigation for fruits and vegetables production

Source: RIU report, 2008

3.2. Research design

The study employed two designs strategy; a case study and a cross-sectional descriptive survey. The case study was used to generate relevant qualitative information to meet the study objectives as well as provide a base on which the elements of the cross-sectional survey were to be built. The case study generated background information on the IPs and their objectives, contextual factors (such as the existing initiatives, local infrastructure and local partners), incentives, institutional arrangements and capacities required by various actors.

The descriptive survey was built on elements generated from the case study to explore further the incentives, institutional arrangements, and capacity needs and their perceived importance using a quantitative approach.

3.3. Sample selection and sampling procedures

Sample selection procedures and sample size were dictated by the type of design at hand. While more probability sampling techniques were used to select the respondents for the descriptive survey, non-probability techniques were used to select the case study participants. Case study participants were purposively selected because they possessed vast information about the history, current functioning, opportunities and challenges of the platforms. The participants that were purposively selected included representatives of actors as well as IP committee members. The number of participants varied for each IP and is summarized in Table 2.

Table 2: Case study participants

Name of the IP	Districts	Number of actors participating in the case study		
		Males	Females	Total
Maize IP	Nyagatare	8	4	12
Cassava IP	Gatsibo	10	2	12
Potato IP	Gicumbi	7	4	11
Karongi IP	Karongi	5	2	7
Total		30	12	42

A total of 42 respondents including 30 males and 12 females were selected to participate in the case study.

Respondents for the cross-sectional surveys were selected from all categories of actors, namely: farmers and farmer cooperatives, researchers and extensionists, processors and inputs suppliers, financial services providers, local leaders and policy makers. A sample size of 102 respondents was selected out of a target population of 175 IPs'actors, with a confidence interval of 6.16 at p=0.05 (Table 3). While female respondents were purposively[1] selected from the various IP platforms, a random selection procedure was followed to select the male respondents. Prior to selection of the study respondents, lists of IP actors were obtained from RIU office and this formed the sampling frame.

The lists of IP actors were stratified by actor categories and random selection using the table of random numbers was used to select the study respondents as summarized in Table 3.

[1] The basis of purposively selecting female respondents was because very few women were involved in the IP activities and it was important that their views are included in this study.

Table 3: Sample composition for the survey

IP's name	Number of actors	Actor categories					Total sample
		Producers	Traders	Researchers	Financial institutions	Local leaders	
Maize IP	55	17	1	9	1	2	30
Cassava IP	60	26	1	2	1	3	33
Potato IP	37	19	1	4	0	1	25
Karongi IP[2]	23	9	2	2	1	0	14
Total surveyed	175	71	5	17	3	6	102
%	100	40.6	2.8	9.7	1.7	3.4	58.3

Source: our survey, 2010

As part of the cross-sectional survey, a capacity needs assessment activity was conducted among the same IP actors. For this activity, 144 respondents were selected from the same target population (175 IP actors) to participate in the competences scoring. The key competences for each category of actors were agreed upon in a feed-back workshop. These competences were placed on a Likert scale (levels 1-10) to measure the importance and need for capacity building for each competence (Appendix 7).

3.4. Data collection procedures and tools

The tools for data collection and their related procedures are tied back to the design of the study (Appendix 8) which in turn is based on the study objectives.

3.4.1. Tools for the case study

The tools used to collect the case study information included Focus Group Discussions (FGDs) and participant observations. FGDs were used within the recommendations of Merton, Fiske, and

[2] The Karongi IP is named according to location because it is locally based and combine fruits and vegetables instead of focusing on one crop like other IPs do

Kendall, (1990, p.137) to collect information that pertained to the IPs intended objective of spreading innovations. As the study covered four IPs, four FGDs were conducted, one per each IP. A total of 42 key informants participated in this exercise. Each group comprised between five and 12 participants to ensure that each participant was given a chance to express its own views. The FGDs were moderated by the researcher while a rapporteur recorded notes to make sure that all participants' views were captured. In addition, a tape-recorder was also used to back-up the written notes. Appendix 4 shows the checklist that guided the focus group discussions to ensure that the relevant aspects of the study were discussed.

Participant observations were used to validate and or complement some of the information generated in the FGDs. The researcher observed the physical setting and environmental factors within which IPs activities took place; such as existing initiatives, local infrastructure and local partners. This required the researcher to participate in the IPs planned activities supported by RIU, such as workshops, field visits or learning events on farming techniques. Researcher observations generated insight and better understanding of the context and activities implemented by the IPs. The observation guide (Appendix 3) included details on the location of the IP, the office, the key players, the committee composition and the IP facilitators, attendance and participation of members, the incentives received from RIU, the local initiatives and partners, the challenges faced during the process and coping mechanisms. IPs documents like MoUs, action plans were visualized and consulted. The information generated from the case study guided the design of the instrument for the cross-sectional survey.

3.4.2. Tools for the cross-sectional survey

Three instruments were used in the cross-sectional survey: a semi-structured interview schedule, a feedback workshop, and a capacity needs rating scale. Initially, a semi-structured interview schedule was used to collect quantitative data on factors influencing the performance of IPs, incentives, institutional arrangements and inventory of competences needed by various actors. The interviews were administered face to face to the different categories of respondents from the four IPs. Two versions of the interview schedule were developed, one targeting producers and the other customized to the rest of the actors (Appendixes 5&6). The interview instruments were pre-tested with five individuals each one representing a different category of actors. However, these respondents in pre-test were excluded in the sample for the survey. A total of 102 IPs actors were interviewed (Table 3).

Secondly, feed-back workshops were used as a tool for the respondents to rate the competences under guidance of the researcher. Given the number of IPs surveyed, four feedback workshops were planned and conducted after the cross-sectional survey. They were convened and supported by RIU-Rwanda Project to provide feed-back from the researcher about the main findings to the survey and thereafter the scoring sheets were filled individually by each participant. A total of 144 IPs actors participated in the four workshops and rated the competences. These feed-back workshops helped to validate the findings of the research.

3.5. Validity and reliability of the study instruments

To ensure validity and reliability of the instruments, the study was conducted in three stages.

In the first stage, the researcher made a review of RIU project documents and other related literature to develop an appropriate FGD outline. Referring to RIU documents, the validity of the outline was half ensured. Additional validity was provided by the University Supervisors who corrected the research instrument.

In the second stage, the researcher carried out the pre-test of the FGD instrument to ensure its reliability. Adjustments were made after the pre-test with the help of the academic supervisors. The basic data from FGDs (Appendix 4) were thereafter collected with a rapporteur well trained on how the exercise should be conducted and using a tape-recorder for cross-checking the written notes.

In the third stage, the FGDs became a base on which the elements of the cross-sectional survey were built. The questionnaires developed were also reviewed by supervisors before the pre-test and the main survey (Appendix 5&6).

3.6. Data analysis tools

The qualitative data generated through focus group discussions and key informant interviews were analyzed by content analysis guided by themes developed by the researcher. Five themes were developed based on the study objectives and questions: achievements of IPs, contextual factors that influenced achievements, incentives, the institutional arrangements and the competences needed by various actors.

The quantitative data generated through the survey using individual interviews and competence rating were coded and entered into spreadsheets and analyzed using the software of Statistical Packages for Social Sciences (SPSS). Descriptive statistics including means, medians,

frequencies, percentages were obtained. The means were used to rank the competence needs with respect to their relative importance using the medians as reference points. Cross tabulations were done to compare variables across IPs. Chi square tests were performed to test the independence between variables. Further, SPSS helped to perform an additional analysis using the extraction method-principal component and factor analysis (Costello and Osborne, 2005). The Principal Component Analysis (PCA) is the default method of extraction in many popular statistical software packages, including SPSS. However, PCA is not a true method of factor analysis and there is disagreement among statistical theorists about when it should be used. Some argue for severely restricted use of components analysis in favor of a true factor analysis method (Bentler & Kano; Floyd & Widaman; Ford, MacCallum & Tait, ; Gorsuch; Loehlin and Widaman as cited by Costello and Osborne, 2005). In this study, PCA permitted to get components matrix that clustered the competences into different themes for each category of actors.

For the relationships among IP actors, Social Network Analysis (SNA) software was also used to depict the main partners in the IP activities. Tables, graphs, network maps and photographs were used to present the data.

CHAPTER 4: RESULTS AND DISCUSSION

4.1. Description of RIU project in Rwanda

RIU is a five year DFID/UK funded project, launched in Rwanda in February 2008 (RIU, 2008). Figure 5 below illustrates the layout of the project in Rwanda.

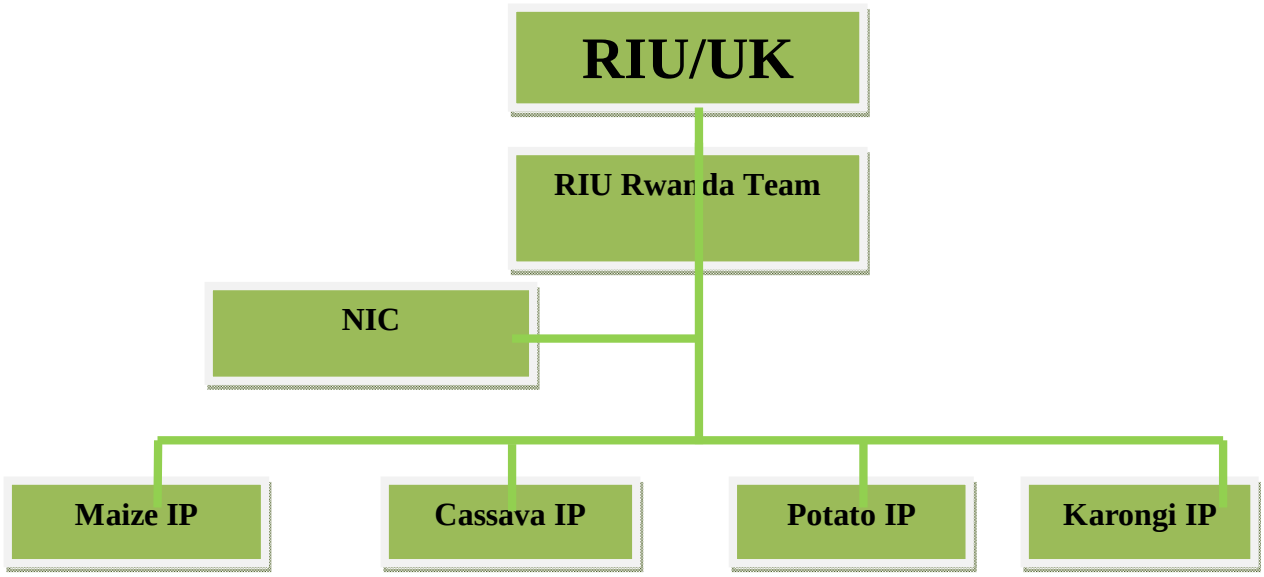

Figure 5: RIU Project organogram

Funding from DFID is managed by RIU-Rwanda Team in Kigali under the supervision of the Ministry of Agriculture (MINAGRI). RIU Rwanda Team is composed of: a country coordinator in charge of the overall activities, a program assistant in charge of finance and administration, a program facilitator in charge of field activities implementation and a planning & monitoring facilitator (RIU, 2010). To oversee and drive the RIU project in Rwanda is a National Innovation Coalition (NIC) comprising of eleven representatives of cluster organizations drawn from key public-private organizations involved in the agriculture sector in Rwanda. NIC is led

by the Private Sector Federation (PSF) of Rwanda and is charged with not only the establishment of the IPs but also the policy dialogue at national level. The NIC helped the RIU Rwanda Team to initiate the four Innovation Platforms: Maize, Cassava, Potato and Karongi IPs (Figure 5) by doing what?

Each IP has a Committee composed of: president, vice-president, secretary and two advisors. However, Maize and Cassava IPs have advisors in their respective committees while Potato and Karongi IPs do not have such position in their structure (RIU, 2009). The structure of the committee was not imposed by RIU. It was an initiative for IPs to include advisors or not. The four IPs initiated by RIU are different in terms of their history, composition of actors, and operational arrangements but they also share some similarities in terms of strengths and weaknesses. The IPs are described in detail with respect to their establishment and operations.

4.2. History of Innovation Platforms (IPs)

From 2000, several IPs were established in Rwanda by different NGOs as well as the Ministry of agriculture (MINAGRI). Setting up IPs for RIU in the case of Rwanda was a process comprising of several activities: the country assessment exercise, the design of the Country Strategy Plan, the drawing of the Country Implementation Plan and the signing of the Memorandum of Understanding (MoU) between various partners in Rwandan Agriculture Innovation System.

An RIU Country Assessment Team visited Rwanda early February 2007. Based on the results of a number of interviews and field visits, a review of available literature, and extensive Team discussions, the Team concluded that there were excellent opportunities for the RIU Project to operate in Rwanda through Innovation Platforms. The initial mapping of the Rwanda

“innovation system” resulted into the creation of the National Innovation Coalition (NIC), a cluster of 11 members drown from public-private organizations involved in Rwandan agricultural development. It was then envisioned that this coalition would manage the resources necessary to facilitate up to six Innovation Platforms, as opportunities emerge and implementation capacity enhanced by RIU Project. This NIC had to work closely with district level partners, given the central role that the districts play in Rwanda's decentralized structure. Thus, RIU IPs were set-up to operate at district level (RIU, 2008).

RIU Project in Rwanda was launched in February 2008. In May 2008, the first three IPs were established by NIC and RIU Rwanda Team in three districts: maize IP in Nyagatare, cassava IP in Gatsibo and potato IP in Gicumbi. They were drawn from a long list of potential platforms (rice, cassava, maize, dairy cattle, coffee, Irish potato, wheat and passion fruit). The fourth IP was initiated later in November 2008 by RIU coordination with the help of AJEMAC, a championing farmer organization in Karongi district, Western Province (RIU, 2008). Except Karongi IP established due to AJEMAC initiative with RIU support, the other three IPs were set-up by RIU full engagement and followed the same steps: contacting the Mayor to secure the district support, mapping local partners in the district, setting a meeting on problems and priorities identification, creating the IP, elaborating an action plan, implementing, monitoring and evaluating activities regularly. The creation of the four IPs was based on existing favorable conditions and political context of the Crop Intensification Program in Rwanda which had allocated maize in the East, cassava in the middle-East and Irish potato in the North. The enabling environment for RIU IPs’ development comprises the Rwadan state policy of land consolidation, the natural soils and climatic conditions, as well as an abundant and hard working labor with strong local organizations in agriculture sector. Therefore, infrastructure to start with

and supportive local organizations were identified and linked by RIU. Physical resources were mobilized from all sides to kick-start IPs'activities. These include farms and labor of IPs actors.

The Maize IP was initiated with involvement of the Rwanda Development Organisation (RDO), a national NGO which is also a member of NIC. RDO was already involved in promoting maize production in Eastern Province even before the initiation of RIU. MINAGRI was also supporting maize production in that area following the Crop Intensification Program mapping. Furthermore, RDO had set up a subsidiary organization, the Rwanda Development Investments (RDI) to add value on maize harvest using processing techniques. However, RDI failed to pay back maize farmers who had availed their production for maize flour processing. RDI weaknesses to promote maize industry and marketing forced members of the IP to create Nyagatare Maize Investiment Group (NYAMIG) which is a business arm to focus on marketing in a win-win approach involving all Maize IP actors.

Besides maize IP, RDO promoted cassava IP in Gatsibo District, Eastern Province. Cassava was chosen for two reasons: it was the most profitable crop and also served as a food security crop for households. Due to the Cassava Mosaic Disease (CMD) this crop was being abandoned by farmers in Eastern province whereas in the Southern province, ISAR and a farmer syndicate named INGABO were promoting new cassava varieties resistant to the CMD. The intention of RIU was to scale-out the uptake of CMD resistant varieties in high potential areas like Gatsibo district. For this reason and using the experiences of the NYAMIG, RDO influenced the Cassava IP to start a Cassava Investment Group (CIG) in order to promote cassava industry in the district.

The Potato IP establishment was encouraged by IMPUYAKI, a farmers' cooperative in Gicumbi district which has long experience in potato production. IMPUYAKI is a member of ROPARWA which is a NIC member. The cooperative has about thirty hectares of land from the

Government of Rwanda in Kaniga sector and seem to lead potato growing in the whole district. Irish potato was chosen for this district, because it is a main potato growing area which is always constrained by lack of potato seeds. The crop was also being promoted by the Catholic Church brothers (Frères de l'Instruction Chrétienne (FIC)) since the early 1990s. With funding from RIU and technical support from ISAR, this platform has constructed a Greenhouse for potato seeds multiplication in Kaniga sector of Gicumbi District, where farmers grow wheat and Irish potato in rotation on the fields of their cooperative, IMPUYAKI. In addition, the IP is promoting positive potato seeds selection on farms in collaboration with local partners such as CARITAS, URUGAGA-IMBARAGA and IMPUYAKI. The positive selection technique of seeds consists in an empirical identification of healthier potato in the field, tie them with red colored ribbons and earmark them before the harvest as the best seeds for the following season.

Farmer organization IP (Karongi IP) was initiated, as explained above, with the help of AJEMAC, a local NGO. Karongi District has high potential for fruits and vegetables and indeed Karongi Farmers, Processors and Traders Association supplies most of the fruits and vegetables to Kigali city (AJEMAC, 2009). The focus of Karongi IP was to ensure year-round production of fruits and vegetables using hillsides' irrigation (gravity water from the hill to the valley-bottom). The AJEMAC manufacture locally made pumps (30.000 Rwf each) and RIU supported beneficiary farmers to acquire the pumps. The Karongi IP received from RIU support, pipes to reconstruct the water canal which was destroyed by severe soil erosion in 2008.

For the sustainability issues of different IPs, the MoUs between platform members themselves on one hand and RIU on the other hand with local organizations are currently under signatory.

4.3. Current status of the RIU Innovation Platforms

The Research Into Use (RIU) project in Rwanda was launched in the country in 2008 and three IPs including maize IP in Nyagatare, cassava IP in Gatsibo and potato IP in Gicumbi were established in May of the same year. The fourth IP was initiated later in November 2008 by RIU coordination and a farmer organization, AJEMAC, in Karongi district, Western Province. Whereas in the beginning RIU supported the four IPs for their meetings, seeds and fertilizers, two of the IPs are being phased out since March 2010. The IPs being phased out are those of Cassava and Farmer organizations. RIU argues that it needs to focus its support on a few IPs to enhance impact. Discussions with the representatives of the Cassava and Farmer organizations platforms were positive about the phasing out of their IPs from RIU support and were committed to continuing with the IPs activities on their own. To date the Cassava and the Farmer organizations IPs continue to operate after the withdrawal of RIU support and have since solicited support from new partners including MINAGRI and USAID.

RIU however continues to extend its support to the Maize and Potato IPs given that maize and potato value chains were identified as a key priority by the Government of Rwanda within the National Crop Intensification Programme. In RIU vision and reform, the Maize and Potato IPs have the potential to contribute significantly to national/local development agenda given the opportunities that IPs offer for multiple actors to engage. This is not to underestimate other institutional and organizational weaknesses that currently limit IPs' capacity to deliver (RIU, 2010). Table 4 highlights some of the strengths and weaknesses that IPs face as perceived by the study respondents.

Table 4: Critical strengths and weaknesses of RIU IPs

	Critical Strengths and Weaknesses	
IP	**Strengths**	**Weaknesses**
Maize	High quality maize production	Insufficient driers, shelling machines and irrigation techniques
Potato	High quality potato seeds production in a Green-house	Lack of warehouse equipped to store potato harvested
Cassava	Intensive cassava seed multiplication Cassava production increase and various post harvest products	Insufficient cassava postharvest techniques and processing equipment
Karongi	Year-round production of fruits and vegetables using gravity water irrigation	Lack of strong committee to organize the platform and insufficient funds to purchase the pumps for irrigation.

Other general strengths and weaknesses that cut across all the four IPs include mainly good soils and climate conditions, market guaranteed, moral vision, investment groups' creation; and despondently lack of strategic plan with insufficient skills in proposals writing to get funds from donors and move on. While these platforms have the same focus of spreading innovations, they are evolving in different environment, working on different crops and acquiring different characteristics.

4.4. Characteristics of Innovation Platforms

The basic information about the IPs with respect to the membership recorded by RIU (2010) is presented in Table 5.

Table 5: Characteristics of RIU innovation platforms

Name	Number of members		
	Men	**Women**	**Total**
Maize IP	41	14	55
Cassava IP	44	16	60
Potato IP	27	10	37
Karongi IP	16	7	23
Total	128	47	175
Percentage	73.1 %	26.9 %	100%

Source: RIU report, 2009

Table 5 indicates that there were less female members in the IPs (27%) than males (73%). Males are always greater in numbers and also occupy top leadership positions in cooperatives. The membership however fluctuates given that new members are registered while other members also exit the IPs. The IPs membership is dominated by producers who constitute over 70% of the total membership. The other members of the IPs are from institutions like cooperatives; hence the narrative of respondents focuses more on the producers (farmers).

4.5. Socio-economic characteristics of producers involved in the IPs

The socio-economic characteristics of producers involved in the IPs are summarized in Table 6. The study specifically focuses on gender, education level and household size.

Table 6: Socio-economic Characteristics of producer IPs members

Characteristics	Frequency (n=71)	%
Gender		
Males	39	54.9
Females	32	45.1
Age in years (Mean=45)		
22-29	2	2.8
30-39	17	24
41- 49	28	39.4
50-59	20	28.2
60-69	4	5.6
Marital Status		
Married	62	87.3
Single	2	2.8
Divorced	1	1.4
Widow	6	8.5
Family size (Mean=7)		
1-3	3	4.3
4-8	50	71.4
9-12	15	21.4
>12	2	2.9
Education level		
No Formal Education	3	4.2
Attained at least Primary Level	38	53.5
Attained at least Post-primary level	10	14.1
Attained at least Secondary Level	19	28.3
Religion		
Protestant	37	52.1
Catholic	31	43.7
Muslim	1	1.4
Seven Day Adventist	1	1.4
Jehovah adepts	1	1.4
Responsibilities in IPs		
President	1	1.4
Vice-President	3	4.2
Advisor	1	1.4
Ordinary member	66	93.0

Source: our survey, 2010

Gender

The sample for individual interviews comprised of 55% male and 45% female producers. Given that the producer membership in IPs was 27 % females and 73% males (Table 5), the proportion of females in the sample was correspondingly smaller than that of males. However, the study included all the female producers and thus their number was augmented in this sample (from 27% to 46%). In terms of gender, representation in the IPs is the reverse of the national gender picture. In Rwanda 70% of the farmers are women (Blackden and Bhanu, 1999). Despite women being the majority in agricultural production, they are least represented in such initiatives which tend to commercialize agriculture or have a monetary benefit. The men tend to dominate such initiatives as indicated in the membership of women in IPs. One of the female respondents explained this in a cultural context that women especially in rural areas are supposed to stay at home; to look after the family and are not expected to represent their households while the husband is still alive.

Age

Table 6 reveals that the youngest producer was 22 years while the oldest was 69 years. The majority of the respondents were relatively young, with an average of 46 years. It is observed that 39 % of the sample had age range between 36 and 54 years old. The majority of producers interviewed are distributed between 30 and 59 years which is a productive age range.

Marital Status

The majority (87.3%) of the respondents were married; (8.5 %) were widowed; (2.8%) were single and (1.4%) divorced. The spouses of the most of the widowed respondents were killed during the atrocious genocide in Rwanda in1994. Most of the female household heads were from this category as more men died during the genocide than women.

Family size

Most respondents (71 %) reported a family size ranging between four and eight members, with an average family size of 7 members. The family size is within the range of the national census results (8 members) found by MINIPLAN (2002).

Education level

In terms of education level, most of the respondents were literate: 54% had attained at least primary education, 14% had attained at least post-primary, 28% had attained at least secondary education, and only 4% had not had any formal education. For the IP membership, high level of education is not a requirement. The low level of education for the majority of producers (54%) does not enable them to get professional employment and resort to farming for a livelihood.

Religion

There are two major religions in Rwanda, Protestant and Catholic. More than half (52%) of the respondents were Protestants and 44% were Catholics. There has been a growing community of Protestants as a post-genocide phenomenon. Before genocide, Catholics were about 70% of the population (MINIPLAN, 1991). However, IP's membership is not related to religious affiliation.

Responsibilities in the IPs

The majority (93%) of respondents were ordinary members of the IPs. Nevertheless, all these ordinary members had some responsibilities in their respective villages. Some of them are representatives of cooperatives (50%), local leaders (15%), religious leaders (10%) and (25%) without any leadership role in the community.

Occupation

The major occupation (90%) for most of the respondents was mixed farming (growing crops and rearing animals) and only 10% were involved in crop agriculture alone. Mixed farming has an

advantage of generating farm yard manure from livestock which is used as organic fertilizer for the crop production. Besides occupation, the wealth depends on land and livestock keeping.

Land ownership and livestock keeping

The land currently being used by the producers is inherited, purchased, hired or given by the Government of Rwanda. Table 7 presents the land tenure system and land size owned by the producers.

Table 7: Land size owned by producers in the IPs

Land Tenure System	Number of Respondents under the tenure system (n=71)	Percentage	Average land owned (Ha)
Area inherited in Ha	50	70.4	1.47
Area purchased in Ha	33	46.4	2.26
Area hired/rented in Ha	16	22.5	4.41
Area given by Government (after 1994 genocide)	16	22.5	6.59
Area average			4.53

Only 70% interviewed producers have inherited land, 46% were able to purchase some portion of land and 22% have got land from the Government and 22% hire lands from their neighbors. Land ownership (Table 7) has implications especially on fertilizer use because those who hire land avoid this agricultural practice; the land is not theirs and the holder can repossess it any time. Such farmers, the non-holder are reluctant to invest in soil fertility practices.

The mean acreage (4.53 ha) for the producers in IPs is higher than the national average (0.50 ha/farmer) reported by MINAGRI (2008) because the research involved two districts of western province, which are recently resettled after the 1994 genocide. In this area, people tend to own larger pieces of land (10.62 ha/farmer) than in other parts of the country (e.g Karongi, 1.78 ha/farmer). In addition, there were three outliers with over 20 ha each and these pulled the mean

upwards. When the outliers are excluded from the list, the average acreage (4.75 ha) is not significantly different with the one of other IPs assessed.

The livestock keeping is also important for producers to recycle their farms. Given the population density per acre, the farm yard manure is needed to produce cash and food crops on the unfertile soils of Rwanda washed by erosion. The use of inorganic fertilizers is newly introduced and still low in the IPs like it is for the whole country. The average cattle kept is high (9 animals) in Maize IP compared to other IPs due to the returnees from Uganda and Tanzania who came back home after 1994 genocide with large herds of animals.

The land size and cattle keeping show that Maize IP producers are advantaged compared to other three IPs' members. These differences in landholdings and livestock ownership between Eastern province farmers and other provinces are typically explained by the Rwandan situation of long exile and return from Uganda and Tanzania with the redistribution of land done by the Government in that area.

It can be concluded that, among the producers' socio-economic characteristics under study, only the land size seem to have strong influence on membership to IPs while education, religion, occupation and marital status, sex, age, family size and cattle keeping do not significantly determine the involvement in the IPs' activities. Table 8 presents the summary of Pearson Chi-Square Tests for this relationship.

Table 8: Relationships between characteristics of Producers and IP membership

Characteristics	Test statistics (Chi-Square)	
	Value	Asymp. Sig. (2-sided)
Education level	37.033(a)	.094
Religious	9.475(a)	.662
Major occupation	4.308(a)	.230
Marital status	8.368(a)	.498
Sex	2.710(a)	.439
Age	82.999(a)	.687
Family size	29.435(a)	.645
Land size	69.635(a)	.042*
Cattle keeping	35.529(a)	.126

**Relationship is significant at 0.05 significance level (p).*

(a): The number of cells expected count less than 5. The minimum is however calculated.

The IPs process of implementation demonstrated solidarity, commitment, cooperation and dynamic involvement of the IPs actors. Slowly, strong ownership of the innovations developed. The scores given below by key informants during the FGDs reveal that the activities on the ground demonstrate a good functioning of IPs at the moment of the field research.

4.6. RIU innovation platforms performance

The performance of IPs was assessed using a scale of 0 to 10 in terms of performance as perceived by each IP actors: very strong (9.0-9.9), strong (8.0-8.9), moderate (7.0-7.9), week (6.0-6.9), very week (<6). The exercise was done during separate FGD where the participants agreed on the scale and the rates before individually scoring the performance of their own IPs. Average scores were obtained for the performance from 2008 to 2010 for each of the IPs and the results are summarized in Figure 6.

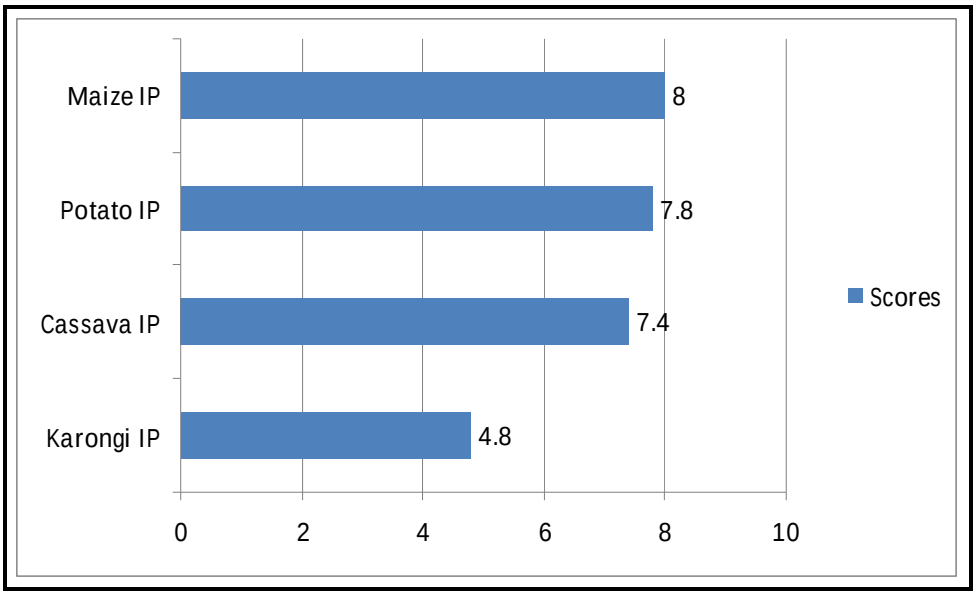

Figure 6: Performance scores for IPs

In view of the respondents, the Maize IP is strong, Potato and Cassava IPs were rated to be performing moderately (7-7.9) while Farmer organisations IP (Karongi IP) was rated as being very weak (<6). Some indicators are seen on the ground. Maize platform is continuing with an investment group development. Potato IP is working well with a Green house establishment and seeds multiplication. The two other IPs lag behind. Nevertheless, Cassava IP is in the process of setting up a Cassava Investment Group while Karongi IP has no clear strategic plan. It may focus on the dissemination of gravity water irrigation using pumps manufactured by CELLINO (Cellule d'Innovations) of AJEMAC. However, the price of pumps is not affordable for small-scale farmers (30.000 Frw/pump). This implies support need instead of phasing out. The performance of Karongi IP is rated weak by its own members.

Using the same scale, the key elements for IPs development were rated as follows (Table 9).

Table 9: Scores of main features for IPs activities development

Main features for IPs activities development	Scores
NIC champion	9.5
Environmental/favorable conditions	8.3
Innovation in use	8.0
Incentives received from RIU	7.7
Challenges faced and coping mechanisms	7.0
Key players	7.0
Number of members	6.5
Activities plan	6.2
Existence of the Platform	6.2

Data from key informants'scores show that the NIC champions (like RDO, ROPARWA, AJEMAC, ISAR and RADA) are active in the IPs activities. Environmental conditions and innovation in use are considerd strong (8.3), the number of IP members is weak (6.5) because of changing over time whereas the existence of the platform is weak (6.2) due to the lack of an office and basic equipements for all IPs assessed. For sustainability issues after RIU ends which is the core of the current study, these results imply that the project should emphasise on IPs' activities business plans which are scored weak (6.2). On the Table 9 above, there is no one key element qualified very weak (<6).

The results consequently imply that environmental and other favorable conditions such as natural soils and climate conditions, and governement policy permitted IP actors to use the financial and material support received from RIU and put into practice innovations which is demonstatated by the strong score (8).

Also, the current performance is shown by the increament of membership in the IPs (Figure 7).

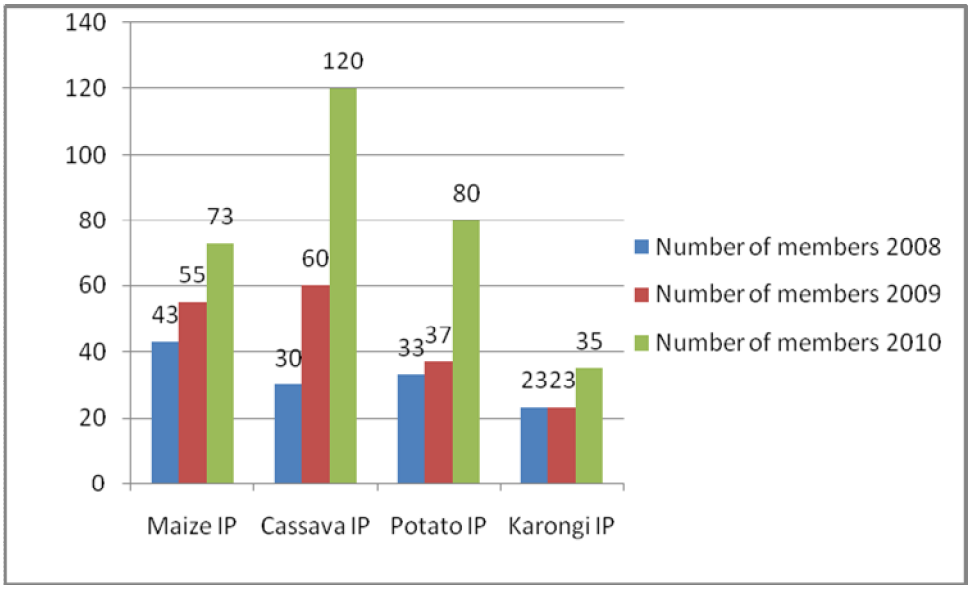

Figure 7: IP membership dynamics from 2008 to 2010

There has been progression in membership in all IPs from 2008 to 2010. However, more dramatic growth in membership in the same period was recorded in the Cassava IP because of the preliminary results of cassava cuttings dissemination in Gatsibo district during the year of 2009. Many cassava producers were attracted by the new varieties resistant to Cassava Mosaic Desease. The overall growth in membership in the IPs does not mean that none dropped off along the way. Some members dropped off due to reasons related to failure to meet their expectations mainly financial and inputs supply. This was acknowledged by some of the members who dropped out of the IPs. However, new members joined the IPs and the membership increased overall. New members are attracted to join the IPs for various reasons including; observed increases in farm yields and household income among the producers as well as networking with others while using new ways of doing things. In addition, farmers changed attitudes and mentality of people given the progress made by IP members in rural area. Also new members are attracted to reap the benefits. Financial support from RIU to finance meetings, and

overall achievements of the IPs with respect to their intended objectives also influenced the IP membership increase.

4.7. Perceived achievements of IPs

RIU project was expected to work within the existing national development frameworks, build on existing structures as well as processes and initiatives. The most important achievements of RIU initiated IPs in Rwanda include; the establishment of effective multi-stakeholder collaboration and the strengthning of farmer-groups. Using a scale from 0 to 10 to rate the IPs' performance during FGD, RIU achievements were ranked and the results summarized in Table 10

Table 10: Major achievements perceived by IP actors

Major achievements	Scores
Raise adoption of new technologies and processes to sustain yields	9.5
Lead to new market opportunities for producers and processors	9.2
Stakeholders' networking	9
Improve stakeholders'participation in R&D	8.5
Identify priorities and opportunities	8
Trace behind when the project ends	8
Focus on the most promising options for reducing poverty, stimulating economic growth and protecting the environment	7.5
Ensure that use of innovation isn't dependent on RIU involvement	7.5
Policy dialogue and institutional environment for innovations which send out signals to potential users	6
Monitoring and learning processes	5.5
Empower research users to turn information into innovation	5

From Table 10, it can be observed that the main achievement is related to spreading innovations in rural areas using IPs. Raising adoption of new technologies and new markets with stakeholder networking were the most highlighted (9.0).

The market opportunities are notably associated with maize, cassava and potato producers. Traders in Kigali town were attracted by the first harvest for above crops in 2009. Also, the improved participation of stakeholders in identifying priorities was rated strong (8.5). Hence the platform would be sustained when the project is ending (8). As confirmed by respondents, this means that some of the activities would be found continuing on the ground after RIU project termination.

To illustrate the networking of actors for each IP, Social Network diagrams in Figures 8-11 show the nodes of the networks. While nodes represent the people or institutions, joining lines indicate relationships among the actors or nodes. Numerical values were used to establish the strengths of the relationships. Values were assigned to characteristics such as how often they are in contact per week, the perceived usefulness or reliability of the information obtained, frequency of meetings, the timeliness, etc. The information was provided by IP members individually during working sessions conducted by the researcher separately with each IP. A scale of 1-5 was used where 1 is the minimum and 5 maximum.

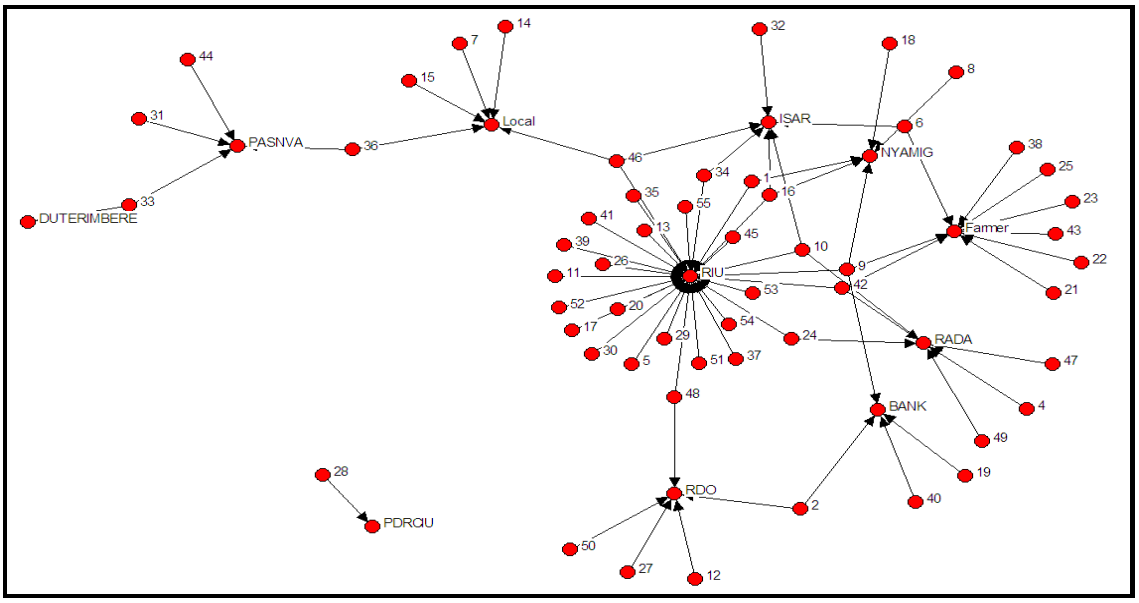

Figure 8: Maize IP social network (55 members)

In maize IP, RIU takes the lead in the network with attraction of half of actors. However, PASNVA, local leaders, ISAR, NYAMIG, farmers, RADA, the Bank and RDO are also key players in the area. PDRCIU which is an agricultural project is out of the network and attracts only one member. It is therefore isolated in the overall network.

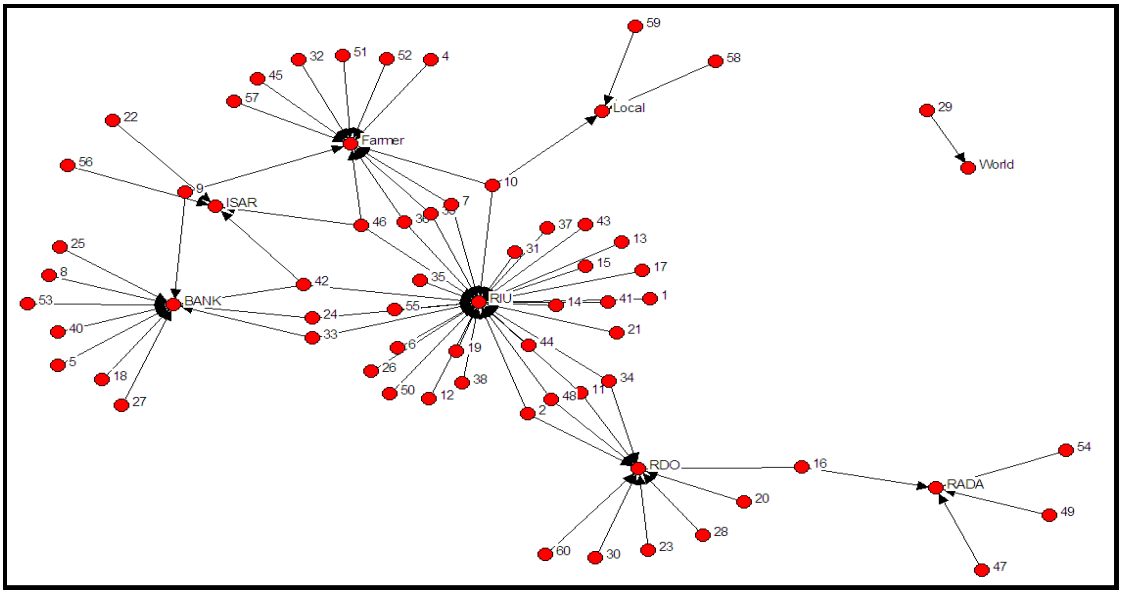

Figure 9: Cassava IP social network (60 members)

The Cassava IP social network is the largest of all the IPs under study and attracts up to 60 members. Figure 9 shows that the various actors within the network and the way they link with each other. Note that the majority of farmers are directly linked to RIU and through the farmers, RIU indirectly networks with other institutions/groups of farmers including banks, ISAR, other farmers, local leaders, World vision, RDO and RADA. The strength of these networks however is measured by the number of farmers through whom RIU links to other institutions. One member for example links RIU to World vision implying a low level of networking with the IP members. Inclusion in such social network provides vital access to information, social support, confidence and the ability to participate in collective life of the IP.

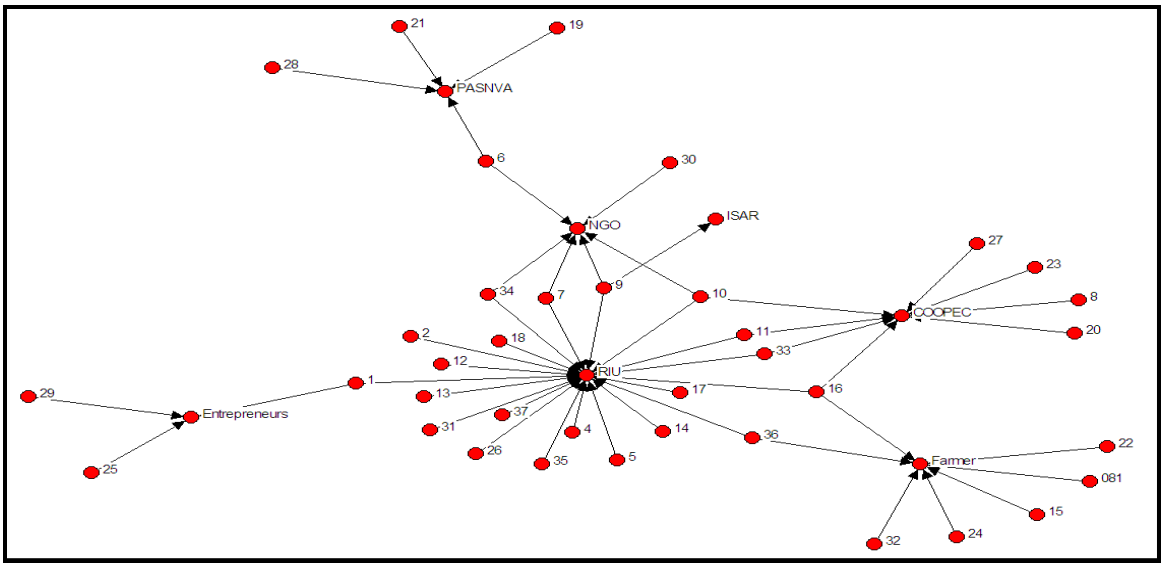

Figure 10: Potato IP network (37 members)

For Potato IP network, 37 members are mainly linked with RIU, NGO, PASNVA, COOPEC, farmers' organizations and entrepreneurs. The COOPEC (Cooperatives d'Epargne et de Credit or Savings and credits cooperatives) seems to attract a good number of actors after RIU. This

demonstrates the importance of credits organizations in energizing IP activities. The NGO and extension services (PASNVA) are not influencing as expected from the Ministry of Agriculture. ISAR, with the nearest working station located in Musanze district neighboring Gicumbi, is almost absent. It was able to attract only one member. That is critical for a Research organization and expected interventions in the IP development. Nevertheless, entrepreneurship needs also to become more active as long as RIU seeks strong participation from local actors.

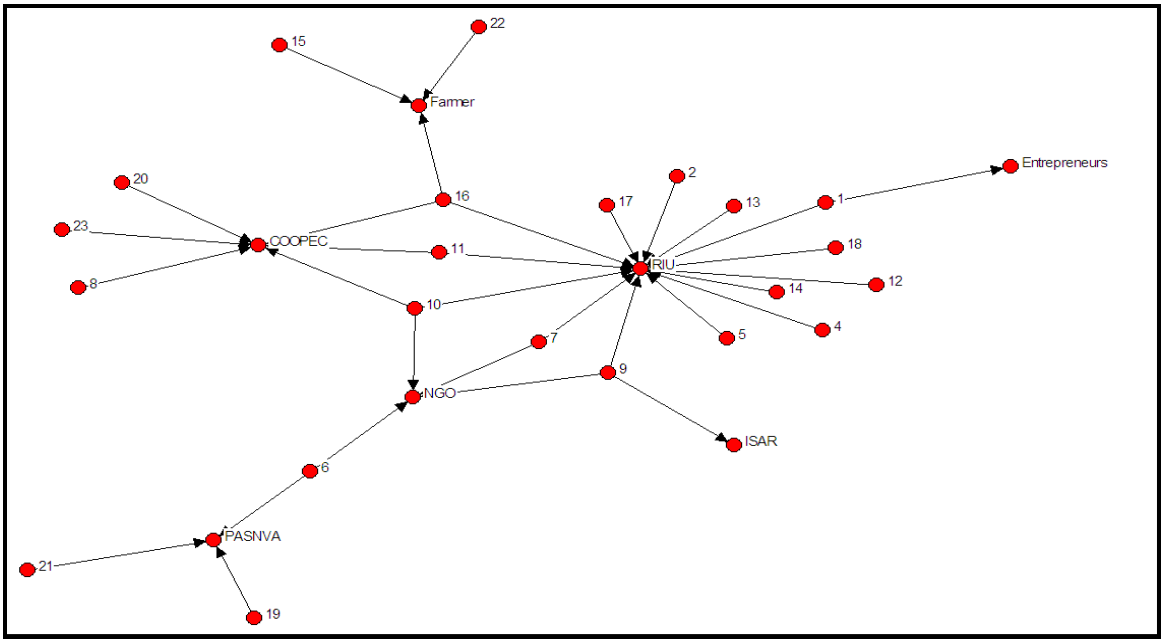

Figure 11: Karongi IP Platform social network (23 members)

In Karongi IP social network, with 23 members, it can be observed that RIU comes first and then follow COOPEC, NGO, PASNVA and farmers' organizations while ISAR and Entrepreneurs are less active in this IP. The nearest ISAR station is based in Gakuta at 60 km from Karongi IP location. There is no excuse for local partners to miss out such social network.

In the overall networks, RIU is the main player because the contacts, usefulness of the information, frequency of meetings and timeliness of the project were highly rated by all IPs

members.The value of these networks is to help to understand the social structures and characteristics of relationships between the actors and institutions in the areas where the platforms operate (Clark, 2006). It is not good to work within unknown social structures. This is the reason why it is so important to identify key actors and understand the relationships they have with local people and their surroundings. These social networks are part of understanding the flow of information within the IPs and how RIU Project relates to existing partners in different areas of Rwanda.

In this study, SNA helped to identify those who can support the work, block efforts or take the lead after RIU phases out its support. The survival and sustainability of the IPs will depend on the number and usefulness of their networks. For instance in the Maize IP, as far as sustainability is concerned after RIU ends support, results show that farmers themselves, RADA, ISAR, RDO, NYAMIG, local leaders, PASNVA and banks would take the lead without waiting for external support. In cassava IP, the bank, ISAR, farmers, local leaders, RDO and RADA would lead activities while in Potato IP, the lead should be taken respectively by COOPEC, farmers, NGOs, PASNVA and entrepreneurs. In Karongi IP, the lead belongs to COOPEC, PASNVA, NGOs and farmers themselves.

4.8. Institutional arrangements for IPs functioning

Before RIU interventions in Rwanda, there was a total lack of networking between actors alongside the crops value chain (RIU, 2008-2009a). Increasing relationships of different actors and supporting them to network was in itself innovative for RIU. It couldn't be effective without certain binding mechanisms to be put in place by platform members and local institutions. This

justifies the memoranda of understanding (MoUs) and collective action plans elaborated by the IPs under the cover of RIU support. The process helps to establish mutual perceptions, trust and vision. It helps also to negotiate deals with actors in a transparent manner. The purpose of these MoUs is to assign various roles to public, private organisations and individuals involved in the networks, partnerships and alliances.

Right from the design, there was consciousness on the part of RIU to address the institutional arrangements required between IPs' actors specifically to target public-private and social goals such as poverty reduction and sustainability (RIU, 2007). There was a minimum requirement of institutional settings such as routine norms and ways of working to get the IPs started. The IP required for instance members to meet once a month. Public-private sector partnerships were an institutional arrangement perceived to promote innovation process. This idea needed some clarifications throughout the MoUs developed and agreed upon by all actors. RIU hoped that individuals, public and private organizations will share roles and responsibilities in their MoU to address collectively emerging issues.

Institutional arrangements were assessed amongst the four RIU innovation Platforms using FDGs, observations and individual interviews. RIU and IPs documents were also consulted. By the time of this research, only NIC members' MoU was operational. However, three types of MoUs were to be signed to streamline the collaboration amongst the members of each platform on one hand, between RIU and the platforms, and between RIU and Local NGOs on the other hand.

4.8.1. MOU between RIU and NIC members

This MOU was developed to organize NIC members' activity and sharing roles and responsibilities with RIU project itself. The National Innovation Coalition (NIC) is made up of representatives of national actors with common interest of getting research into use. The first MoU was signed between RIU and NIC and stressed that NIC should with time take over and own the RIU Project in Rwanda. It operated under the supervision of MINAGRI. The major purpose of NIC was to engage in policy dialogue with actors and mobilization of the resources required by the innovation platforms. NIC was therefore expected to create an enabling environment for emergence and development of Innovation Platforms through strategies such as:

- identifying and creating innovation platforms,
- channeling funds and resources to support innovation activities in the platforms, and
- putting in place a board of the coalition led by a chair person.

Specifically, NIC is comprised of eleven organizations: ISAR, RADA, RARDA, MINICOM, FACAGRO, BRD, PSF, CAPMER, RDO, ROPARWA and Pro-Femmes TWESEHAMWE (The Women's Umbrella Organisation at national level). By the time of this research, new members were still joining NIC. These were ISAE-Busogo (a High Agriculture Institute in the Northern Province), DUTERIMBERE (a woman umbrella organization that has reputation in empowering rural women entrepreneurship), Umutara Polytechnic University (in the Western Province), Rwanda Association of Microfinance Institutions and the National Agricultural Information Network (NAIN) while Pro-Femmes TWESE HAMWE had quit because of unavailability of its representatives in RIU/NIC meetings. Some internal changes in its staff influenced the quitting.

However, the NIC performed well its role in the initiation of the four RIU Innovation Platforms. The chairman of NIC (from PSF), is the one who signs together with the RIU country coordinator for the money released to implement activities. In practice, NIC oversees the implementation of RIU project. Moreover, NIC members from RDO and ROPARWA played specifically a key role in the process of IPs initiation. They merit the name of champions for maize, cassava and potato IPs. The implication on the IPs sustainability lies in the participation of local partners including the champions themselves. The IPs are not created by RIU project in top-down approach, they evolve locally to promote innovations in bottom-up fashion.

The challenges for the NIC to perform its role included the lack of a concrete picture of IPs to initiate and the mobilization of funds allocated to RIU Team by DFID/UK. Sometimes funds were not released in time. Despite its commendable role in overseeing the implementation of the Programme, NIC was constrained by poor participation of certain members (like NUR, BRD and Profemmes-TWESEHAMWE) and an overall lack of strategic commitment in advocating for innovations at national level. However, NIC has a strong leadership (PSF, RDO and RADA) and some members (like ROPARWA and ISAR) are determined to induce change in that institution for better performance.

4.8.2. MOUs for cooperation amongst IPs' members

Three types of MoUs were being signed by the time of this research, to share roles and responsibilities between IPs' members, between RIU and the IPs, between RIU and local NGOs namely RDO, CARITAS, World Food Program, etc. This kind of relationships was prompted by emergence of market opportunities and conflicts of interests from various actors. In view of the

RIU- Rwanda project management, functional institutional arrangement is thought to be the topmost challenge in development of the IPs and yet it is also considered as the core for sustainability of any IP (RIU, 2010). The institutional arrangements constitute the most important challenge because binding mechanisms should be in place to discourage members to pull apart after RIU ends. On the ground, IP members have understood the importance of developing MoUs with strict rules and regulations. The majority of IP actors are from cooperatives where they have clear constitution, rules and regulations. They want to see their IPs get into such well organized structure. The process of developing the MOUs started in the four IPs in March 2010. Discussions are going on for key elements to be included in the final document. Those MOUs are still in the pipeline and require an expert in laws regulating associations of people and institutions. Based on observations and information from FGDs, there is a need for including in the MOUs, a section on sanctions for non-compliance actors to the IPs rules and regulations.

4.9. Incentives for sustainability of IPs

Incentives in this case are factors that motivate the IP actors to continue engaging intensively in order to achieve their intended goal. It was repeatedly reported by interviewed actors that incentives were a common issue for discussion in IPs workshops. RIU incentives varied across IPs and among actor categories. Within the IPs, profit sharing was the major incentive for producers, processors and traders. However, RIU thought differently about incentives. According to RIU, the incentives portfolio includes trainings, improved seeds, inorganic fertilizers, equipments and study tours. It was thought that acquisition of skills would be a strong

incentive but the IP actors especially producers, processors and traders who may be largely categorized as “private sector” did not think so. Rwandan Government already had a policy of rewarding hard working and innovative farmers with items such as wheelbarrows, shovels, spades, hoes, watering cans, sprayers, pumps, machines or agro-inputs like seeds, fertilizers, hybrid cattle and piglets but the cash incentive was stronger. RIU struggles to convince people that they will be rewarded by their acts instead of waiting for cash incentive. Different actors identified incentives that motivated them to participate and stay in the IPs.

4.9.1. Incentives to farmers/producers

Profitable farming techniques such as planting in lines, spacing, using improved seeds especially for potato, cassava and maize, provision of inorganic fertilizers and study tours supported by RIU were the key incentives for farmers (figures12&13).

Figure 12: Potato farmers on study tour in ISAR

Figure 13: Maize farmers on study tour in Uganda

From the experiences gained in the study tour, the potato farmers for example initiated a Green House whose construction is funded by RIU with the technical support from ISAR. Similarly, a tour to Uganda by maize farmers stimulated several initiatives among which small machines for milling maize and warehouse equipments were acquired to add value to maize. As one farmer clearly put it, "*Akanyoni katagurutse ntikamenya iyo bweze*" meaning that a bird which doesn't fly can't know where food can be found". This demonstrates the importance of the tours in enabling access to relevant information and technology. The tours were inspiring as farmers were able to observe knowledge and technologies in practice and the associated benefits. Table 9 presents what farmers considered to be their specific benefits associated with their participation in IPs.

Table 11: Farmers' benefits/incentives

Benefits/incentives	Frequency (n=71)	(%)
Access to technologies	55	39.4
Knowledge and skills	43	30.6
Social networks and relationships	34	24
Access to new markets	8	6

Access to technologies was the benefit most mentioned by 39.4% of the respondents. This was followed by access to knowledge and skills (30.6%), enhancing social networks and relationships (24%) and lastly access to new markets. Most of the technologies accessed included improved seeds, fertilizers, use of oxen and irrigation. The knowledge was more on crop agronomy and disease/pest management.

New markets were found in Kigali (the capital city) and local market centers for maize, cassava, potato, fruits and vegetables. This was an opportunity for farmers to move out of non-benefit isolation while marketing their products. In a study on diffusion of innovations, Cochrane (as cited in Sanginga et al., 2009), clearly emphasizes that the windfall profit for early adopters, is the foremost incentive. The amount of cash into the farmers' pockets and the change in the household livelihood motivate not only the producer but also all their neighbours. For example, one maize farmer in Nyagatare District, proudly asserted during a training session: *"From two last maize harvest season's, I was able to buy two motorcycles, build a new house and I am planning to acquire a computer for my children to use"*. The local leader on maize IP has four hectares of land and eight family members. He is a hard working man and use 2 labourers each planting season. He is overwhelmed by the IP responsibilities which divert him from attending to his other agricultural enterprises. He couldn't tell what would happen if he concentrated all his efforts on maize only.

At the level of the IPs, it was important to find out what exactly the farmers benefited directly

from RIU as a project. The three major direct benefits to the farmers were acquisition of crop management techniques, access to improved seed and fertilizers. From the survey results, incentives were ranked as follows.

Table 12: Benefits from RIU support ranked by farmers participating in the IPs

Ranking	Incentives	Maize IP (%)	Cassava IP (%)	Potato IP (%)	Karongi IP (%)	Total
1	Crop management techniques	23.6	36.1	27.8	12.5	100
2	Seeds	22.4	44.8	32.8	.0	100
3	Fertilizers	25.5	37.3	37.3	.0	100

The respondents in this ranking were farmers and farmer cooperatives representative (n=71). Cassava IP benefited more in the three cases than the other IPs (see the high percentages). The highest ranking for improved seed by the cassava IP is associated with the cassava for mosaic disease free cuttings promoted to revitalize the cassava crop after it was severely affected by the CMD. Application of fertilizers on cassava crop was new in Rwanda. Ordinarily farmers don't apply fertilizers on cassava. The application of fertilizers was not only exciting to the farmers but it also greatly improved the productivity per acre by about three fold (RIU, 2010).

Like Cassava IP, the potato IP benefited more on seeds and fertilizers from RIU support (Table 10). The first consignment of support from RIU to the potato IP included 30 tonnes of potato seeds and 9 tonnes of NPK targeting 60 producers. Complementing the NPK fertilizer with farm yard manure greatly increased the yields but created another problem of inadequate markets. The same applied to cassava (Figures 14&15). The Farmer Organsation IP (Karongi) received less direct benefits from RIU as compared to the others because it started five months late and had no concrete plan. The Cassava IP and the Farmer Organisation IP are currently being phased out

for different reasons. The former is thought to have matured given the considerable support it has received from the project and is now supposed to pursue activities on its own. The latter did not receive sufficient support from RIU and did not develop at the rate of the others – it is difficult to focus on it when the project is coming to an end, confirms RIU project managers.

Figure 14: Farmers in Gicumbi selling Potato harvest

Figure 15: Cassava needs postharvest handling

Farmers in Gicumbi district had difficulty selling their increased potato yield amounting to 12 tonnes per ha in January 2009. They sold potato seeds at 0.5 USD/kg and warehouse potato at 0.16 USD/kg (RIU, 2010). This phenomenon is common; when a new technology begins to be adopted, few early adopters make a windfall profit but as more farmers adopt, the total production increases and prices begin to drop (Cochrane cited by Sanginga et al., 2009). The IPs are intended partly to address such problems by searching new market opportunities and at the same time mobilizing the producers to protect them against prices' fluctuations.

In the same way, cassava production in Gatsibo district (Figure 15) increased from 30 ha by 60 farmers to 90 ha by 180 farmers (RIU, 2010). The cassava farmers benefited a lot from selling mosaic free planting materials to other farmers. One cassava cutting of 10 cm was sold at 0.03 USD in March 2010. In the following season, about 200 hundred farmers volunteered to plant cassava with RIU project support. The challenge for cassava was improved processing to add value in order to access good markets.

The other incentives put in place by RIU included best bets projects, innovation development fund, and the in-kind incentives. The best-bet projects are financed by RIU on a competitive basis. Among other things, this requires high level of writing skills to develop competitive proposals. No such project was funded in Rwanda. The Innovation development fund or innovation facility fund (also called Flexibility Fund) is intended to serve as a social venture capital fund to test whether this mode of investment can stimulate development oriented innovation. At the time of this research, a call for proposals was underway and all the RIU supported IPs were preparing to apply for the funding. However, developing proposals remained a major challenge. The in-kind incentives included inputs/equipments such as pipes, pumps, driers, milling machines, seeds and fertilisers. Pipes and locally manufactured pumps (Figure 16

& 17) were provided to Karongi IP. The pumps were used for gravity water irrigation. In total 12 pumps were acquired by IP members with the support of RIU. However, a local company that manufactures pumps, CELLINO, indicated that 18 more pumps were purchased separately by farmers. This demonstrates a stimulation of application of such technologies after the farmers realise their potential value and may indicate a likelihood of sustainability after the RIU project.

Figure 16: Irrigation pipes for Karongi IP

Figure 17: Irrigation pumps for Karongi IP, 2009

Also, two driers (Figure 18) for maize were constructed in Nyagatare so as to disseminate the technology amongst the maize farmers. However, driers for cassava are also needed in Gatsibo for value addition to the cassava flour (Figure 19).

Figure 18: One of the maize driers is ready, 2010.

Figure 19: A cooperative's cassava drier.

In addition, all learning events (workshop meeting, FFS, Farmer field visit, study tours, etc.) were reported as incentives by respondents.

Figure 20: Cassava FFS learning event, maximum 25 farmers can learn at the same time.

Figure 21: More learning event in Cassava IP, 2009.

Figures 20&21 show the same farmers learning in a practical way techniques for planting cassava in Rugarama, Gatsibo district (November 2009). This extension approach (Farmer Field Schools (FFS) was used in Cassava and Potato IPs. Acquiring knowledge and skills was the most

important driver for farmers to participate in the learning events (76.1%). Specifically, some of the knowledge and skills gained included planting, spacing, disease and pests' management, fertilizer application, selection of good planting material/seed. Other drivers for farmer participation are indicated in Table 13.

Table 13: Drivers for farmer participation in learning events

Drivers/expectations	Frequency (n=71)	(%)
To gain knowledge and skills	54	33.5
Developing crop enterprise	35	21.7
Networking with others for market	32	19.9
Fight against CMD and get good planting materials	22	13.7
Becoming an exemplary farmer	15	9.3
To gain machinery/equipment	3	1.9

The other drivers for farmer participation in the learning events were gaining knowledge and skills (33.5%), changing cropping into enterprise (21.7%) and networking with others to acquire new markets (19.9%). The major learning events listed by farmers are workshops and study tours (Table 14).

Table 14: Main activities implemented by IPs

Main activities	Frequency (n=71)	(%)
Workshops	70	28.3
Study tours	59	23.9
Cassava production	27	10.9
Training others	27	10.9
Maize production	16	6.5
Potato production	15	6.5
Land consolidation with others	13	5.3
Investing money in groups	11	4.5
Irrigation	9	3.6

Since actors joined the IPs the other activities in which they were involved were, agricultural production (e.g. cassava, maize and potato), land consolidation and trainings others (Table 14).

Training others implies technology dissemination farmer to farmer technique. This is the reason Farmer Field School approach is being promoted. Farmer Field Schools (FFS) were chosen because, as a group learning approach, it can build knowledge and capacity amongst farmers to enable them diagnose their problems, identify solutions and develop plans and implement them with or without support from outside (RIU, 2010). RIU project provides support in defining the concept/methodology and providing some resources (human and financial) for testing this initiative in collaboration with ISAR. This approach would be scaled out by the Ministry of Agriculture (MINAGRI). It is within the FFS that positive selection of seeds should be promoted, lessons learned and technologies disseminated. The irrigation with low marking (Table 14) was cited by actors of Karongi IP where use of locally made pumps was limited. The Table 14 shows that workshops and study tours were dominant activities in the IPs. However, while checking on the sustainability issues of such learning activities, the responses were clear and focused on the stopping of meetings (Table 15) instead of their continuation.

Table 15: Farmer perceptions of what might happen after RIU ends

What is foreseen by farmers	Frequency (n=71)	(%)
Stopping meetings	57	53.8
Capacity building still needed in various areas	14	13.2
Slowing down in activities started by RIU	12	11.3
Long distance from members' house to another	7	6.6
Lack of proper funds	7	6.6
Platform committees failure	6	5.7
Lack of processing industries equipment	3	2.8

For farmers, it is foreseen that meetings will stop but Farmer Field Schools (FFS) should continue on their own. Study tours will stop also due to the lack of funding but farmer field visits in the nearest place should continue on their own. The capacity building in FFS approach was

still needed at the moment of this research. This demonstrates how phasing out of support to IP an issue for sustainability is because any IP needs enough capacity to be mature and continue activities on its own.

4.9.2. Incentives to non-farmer actors

This section seeks to explain the incentives to non-farmer actors namely; researchers and extensionists, local leaders, processors, input-suppliers, savings and credits organizations (SACOs), NGOs agents, traders and retailers. Specific incentives by category of non-farmer actors are highlighted in the Table 16.

Table 16: Incentives for non-farmer actors

Incentives Categories	Knowledge and skills	Rewards (promotion at work place, medals, cash)	Access to credits and increased stocks	Increased income (money)
Researchers and extensionists	High	High	None	None
Local leaders	Medium	High	None	None
Processors	High		High	Low
Traders, input-suppliers and retailers	Medium	None	High	Medium
SACOs agents	Low	None	None	High
NGOs agents	High	Low	None	Low

The other actors, as they are listed in Table 16, gained in more intangible benefits at different levels. These benefits were rated on a scale of 1 to 10 as low (<5), medium (5-7) or high (8-10) by the respective actors during the FGD. Researchers, extensionists, processors and NGOs'agents generally gained knowledge and skills for better performance of their functions. The trader incentives included marketing agro products to loan access because they can mortgage their stocks. Local leaders are rewarded by Rwandan Government for having helped their people to get out of poverty. Such rewards can be professional promotion, medals, cash, etc.

To that point, research and extension agents from Government can also be promoted that way. In overall, incentives are various and shared by all non-farmer actors. However, there is a need of policy incentives for IPs actors to motivate the network as a whole. It is in the same range of ideas that the capacity needs of IP actors are described in the following section.

4.10. Capacity needs for the IP actors

Besides strengthening the capacity of National Innovation Coalition, the RIU Project sought to also strengthen the capacity of the innovation platforms actors through backstopping, coaching and training in agricultural innovations. The training sessions were focused on enhancing knowledge and the practice of innovation systems approach and the role of actors in innovation platforms. The capacity of the actors to continue performing their roles after the end of the RIU project is key to sustainability of the innovation platforms. This research specifically targeted the capacity needs for IP actors. The capacity needs assessment done by RIU facilitators and NIC members at the initiation time of the platforms was generic and did not specify the peculiar needs of the different actors. In addition to identifying the competence needs for each IP actor, the importance and urgency of such competences were rated by the respondents (Appendix 7). This rating enables prioritization of the competences with respect to two criteria of importance and urgency. Using the median scores for importance and urgency, the four priority categories are illustrated in Figure 22.

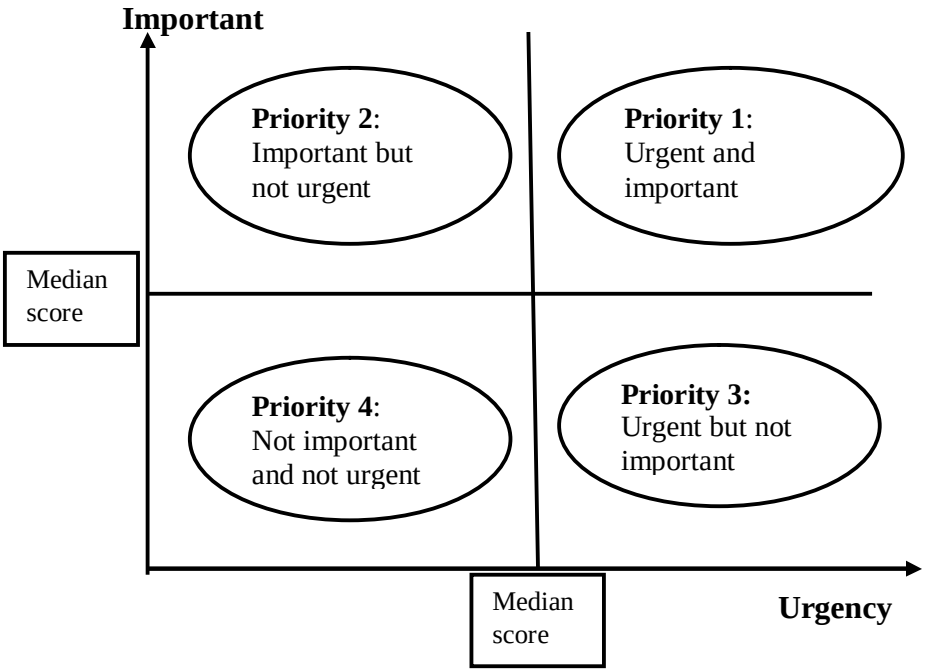

Figure 22: Quadrants for priority base on urgency and importance of competences

Scores were on a scale of 1 to 10 for importance of the competence and the need for capacity building (Appendix 7). As illustrated in Figure 22, plotting importance against urgency creates four quadrants of priority. Table 17 explains the quadrants.

Table 17: Priority list of competences needed

Rank	Priority	Explanation
Quadrant 1	Highest priority	Competences that are both important and urgently needed to enable the stakeholder participate more effectively in IP activities
Quadrant 2	Medium priority	Competences though not urgent are important, for the long-term and sustainable participation in IPs. They may be of strategic nature.
Quadrant 3	Low priority	Competences that are urgent but not important may only contribute marginally to the achievement of objectives of the IP members
Quadrant 4	Posteriority	Competences that are neither important nor urgent. These could be ignored or eliminated. They may be of personal nature and not necessarily contributing to collective goals of the IPs.

The competences were clustered into different themes for each category using the principal component analysis from SPSS software as explained in Chapter 3, Methodology (p.33). Using the above criteria for prioritization, the competences required for each of the actor categories (i.e. farmer and farmer cooperatives, researchers and extensionists, processors and inputs-suppliers, financial services providers, local leaders and policy-makers) are classified and discussed.

4.10.1. Capacity for farmers and farmer cooperatives

For a sample of 77 farmers, the scores for importance on all the competences (Appendix 7) had a median of 7.55; while the scores for urgency of the same paired sample made a median of 7.18. With the aid of Figure 22, the competences were plotted and placed in their respective quadrants by comparison of their mean scores of each competence with the median for importance and urgency using "One Way ANOVA-Means plots". The competences were clustered into themes representing broader competence areas. The Table 18 summarizes the clustered themes and priorities of each producer competence.

Table 18: Farmer and farmers cooperatives capacity needs

Themes	Competences	Strength (n=77)		Priority			
		Importance (Med=7.55)	Need (Med=7.12)	1	2	3	4
Farmer empowerment related competences	Taking initiative to source for knowledge and technologies that will enable them achieve their development vision	8.22	7.84	x			
	Articulation of demand for research and advisory services that matches with their business/development plans	7.49	7.36			x	
	Negotiation with different actors for fair deals	7.49	7.18			x	
	Courage to get started with new ideas to take advantage of market opportunities	7.49	7.17				x
	Financial management and discipline - wise use of money including the culture of saving and investment	7.42	6.77				x
	Critical analysis and decision-making	7.05	6.42				x
	Lobbying and advocacy - making themselves visible and felt by other actors including the politicians	6.99	6.3				x
	Self-confidence and believing own potentials	6.22	5.75				x
Access to and use of technical knowledge and skills	Skills in machinery and irrigation equipments' use	8.58	8.03	x			
	Pests and disease management	7.99	7.95	x			
	Post-harvest technologies (storage, processing, packaging and marketing)	7.97	7.78	x			
	Searching for market information and utilising it to expand their markets	7.03	6.94				x
	Share knowledge, learn from each other and openness to change	7.62	6.83		X		
Business related	Organising themselves and managing group dynamics	8.38	7.99	x			

competences	Seeds multiplication	8.17	7.9	x	
	Business planning based on a development vision	7.95	7.78	x	
	Standardization of product(Rwanda Bureau of Standards)	7.43	7.04		x

For farmers and farmer cooperatives, most of the top priority competences are related to business and access to and use of technical information and skills (Table 18). Information sharing and technology dissemination were second priority. Whereas farmer empowerment related competences would have been expected to be among the top priority, in view of the farmers, they were not. Instead most of them happen to fall in either priority 3 or 4. Those competences are neither important nor urgent because farmers think that they are already empowered enough after working for long with NGOs and extension services.

Figure 23 illustrates the plots and locations of the competences within the quadrants.

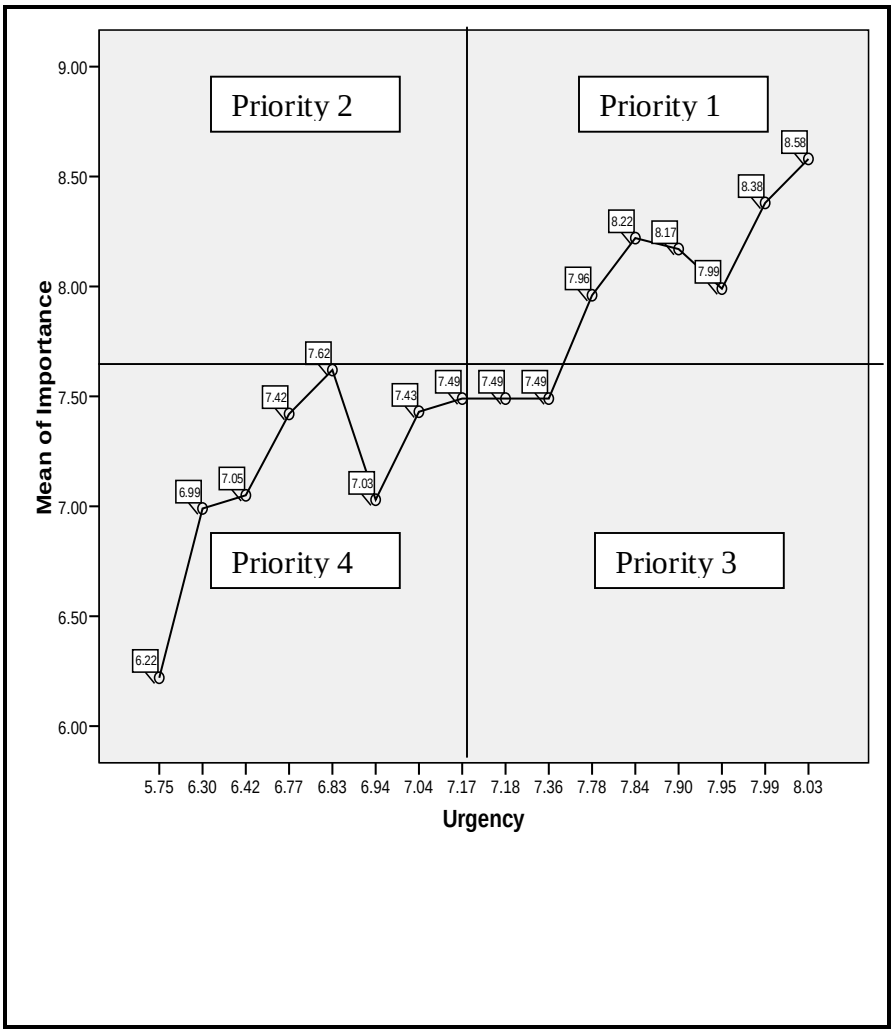

Figure 23: Farmers and farmer cooperatives competences in the four quadrants

In agreement with the above analysis and prioritization, the top priority competences are skills in post-harvest technologies including storage, processing, packaging and marketing with seeds multiplication.

4.10.2. Capacity for researchers and extensionists

For researchers and extensionists, the median was 7.47 for importance and that of urgency was 7.12. The Table 19 summarizes the priority categories for each competence and Figure 24 presents a plot of the competences in their respective quadrants of priority.

Table 19: Researchers and extensionists capacity needs

Themes	Competences for R& extensionists	Strength (n=17)		Priority			
		Importance (Med=7.47)	Need (Med=7.12)	1	2	3	4
Participatory and transdisciplinary research and dissemination of research results	- Creating linkages between Research, Extension and End Users and Markets	9.41	8.76	x			
	- Engaging with the community and other actors to develop relevant knowledge and technologies (action research)	9	8.41	x			
	- Facilitating learning and knowledge/technology exchange	8.76	7.71	x			
	- Team work - working in multidisciplinary teams	8.47	7.88	x			
	- Thinking in a value chain perspective	8.06	7.59	x			
	- Accepting criticism and feedback in a positive manner	7.29	6.06				X
	- Good communication skills for different client categories	7.12	5.76				X
	- Commitment to respond to demand and in a respectful manner	7.06	6.12				X
	- Self-reflection and providing constructive feedback	6.18	5.53				X
Networking and change management competences	- Brokering and negotiating partnerships, linkages and networks that benefit all IP actors	7.47	6.47		x		
	- Translating demand into research question and service delivery action plans	7.12	7.53			x	
	- Managing group dynamics, and multiple and divergent expectations	6.59	6.59				X
	- Applying a variety of approaches to influence change with persistence	7.82	7.12	x			

Participatory, transdisciplinary research, dissemination of research results, networking and change management competences are the two themes identified for researchers and extensionists category. The first theme shows from creating linkages between Research, Extension and End Users and Markets to team-work and value chain ranging without doubt into category 1 (see Figure 24) while all the second theme cuts across categories 1, 2, 3 and 4. Nonetheless, researchers and extensionists think having enough skills related to partnerships as well as managing group dynamics. Thus, they are not important and urgent competences needed by these actors.

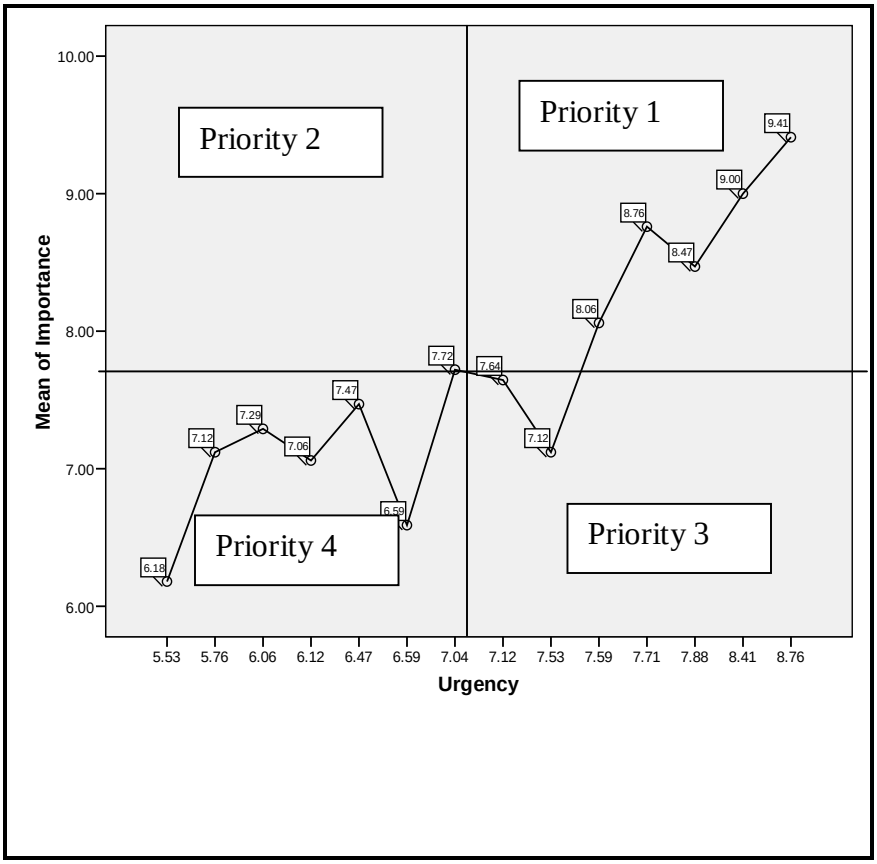

Figure 24: Researchers and extensionists competence needs scattered

Six competences with high mean scores for urgency and importance comparisons are plotted in priority 1. Such competences (from mean=9.41 to mean=7.64) are more important and urgent for researchers and extensionists. The people centred competences such as communication, accepting criticism, commitment to respond to demand and self-reflection though very important in multi-stakeholder engagement; the researchers did not consider them critical because they consider themselves having enough skills in that domain.

4.10.3. Capacity for processors and input suppliers

Processors and input suppliers were put in the same category of actors as they are largely private sector and business oriented. This was mainly observed in maize IP, Eastern province of Rwanda. Table 20 presents the results for processors and input suppliers category while Figure 25 illustrates the plots of the competences in their respective quadrants.

Table 20: Processors and input-suppliers capacity needs

Themes	**Competences for R& extensionists**	**Strength n=14**		**Priority**			
		Importance (Med=7.5)	Need (Med=7.0)	1	2	3	4
Postharvest handling	Increasing knowledge and skills in food technology, processing, packaging and marketing important	8.57	8.07	x			
	Increasing knowledge and skills in storage, machinery and other equipments	8.36	8.71	x			
	Quality assurance and ensuring standards important	7.71	5.93		x		
People centred competences for	Overcoming fear of failure, risk taking and learning from all experience	7.5	7		x		

empowerment and collaboration	Transparency, honesty and fairness	7.36	6.29		x
	Good communication and negotiation skills	7.21	5.86		x
	Self-assessment and decision making	6.71	5.36		x
Business Skills	Business planning and management	7.5	7	x	
	Increasing knowledge and skills in Standardization of product (Rwanda Bureau of Standards)	7.5	6.71		x
	Market intelligence and timely response to market opportunities	8.57	7.36	x	
	Identifying business opportunities and realistically assessing risks	7.86	7.14	x	

Postharvest handling and business skills form the priority areas. The people centred competences for empowerment and collaboration were not considered as important areas by this category of actors. These actors think to be enough empowered to go on businesses without any fear. The different competences needed by processors and input-suppliers are shown in priority 1 (Figure 25).

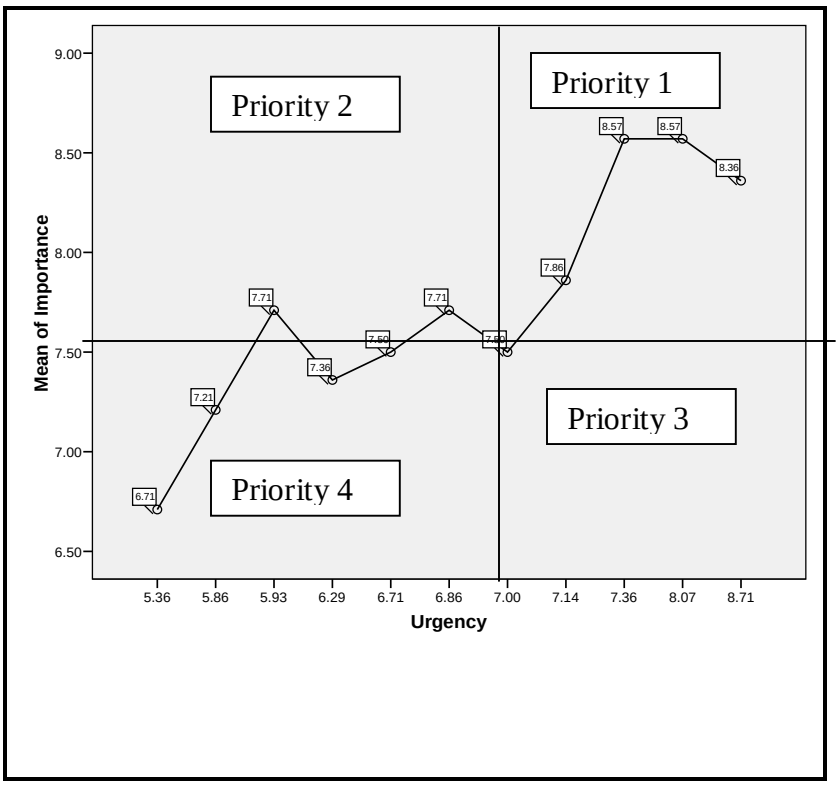

Figure 25: Processors and input suppliers competence needs

This Figure 25 locates four scored competences in priority 1, three competences in priority 2 and three in priority 4. None of the competences falls in the category 3.

4.10.4. Capacity for financial services providers

The mean scores for financial service providers had medians of 9.54 and 7.14 for importance and urgency respectively. Table 21 presents the priorities for this category of IP actors while Figure 26 shows plots of the competences in their respective priority quadrants. None of the competence falls in priority 3 while two competences are in priority 4.

Table 21: Priority capacity needs for financial services providers

Themes	Competences for Researchers and extensionists	Strength (n=14)		Priority			
		Importance (Med=9.54)	Need (Med=7.14)	1	2	3	4
Enterprise and risk management	Timely response to demand	10	9.36	x			
	Counselling and encouragement/motivation	8.43	6.93				x
	Realistic enterprise assessment	9.71	6.21		x		
Marketing and customer care Skills	Good communication skills	8.86	4.36				x
	Marketing credits to clients	9.86	9.93	x			

For financial service providers, the two top priorities for capacity building are:

1. Marketing credit services to clients especially farmers and
2. Timely response to demand for financial services

Realistic enterprise assessment is the second priority competences, while counseling and communication skills were not considered important competences by the financial service providers.

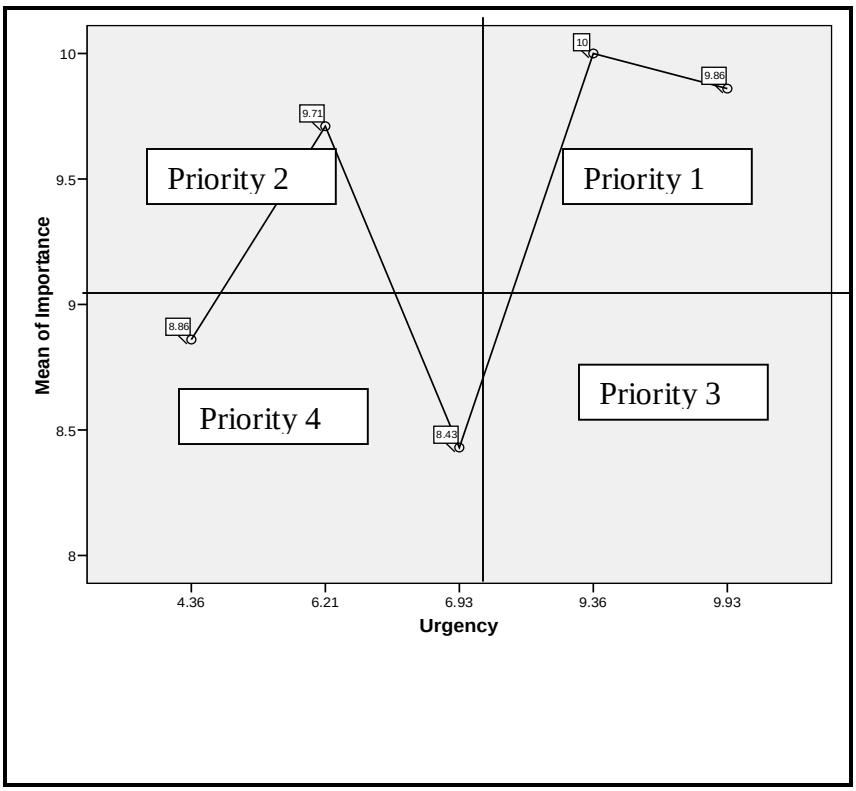

Figure 26: Financial services providers' competences plotted

Marketing credits services to clients especially farmers and timely response to demand for financial services are the competences ranged in priority 1 and therefore utmost needed.

4.10.5. Capacity for local leaders and policy makers

The medians of mean scores of local leaders and policy makers were 9.06 for importance and 7.44 for urgency. The summary is presented in Table 22

Table 22: Capacity needs for Local leaders and policy makers

Competences for local leaders and policy makers	**Strength (n=18)**		**Priority**			
	Importance (Med=9.06)	Need (Med=7.44)	1	2	3	4
Knowledge on agriculture laws and regulations	9.94	9.94	x			
Lobbying and advocacy	8.5	5.11				x
Good governance and leadership skills	9.67	8.22	x			
Influencing policy processes based on expressed needs	9.06	7.44		x		
Good communication skills	6.89	3.61				x

As these competences were very few, there was no need to create themes for this category of actors. The top priority competences for the local leaders and policy makers are knowledge on agriculture laws and good governance with leadership skills. Influencing policy processes is the second priority. Whereas influencing policy process is a communicative process and also involving lobbying these two competences were not considered important by the local leaders and policy makers. They consider themselves skilled in these domains by their functions.

Figure 27 present's knowledge on agriculture laws, good governance and leadership skills as the plotted competences in priority 1.

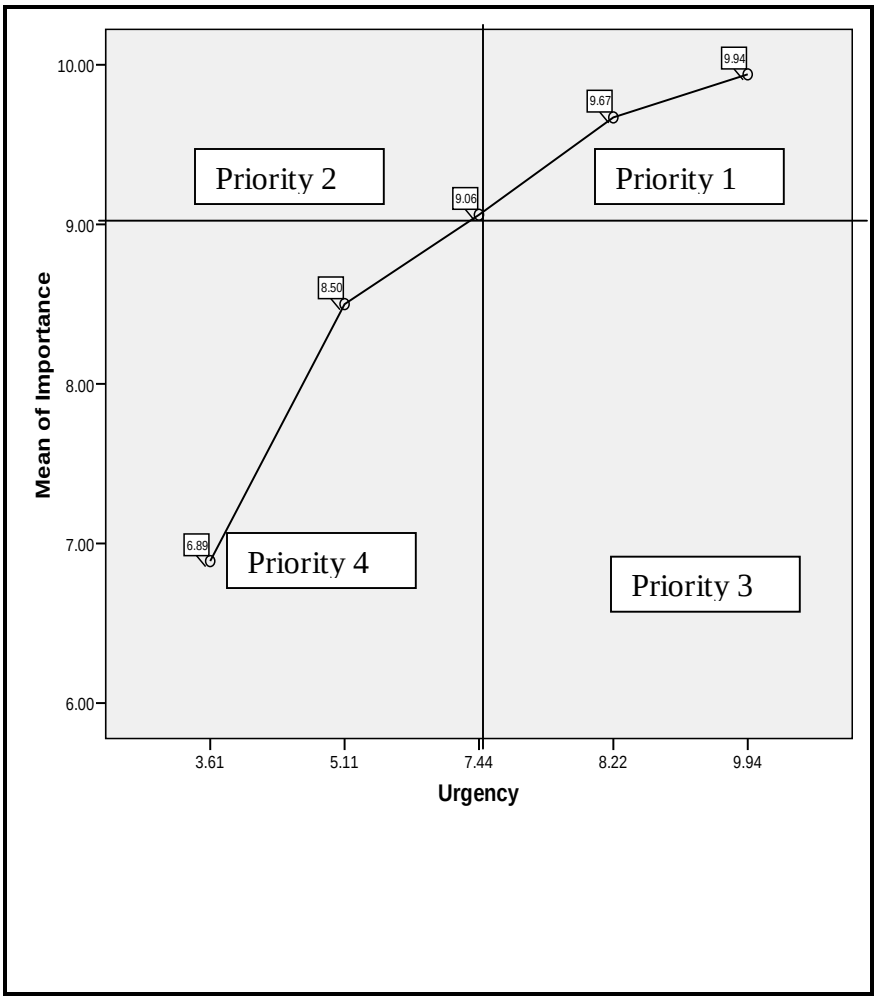

Figure 27: Local leaders' competence needs in the four quadrants

This section discussed the competences needed by category of actors. It is suggested to focus on these competences in the future projects to ensure the IPs sustainability.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions and recommendations which are derived from the findings.

5.1. Conclusions

Based on the results of the study, the following conclusions can be made:

1. Innovation Platforms (IPs) is one of the most relevant approaches for developing agricultural value chains in a holistic manner as it creates the space for participation of a wide range of actors. However, the management and coordination of the very many actors and meeting their diverse expectations and needs is the biggest challenge in operationalizing them.
2. This study highlights the efforts made by RIU project in establishing four agricultural IPs in Rwanda which is highly appreciated by all the actors involved. Sustainability of those IPs however will depend on: (i) the contextual factors such as availability of local resources, actors and land consolidation policy, (ii) the institutional arrangement for effective management and coordination among the IP actors, (iii) the incentives for maintaining the participation of the various actors with their diverse needs and expectations and even more importantly and (iv) the capacities required for each category of stakeholder to make their maximum contribution to the IPs.

3. Some of the major achievements from the RIU initiated IPs in Rwanda include bringing together and strengthening social network between various actors in agricultural value chain namely farmers and farmer cooperatives, researchers and extensionists, processors and inputs suppliers, financial services providers, local leaders and policy makers;

creating interest and common ground for cooperation. Scaling-out such successes to benefit the wider majority of actors especially farmers is a challenge due to the logistical and technical support required as exemplified in some cases pre-mature phasing out of some IPs by RIU.

4. Whereas it is desirable to maintain the memberships and stakeholder composition of the IPs, this study has revealed that membership of IP is very dynamic with new members joining and others dropping out. This dynamism reflects the extent to which the IPs fulfill the needs and expectations of its diverse membership. On one hand, what tended to attract new members to the IPs included; access to technology and increased yields, increased income resulting from increased yields, networking and access to information and markets. On the the other hand, the things that led to dropping out of some members included; non-satisfaction of high expectations like access to credits and acquisition of equipments. However, more incentives put in place by RIU including best bets projects, innovation development fund, and the in-kind incentives would stimulate IP actors to continue operations when the project ends.

5. The RIU strategy of putting the responsibility for IPs in hands of public-private partners like RDO, ROPARWA, AJEMAC, ISAR, RADA, CARITAS and COOPERATIVES creates local ownership that may lead to sustainability. The Social Network Analysis (SNA) showed several partners who can support the work or take the lead after RIU phases out support. However, sustainability of the IPs will also depend on the capacity of the lead partners to source for investment in value addition and support services (e.g. marketing) that bring tangible benefits to the IP members. The main institutional arrangements put in place by RIU for management of the IPs was the memoranda of

understanding (MoUs) and collective action plans. These stipulate the roles and responsibilities of the different actors; however, MoUs by themselves are not sufficient to generate the commitment of the partners. More binding mechanisms such as strong relationships and bylaws are needed.

6. The key competences required for sustainability of the IPs were identified for the various stakeholder categories. For producers, the priority competences were post-harvest technology and seed system, skills in machinery, irrigation and business planning. Researchers and extensionists stressed the need competences in team-work and thinking in a value-chain perspective. The processors and inputs suppliers emphasised the competences related to skills and knowledge in storage, machinery and other equipments. Financial service providers emphasised the need of marketing credits and timely response to demand. For local leaders, knowledge on agriculture laws, good governance and leadership skills were highlighted as priority competences. In addition to these, there were some critical competences association with the interactive functioning of IPs which were not prioritized by several actors. This may also indicate a deficiency of knowledge/awareness of some of the essential competences required for sustainability of IPs.

5.2. Recommendations

In view of the above conclusions, the following recommendations can be made:

1. For sustainability of IPs attention needs to be focussed on the stakeholder expectations. These expectations should be the basis for planning and mobilising members with a common agreed development agenda. The expectations and needs of the actors are likely to change with time and the organisational framework should allow evolving needs and expectations as well as new emerging ones to be accommodated. This however requires good facilitation skills to support the IPs just as is needed in Farmer Field Schools (FFS).

2. For the IPs to mature enough to be able to sustain themselves, they will need considerable period of support to build their organisational and institutional capacity. Adequate time is needed to build the capacity of the various actors to internalise their roles and responsibilities and to be able to perform them on their own. In addition, putting in place rules and regulations that allow harmony and coordination of activities of the various actors is critical. Weaning off the IPs should be phased out until the point when the IPs have the capacity to continue with their activities with minimal external support.

3. The strongest incentives to the IP actors are those that have economic value. It is therefore important that the actors realistically specify their anticipated economic expectations from the IPs prior to their joining. The support services to the IPs such as training should then be geared towards unleashing the economic benefits to the IP actors; otherwise training per se may not be valued very much.

4. Markets are a strong factor in the sustainability of the IPs. The organization of the IPs should therefore enable its actors to access profitable markets for their products. Alongside production, emphasis needs to be directed towards value addition and access to markets.

5. Competence for the various actors of IPs to perform their expected roles and responsibilities is critical but often ignored. IPs involve complex interactions which require specific and complementary competences among the various actors. A comprehensive competence development programme for the IP actors is essential if the IPs are to survive the challenging and ever changing economic and social contexts.

6. Whereas it is desirable that as many actors as possible participate in the IPs, it is also important to critically assess the value added of each actors and also consider the possible convergence of interests and expectations. The more the actors in the IP, the more complex it will be to manage. It would be advisable that the IPs start with a few critical actors and allow this to expand as need may be and as the actors gain the capacity to manage multi-stakeholder interactions.

LIST OF REFERENCES

Abbott, C., Ghassan, A. and Madubuko, L. (2008). *An innovation platform for construction*, Salford Centre for Research & Innovation, University of Salford.

AJEMAC (2009): Annual report

Ballari, G. (2008). Organic innovations to bring farmers into business. Briefing note for public presentation in *TP organics-Technology Platform for organic food and farming*, c/o IFOAM EU Group, Brussels.

BERR. (2008, July 31st). *Innovation Platforms*. Retrieved July 31st, 2008 from http://www.berr.gov.uk/dius/innovation/technologystrategyboard/tsb/innovation_platforms/index.html

Braun, A.R., Thiele, G. and Fernández, M. (2000). Actor Field Schools and Local Agricultural Research Committees: Complementary Platforms for Integrated Decision-Making in Sustainable Agriculture, *Odi AGREEN*, Network Paper No.105.

Braun, A.R., Thiele, G. and Fernandez, M. (2000). Farmer Field Schools and Local Agricultural Research Committees: complementary platforms for integrated decision-making in sustainable agriculture in *AGREN&ODI, Agricultural Research and Extension Network*, Network Paper no 115, July 2000.

Chakravorti, B., (2003). *The Slow Pace of Fast Change: Bringing Innovations to Market in a Connected World*. Boston, MA: Harvard Business School Press

Clark, L. (2006). *Network mapping as a diagnostic tool*, Centro Internacional de Agricultura Tropical – CIAT 2006. Downloaded on http://www.km4dev.org/index.php?module, 24th June 2010

Costello, A.B. and Osborne, J.W. (2005), Best practices in Exploratory Factor Analysis: Four Recommendations for getting the Most From Your Analysis, in *Practical Assessment, Research&Evaluation*, Vol.10 number 7, July 2005 (electronic Journal)

Critchley, W., (2007), *Working with farmer innovators*, a practical guide, CTA/CIS, vrije Universiteit Amsterdam, First Published 2007.

Davila, T., Epstein, M.J. and Shelton, R. (2006). *Making Innovation Work: How to Manage It, Measure It, and Profit from It. Upper Saddle River: Wharton School Publishing. ISBN 0-13-149786-3, Retrieved, May 5, 2009 from* http://wikipedia.org.wiki/org/innovationLifeCycle.jpg,

DIUS. (2008). *Innovation Nation* (White Paper). London: The Stationery Office.

DTI. (2003). *Innovation Report*. Competing in the Global Economy: The Innovation Challenge. London: The Stationery Office.

Duffy, M.E. (1993). *Methodological triangulation in practical research: planning and design*, edited by PD Leedy, 5th edition. New York: MacMillan Edquist, C. (eds.) 1997. *Systems of Innovation Approaches: Technologies, Institutions and Organizations*. London, UK: Pinter, Casell Academic.

Edquist, C. (ed.) (1997). *Systems of Innovation Approaches: Technologies, Institutions and Organizations*. London, UK: Pinter, Casell Academic

FARA. (2007). Expert group meeting on Agriculture and Rural Development.23-25 April 2007. ECA, Addis-Ababa, Ethiopia. Retrieved March, 18, 2009 from www.fara.com

Freeman, C. (1987). *Technology and Economic Performance: Lessons from Japan*. London, UK: Pinter.

Gawer, A. (2000). The organization of Platform Leadership, Massachusetts Institute of Technology, Ph.D Thesis. Retrieved, March 15, 2009 from http://www.platformleadership.htlm

Hakizimana P. (2007). *Rwanda agricultural extension services system: Operation and funding, modalities.* UN-ECA EA-SRO, Meeting of Experts, Bujumbura, Burundi, from 16th to 19th April 2007, RADA.

Hall, A., Mytelka, L. and Oyeyinka, B. (2005). *Innovation systems: Implications for agricultural policy and practice*. IL AC Brief 2, July 2005,pp 1-4.

Hall, A.J., Sivamohan, M.V.K., Clark, N.G., Taylor, S. and Bockett, G. (2001). Why research partnerships really matter: innovation theory, institutional arrangements and implications for developing new technology for the poor. *World Development* 29(5): 783–797.

Hall, A.J., Sulaiman, R.V., Clark, N.G. and Yoganand, B. (2003). From measuring impact to learning institutional lessons: An innovation systems perspective on improving the management of international agricultural research. *Agricultural Systems* 78: 213–241

Hilbert van der Welf . (2007). *Evaluating the impact of capacity building activities in the field of food quality and food safety*, FAO, Rome (Draft paper, July 2007)

Kagabo, F. (2008). *Guidance note for innovation platform formation and selection of platforms facilitators*, RIU-Rwanda Process Facilitator, 29/6/2008.

Kaplinsky, R. and Morris, M. (2001). *A Handbook for Value Chain Research*. Working Paper Prepared for the IDRC, Brighton, UK, Institute for Development Studies.

Long, N. and Long, A. (ed.) (1992). *Battlefields of knowledge*: *The interlocking of Theory and Practice in Research and Development*. Routledge, London.

Luecke R. and Katz R. (2003). *Managing Creativity and Innovation*. Boston, MA: Harvard Business School Press.

Lundvall, B.A. (ed.). (1992). *National Systems of Innovation and Interactive Learning*. London, UK: Pinter.

Matsiko, F. (2009). *Notes on the Diffusion of Innovation Theory*, Makerere University, Agriculture Extension/Education, unpublished.

Merton, R.K., Fiske, M. and Kendall, P.L. (1990). *The focused interview: A manual of problems and procedures*. (2nd ed.). London: Collier MacMillan.

Monty, P.J. (2007). *Agriculture and Rural Transformation: Highlights of an innovation systems approach to a complex problem*. Expert Group Meeting on Agriculture and Rural Transformation, 23-25 April, 2007, ECA, Addis Ababa, Ethiopia.

Mytelka, L.K. (2000). Local systems of innovation in a globalized world economy. *Industry and Innovation* 77(1): 15–32.

OECD. (1997). *National Innovation Systems*. Paris, France: Organization for Economic Co-operation and Development (OECD).

Philbin, A. (1996). *Capacity Building in Social Justice Organizations Ford Foundation*. Retrieved, June 17, 2010 from http://www.capacitybuilding.htlm

PROLINNOVA. (2009). *Promoting Local Innovation in ecologically-oriented agriculture and NRM*, http://www.prolinova.net, consulted 24/4/2009

RIU. (2007). Enabling the poor to benefit from research, Leaflet retrieved June, 23, 2009 from www.researchintouse.com.

RIU. (2008-2009a). *First quarterly report*, 1rst April-30 June 2008. Retrieved, March 10, 2009 from www.researchintouse.com.

RIU. (2008-2009b). *Second quarterly report*, 1rst July-30 September 2008. Retrieved March 11, 2009 from www.researchintouse.com

RIU. (2008-2009c). *Rwanda country programme annual report 2008-2009*. Retrieved September 12, 2009 from www.researchintouse.com

RIU. (2010). *Putting Research into use: stimulating demand in Sub-Saharan Africa*, Retrieved, March 24, 2010 from www.researchintouse.com

Rodriguez, D. and Solom, D. (2007). *Leadership and innovation in a networked world*. Retrieved 23rd March 2010 on http://www.innovations/summer

Rogers, E. (1995). *The diffusion of innovations*, The free Press, New Turkey, 4e edition.

Rogers, E. (2003). *Diffusion of Innovations*. Fifth Edition, Free Press, New York, NY.

Roling, N. (2009). Conceptual and methodological developments in innovation *in Innovation Africa: Enhancing farmers'Livelihoods*, Earthscan in the UK and USA,pp 9-34.

Sanginga, P.C, Waters-Bayer, A., Kaaria, S., Njuki, J. and Wettasinha, C. (2009). *Innovation Africa: Enhancing farmers'Livelihoods*, Earthscan in the UK and USA.

Schlüter, M. (2008). Organic innovations for sustainable food production, Briefing note for public presentation, December 2, 2008 in *TP organics-Technology Platform for organic food and farming*, c/o IFOAM EU Group, Brussels.

Spielman, D.J. (2005a). A critique of innovation systems perspectives on agricultural research in developing countries. *Innovation Strategy Today* 2(1):41-54.

Spielman, D.J. (2005b). Systems of Innovation: Models, methods, and future directions. *Innovation Strategy Today* 2(1):55-66

UNDP (The United Nations Development Programme), (2010), Retrieved, March 24, 2010 from http://www.undp.org/capacity

Urban Capacity Building Network, (2010). Retrieved March 26, 2010 from http://www.gdrc.org

Yonoshin, M. (2009). *Innovation platform-based silver market in Japan*, Arthur D. Little (Japan) Inc. Tokyo

WAEMU (2009), a workshop on "*Agricultural Transformation in West Africa: Towards New Partnerships for Agricultural Innovation*" was held in Ouagadougou, Burkina Faso from 15 to 16 June 2004 downloaded on http://www.oecd.org/sah/processingagri , on 12th June 2009

World Bank (2006). *Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems*. Agriculture and Rural Development Discussion Paper.

APPENDIXES

Appendix 1: Matching study objectives, methods and techniques with types of data

	Objectives	Methods	Techniques/Tools	Types of data
1	To determine the extent to which the innovation platforms have fulfilled their intended objectives	Historical Analytical Comparative	Secondary data FGD Observation	Qualitative
2	To identify the contextual factors, incentives and institutional arrangements required to influence the effectiveness and sustainability of innovation platforms in Rwanda	Analytical Synthetical Comparative	FGD Face-to-face interviews Observation	Qualitative Quantitative
3	To establish the capacities that different actors of the innovation platforms need to effectively participate and sustain themselves in the innovation platforms	Structural Comparative	Secondary data FGD Face-to face interviews Observation Scores	Qualitative Quantitative

This synchronization has been useful for results triangulation which is a combination of different sources of data.

Appendix 2: Rwanda map: Maize, Cassava , Potato and Karongi IPs

Note:

Maize IP = Nyagatare District
Cassava IP = Gatsibo District
Potato IP = Gicumbi District
Karongi IP = Karongi District

Appendix 3: Observation guide on RIU IPs functioning

Items	Details	Maize IP	Cassava IP	Potato IP	Karongi IP	Points/ 10
Existence of the Platform	Location, Office, MoUs, Action plan					
Key players	Active committee Facilitator Active farmer					
Number of members	No precised number Keep changing					
Innovations in use	What innovative methods used					
Incentives received from RIU	RIU support Other support					
Environment/favorable conditions	Other IPs, opportunities, Partners					
Challenges faced And coping mechanisms	Weather Political environment Others					
Activities in plan	Short, mid, long terms					
NIC champion	Initiation					
Average						

Appendix 4: Guide for conducting FGD

Group categories:

- Committee members: President, Vice-president, Secretaries, Advisors
- Key actors: Researcher, Extensionist, Seed multiplier, Processor, Input supplier,Banker

Gender

- Males
- Females

Size of the group:

Study area:

Aspects regarding the IPs: setting mechanisms, functioning, incentives and capacities needed.

No	Questions
1	Your Innovation Platform (IP) identification
2	Your main innovations
3	Who belongs to your IP?
4	Who do you think should belong and help in the capacity development of your IP?
5	What other IP do you know in this place and what do they do?
6	Who was there in the beginning and who is there now?
7	What were the expectations of the various actors when they joined the platforms and to what extent have those expectations been/not been met?
8	For those who might have dropped out, why did they drop out? And for those who are still in the platform, why have they remained?
9	What are the opportunities they have found by engaging in the platforms and how have they taken advantage of those opportunities? What are the benefits so far for each of the actors?
10	What are the challenges they have experienced by participating in those platforms and how have they addressed them so far?
11	What capacities (knowledge and skills) does each of the actors need to have to function effectively in an innovation platform?
12	What are the other factors or conditions that are favourable for an innovation platform to work effectively and to what extent were these present/absent in the case of Rwanda.
13	What so far have been the roles and responsibilities of RIU and the actors in the platform? How are the platforms coordinated and how do they function in reality. What RIU did they were not able to do?
14	What do the actors think needs to be done to make the innovation platforms work well to fulfill their desired goals/intentions?

Appendix 5: Interview schedule for individual farmers in the IPs

Introduction

Dear Respondent, I am a student from Makerere University, Uganda, pursuing a Masters'Degree in Agriculture Extension/Education. Makerere University and the Principal Researcher invite your participation in this study: **"Capacity for Sustaining Agricultural Innovation Platforms in Rwanda"** by giving responses to the following questions. The purpose of this questionnaire is purely academic. Your responses will be treated confidentially, and will not be used in any other way. Your name and address are requested. Your co-operation will be highly appreciated.

Name if interviewer: _____ Date of interview: _____

1. Identification of the respondent:

Name of interviewee: _____

Village: _____ Cell: _____

District: _____ Sector: _____

Province: _____

Age: _____

Sex: ___Male ___Female

Name of the innovation platform: _____

2. Socio-economic characteristics of the respondent

Marital status: ____Married

____Single

____Divorced/Separate

____Widowed

Religious affiliation:

____Protestant

____Catholic

____Muslim

____Seventh Day Adventist

____Others (Specify) _____

Highest level of education attained: _____

Family size: _____

How many are in school but stay at home _____

How many are in school but don't stay at home except in holidays _____

How many have not started school _____

How many are too old to work on the farm _____

What is your major occupation?

____ Farming both crops and livestock

____ Farming only crops

____ Employed

____ Others (Specify) _____

Area of land under use _____ Acres:

Area inherited _____ Acres

Area purchased _____Acres

Area hired/rented _____ Acres

How many of these animals do you keep?

Cattle _____

Goats _____

Sheep _____

Pigs _____

Chicken _____

4. When did you join this innovation platform? _____

5. What were your expectations on joining the innovation platform?

_____

_____

_____

6. What position or responsibility do you have in this innovation platform?

____Committee member (please specify position) _____

____ Member

7. What activities have you participated in since joining this innovation platform?

_____

_____

_____

_____

8. So far, what have you benefited from being a member of the Innovation platform?

___Technology

____Seed

____ Fertilizers

____ Others (Specify) _____

___ Knowledge/skills (Specify)

(i) _____

(ii) _____

(iii) _____

___ Access to new or better markets

___ Value addition to the produce

___ Social networks and relationships

___ Others (Specify) _____

9. What more do you expect to gain from being a member of the Innovation platform?

_____

_____

_____

10. What needs to be in place for you to fully benefit from the innovation platform?

_____

_____

_____

11. What are three major challenges you have experienced in your Innovation Platform and what have been the solutions so far?

	Challenge	**Solution**
1		
2		
3		

12. What do you think the various actors need to do to sustain the innovation platform even after RIU has closed?

Actor category	**Roles/responsibilities**
Individual producers /farmers	
The farmer cooperatives	
Processors	

Research and extension	
Financial institutions	
Input suppliers and traders	
Policy makers/local leaders	
Others (Specify)	

13. What is the role of RIU in the platform now?

____ Facilitating meetings and networks

____ Providing inputs

____ Others (Specify) _____

14. What do you foresee as the challenges for the Innovation platform when RIU is finished?

_____

_____

_____

Appendix 6: Key Informant Interview for other IP actors

Introduction

Dear Respondent, I am a student from Makerere University, Uganda, pursuing a Masters'Degree in Agriculture Extension/Education. Makerere University and the Principal Researcher invite your participation in this study: **"Capacity for Sustaining Agricultural Innovation Platforms in Rwanda"** by giving responses to the following questions. The purpose of this questionnaire is purely academic. Your responses will be treated confidentially, and will not be used in any other way. Your name and address are requested. Your co-operation will be highly appreciated.

Questions	**Responses**
1. Name of IP	
2. Actor category	

3. When did you join the IP?	
4. How do you come to get involved in the IP?	
5. What are your roles and responsibilities in the IP?	
6. What skills do you need to perform your roles and responsibilities effectively?	
7. What do you and your organization hope to benefit from involvement in the IP?	
8. What needs to be in place for all the actors in the IP benefit?	
9. What are the challenges that the IPs face at the moment?	
10. What needs to be done to address those challenges and to sustain the IPs?	
11. Any addition?	

Appendix 7: Competences scores

Competence scores for producers and producer cooperatives

Specific Competences	Scores																				
	Importance 1 = Not important at all 10 = Extremely important											Need for Capacity building 1 = No need for capacity building 10 = Great need for capacity building									
Organising themselves and managing group dynamics	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Business planning based on a development vision	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Articulation of demand for research and advisory services that matches with their business/development plans	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Taking initiative to source for knowledge and technologies that will enable them achieve their development vision	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Share knowledge, learn from each other and openness to change	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Negotiation with different actors for fair deals	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Lobbying and advocacy – making themselves visible and felt by other actors including the politicians	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Courage to get started with new ideas to take advantage of market opportunities	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Searching for market information and utilising it expand their markets-marketing the products and sub-products	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Financial management	1	2	3	4	5	6	7	8	9	1		1	2	3	4	5	6	7	8	9	1

and discipline – wise use of money including the culture of saving and investment										0											0
Self-confidence and believing own potentials	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing the capacity of individuals and local groups for critical analysis and decision-making	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in seeds systems (multiplication-selection-laws-distribution and marketing)	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in pests and disease management	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in post-harvest technologies (storage, processing, packaging and marketing)	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in machinery and irrigation	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in Standardization of product(Rwanda Bureau of Standards)	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Competence scores for researcher and extension

Specific Competences	**Scores**																				
	Importance **1 = Not important at all** **10 = Extremely important**											**Need for Capacity building** **1 = No need for capacity building** **10 = Great need for capacity building**									
Commitment to respond to demand and in a respectful manner	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Translating demand into	1	2	3	4	5	6	7	8	9	1		1	2	3	4	5	6	7	8	9	1

research question and service delivery action plans										0											0
Facilitating learning and knowledge/technology exchange	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Good communication skills for different client categories	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Brokering and negotiating partnerships, linkages and networks that benefit all IP actors	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Self-reflection and providing constructive feedback	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Engaging with the community and other actors to develop relevant knowledge and technologies (action research)	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Thinking in a value chain perspective	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Team work – working in multidisciplinary teams	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Managing group dynamics, and multiple and divergent expectations	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Thinking in a value chain perspective	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Accepting criticism and feedback in a positive manner	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Applying a variety of approaches to influence change with persistence	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Creating linkages between Research, Extension and End Users and Markets	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Fabricating starch	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Machinery and irrigation	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Use of oxen	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Competence scores for processors and input suppliers

Specific Competences	**Scores**																				
	Importance **1 = Not important at all** **10 = Extremely important**											**Need for Capacity building** **1 = No need for capacity building** **10 = Great need for capacity building**									
Identifying business opportunities and realistically assessing risks	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Transparency, honesty and fairness	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Good communication and negotiation skills	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Market intelligence and timely response to market opportunities	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Quality assurance and ensuring standards	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Business planning and management	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Self-assessment and decision making	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Overcoming fear of failure, risk taking and learning from all experience	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in storage, machinery and other equipments	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in food technology, processing, packaging and marketing	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Increasing knowledge and skills in Standardization of product (Rwanda Bureau of Standards)	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Competence scores for financial services providers

Specific Competences	Scores																			
	Importance 1 = Not important at all 10 = Extremely important											Need for Capacity building 1 = No need for capacity building 10 = Great need for capacity building									
Good communication skills	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Counselling and encouragement/motivation	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Timely response to demand	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Realistic enterprise assessment	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Marketing credits to clients	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Competence scores for Local leader and policy makers

Specific Competencies	Scores																			
	Importance 1 = Not important at all 10 = Extremely important											Need for Capacity building 1 = No need for capacity building 10 = Great need for capacity building									
Lobbying and advocacy	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Influencing policy processes based on expressed needs	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Good communication skills	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Good governance and leadership skills	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
Knowledge on agriculture lows	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10
	1	2	3	4	5	6	7	8	9	10		1	2	3	4	5	6	7	8	9	10

Appendix 8: Relationship between research design and particular data collection methods

	Total population of IPs : 175	
Type of design	Case study	Cross-sectional survey
Method of data collection (Data collection tools)	FGDs **(42)** (Questionnaire-guide) Deep interviews **(4)**	Individual interviews (Questionnaire-guide) **(102)** **Five categories of actors**
	Observation-guide	Scores-sheets **(144)**
Analysis tools	Analysis of documents (Content analysis)	Analysis of Documents (SPSS, SNA were used for quantitative analysis)
Type of data to collect	Qualitative	Quantitative
Objectives of the study addressed	Objective 1,2,3	Objective, 1, 2,3