INNSPUB

International Journal of Agronomy and Agricultural Research (IJAAR)
ISSN: 2223-7054 (Print) 2225-3610 (Online)
http://www.innspub.net
Vol. 12, No. 5, p. 85-99, 2018

REVIEW PAPER OPEN ACCESS

Review of the factors contributing to the sustainability of the agricultural innovation platform

Humphrey Putaa*[1], Bukaza Chachage[2], Liliane Pasape[3]

[1]*Department of Sustainable Agriculture and Biodiversity Conservation (SABC),*
Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha, Tanzania
[2]*Faculty of Business Management, Open University of Tanzania, Iringa, Tanzania*
[3]*School of Business Studies and Humanities,*
Nelson Mandela African Institution of Science and Technology (NM-AIST), Arusha, Tanzania

Article published on May 30, 2018

Key words: Innovation, Innovation platform, Sustainability.

Abstract

The study reviewed factors contributing to the sustainability of the agricultural innovation platform (AIP) in Africa. The study found that the sustainability of the AIP is influenced by the numbers of factors which are; motivation, commitment and ownership, capacity building, resources mobilization and linkages. The study recommend that for sustainability of the AIPs; motivation of the stakeholders should start at the initial stage of platform formation, the interest of the stakeholders must be incorporate into platform activities in order to motivate stakeholders, business model should be developed by the platform on how financial resources should obtained and ways of sustained its sources. Moreover, membership contribution should be emphasized, because it can generate revenue and develop sense of ownership. Capacity building in term of training, fields visit, demonstrations, and workshops it develop capacity of actors to innovate so as to address their constraints in the given value chain. In addition, training facilitation techniques to the actors is important and also facilitation role should rotate among the platform actors. Horizontal linkage that connects platforms of the same level should be emphasized in order to enable stakeholders to learn how other platforms address the similar issues. Lastly, vertical linkage should be encouraged to enabling stakeholder at higher level to learn and see the real situation of the community at the local level.

* **Corresponding Author:** Humphrey Putaa ✉ humph.putaa@gmail.com

Introduction

Innovation platforms (IPs) have become a common useful tool in the field of agriculture research and development to enhance innovation in agriculture sector (Dror, 2015). It organize interactions and learning among different actors in a selected agriculture value chain who collaborate to identifying the challenges, exploration of opportunities and investigation of the solutions that leading to the promotion of agriculture innovation along the selected value chain with the common goal of improving the livelihood of the smallholder farmers and other stakeholders in the value chain (Fatunbi *et al.*, 2016; Fatunbi *et al.*, 2015). With regard to the historical background of innovation systems in Sub-Saharan African Nederlof, *et al.* (2011a) pointed out that in sub- Saharan African various approaches for agriculture research and development that aimed at increasing food and nutrition security, reducing poverty and environmental degradation have emerged and changed over time. Started in 1950's when technology transfer approach was introduced and used in agriculture research and development, whereby research scientists producing new technology and extension agents disseminate to farmers and farmers are expected to adopt and utilize in their field (Ampadu-Ameyaw *et al.*, 2016; Makini *et al.*, 2013). Later on, this approach was criticized due to its limitation of not involving and acknowledging the knowledge of farmers in the development of new technology (Nederlof and Pyburn, 2012).

Consequently, holistic approach emerged in 1970's which focused on entire farming system with the aim of understanding the constraints are faced by farmer (Nederlof and Pyburn, 2012). In this approach, interdisciplinary teams of researchers visited farms and listened to farmers and collaborated with them and attempted to understand farms as system (Amankwah *et al.*, 2015). The main learning and teaching activities consist of analysis and field trials in the farmer's field and monitoring and evaluation to what extent farmers adopted technology and continued to utilize in their field (Amankwah *et al.*, 2015). This approach also demonstrated some limitations such as the complexity of farming system which makes it impossible to keep track of so many factors like biological, social and technology (Nederlof and Pyburn, 2012). In the mid of 1980's participatory approaches where introduced. Those approaches were farmer back to farmer, farmer first and last, and farmer participatory technology development and farmer participatory research (Mulema, 2012; Ampadu-Ameyaw *et al.*, 2016).

The approaches are focusing on involving farmers in the process of producing, testing and evaluating technology to promote sustainable agricultural production. The main goal was to produce technology that suite smallholder farmers and ensure technology adoption to increase productivity and income (Mulema, 2012). These approaches recognized the importance of farmer's involvement in the technology development process. However, the approaches failed to recognize institution and organization constraints as well as importance of multi-stakeholders involvement in the process of enhancing innovation (Makini *et al.*, 2013).

In the1990s and 2000s innovation system approach emerged which emphasize that innovation emerges through interaction between multi-stakeholders (Nederlof, *et al.*, 2011a; Nederlof and Pyburn, 2012). This approach recognizes the role of institutions, multi- actor's involvement and policies toward enhancing innovation in the agriculture sector (Ampadu-Ameyaw *et al.*, 2016).

The approach considers innovation consist of three basic elements; technological, organizational and institutional (Nederlof *et al.*, 2011a). It was from this approach innovation platform gained momentum as a mechanism for enhancing interaction among multi-stakeholders in agriculture research and development (Akpo *et al.*, 2016; Pali and Swaans, 2013). Despite various studies indicate the emergence, evolution, formation and importance of IP in sub-Saharan African countries. Limited literature is available on the factors contributing to the sustainability of the AIPs. Therefore, this review paper aims at highlighting factors that contributes to the sustainability of AIPs.

Review methodology

Methodologically approach, the study adopted qualitative research strategy and used the content analysis focusing on analyzing various types of texts such as books, book chapter's, peer reviewed published articles, as well as web based articles from various internet databases. This methodological approach aided in making replicable and valid inferences from data to their context, with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action as shown in Elo and Kyngas (2008). The methodology provided wide knowledge on areas of AIPs and their sustainability. The study used both older and recent literature in order to provide a historical perspective on the subject matter as well as the advances in this study. Reliability and validity of information was ensured by using search engine called Google scholar to search key words such as innovation, IP, and sustainability of IP. Only peer reviewed journal articles, thesis, dissertation, electronic books, research and project reports from credible institution, policy briefs, book chapters and research briefs were screened and selected most relevant to the study.

Innovation platform in a nutshell

Innovation concept

Innovation as stated by Rogers, (2003) is an idea, practices or object that is perceived as new by an individual or another unit of adoption. Similarly, Fatunbi *et al.* (2015) defined innovation as the successful use of new knowledge or technology to deliver social and economic change. On the other hand Posthumus and Wongtschowski (2014) defined innovation as the process of putting ideas that are new to a certain place into practice and in this way changing the situation of those living in this area for the better. These new ideas in agriculture can be; a new policy that support women and marginalize smallholder farmers to access bank loans, a new way of organizing farmers to improve selling their products, and a new way of enabling farmers to improve irrigation of their farms. According to OECD (2005) distinguished four types of the innovation namely; product innovation, process innovation, market innovation and organizational innovation. The first type is product innovation refers to the process of improving or introduces a good or services. This based on introducing of new product or services and significant improvement of existing products or services. Example of the product innovation is the fodder choppers developed by IP actors in India (Duncan *et al.*, 2015). Another example of product innovation is the Mamera drink that was developed by the members of Babure sorghum IP in Uganda (Boogaard *et al.*, 2013a).

The second type is process innovation which refers as the process of changing the way to create or deliver products or services. The third type is market innovation, which means introducing new marketing methods that include changes in design of the product, techniques of promotion and placement and method of pricing product or services. The fourth type is an organizational innovation which refers as the introducing or improving new organization methods like improving organizational structure and management techniques. Example of organizational innovation that emerged through IP was the Memorandum of Understanding (MoU) that was signed between stakeholders in the platform in Rwanda to clarify the role of each member and promote commitment of the actors in the platform (Dusengemungu *et al.*, 2014).

Innovation platform concept

IP as described by Homann-KeeTui *et al.* (2013) is the group of stakeholders with different background and interest who come together to diagnose problems, identify opportunities and find ways to achieve their goals. Similarly, IP can be defined as a physical, virtual network of stakeholders which is organized around a commodity or system of mutual interest to faster collaboration, partnership, and mutual focus to generate innovation on the commodity or system (Adekunle and Fatunbi, 2012). IP has different names but the same idea, these names including; innovation clusters, concentration and innovation groups, innovation network research for development platform (Nederlof and Pyburn, 2012) Innovation coalition, innovation configuration, and multi-stakeholder platform (Homann-KeeTui *et al.*, 2013).

According to Birachi *et al.* (2013) identified the following three types of the IP which are dealing with the value chain:

- *Farmer-based innovation platform*: This enables farmers to market their produce. It brings together farmers, buyers, processors and service providers together with the goals of enabling farmers to sell their produce to buyers. This kind of platform normally negotiates on behalf of farmers and always avoids certain individual actor like traders who may exploit farmers.
- *Value chain based innovation platform* this kind of platform focuses on the whole value chain of the given commodity. The aim of this platform is to identify and address the constraints in the value chain and find ways to improve the value chain.
- *Accidental innovation platform* this kind of platform normally starts in ad hoc manner. These kinds of the platform are formed to deal with another topic such as animal feeding or crop production, but in the process the stakeholders identify another burning issues such as market development and part of the platform shift to deal emerged issues.

On different perspective, Nederlof *et al.* (2011a) pointed out three types of the IP as follows:

- *Learning and research-oriented platform:* aimed at learning how innovation emerges and how it can be sustained. This type of IPs is organized by research organizations. An example of these kinds of platforms is the oil palm IP in Ghana and maize IP in Rwanda.
- *Development and research-oriented platform:* focus on local economic development where researchers play the role in the platform processes. Examples of platforms in this group are vegetable IP in Malawi, maize and legume platform in Nigeria.
- *Development and non-research oriented platform:* The platform aimed at achieving local economic development where research does not play a role. An example such platforms are the soybean platform in Ghana, oil seed platform in Uganda and Mango platform in Kenya.

As evidence in the above types of IPs, it is clear that the formation of the platform type is context specific and situational in nature.

Composition of the innovation platform

According to Fatunbi *et al.*, 2016; Fatunbi *et al.*, 2015) AIP composed of diverse actors namely; farmers and their organization, processors, traders, transporters, marketing agents, input suppliers, output handlers, policy makers, extension agents, researchers, agricultural finance institutions, information service providers, Non-governmental organization (NGO's) operating within the community and environmentalist. Wennick and Ochola. (2011) categories five groups of actors involved in AIP which are; Smallholder farmers, input dealers, agro-food processors and traders, private and public providers, financial institutions and regulatory bodies.

However, the membership of an IP can change over time and it depends on the issues or activities that the platform is working on. When platform focuses on a single issue it will require a limited number of actors compared to when the platform deals with multiple issues (Nederlof and Pyburn, 2012). Moreover, when the platform achieves its objectives or new issues arise, it influences the platform to change its focus and its composition (Homann-KeeTui *et al.*, 2013). This is because the platform will need new actors which will address the emerging issue or challenges, therefore new actors will be added in the platform while other stakeholders will leave the platform (Ampadu –Ameyaw *et al.*, 2016). For example, in Sierra Leone and Gambia after IPs achieved an improved productivity of cassava and maize new challenges of processing and marketing emerged. The emergence of these new challenges influenced the members of the platform to add new actors which are traders and processors to work together to address market and processing challenges (Mur and Pyburn, 2014).

Formation of the innovation platform

The formation of the IP passes through various stages and it varies depending on various scholars as shown in Table 1. However, there are main four phases of IP formation namely: initiation, establishment,

management and sustainability (Ampadu- Ameyaw *et al.*, 2016; Makini *et al.*, 2013). Under the first phase various activities can be done such as; site selection for IP activities, create awareness among stakeholders and determination of the agenda and entry point by undertaking scoping study to identify commodity or system that the platform will deal with, as well as its challenges and opportunities. This can be done by involving various stakeholders from the given selected commodity of the value chain (Mur *et al.*, 2014; Fatunbi *et al.*, 2016; Lema, 2014).

The second phase is establishment; during this phase stakeholder analysis is conducted to identify stakeholder's interest, influence and their role that expected to play in the platform. Thereafter, relevant stakeholders are selected and engaged in the platform (Ampadu-Ameyaw *et al.*, 2016). Then a first meeting with selected stakeholders has to be conducted and the initiator gives the feedback of the initiation stage (Lema, 2014). Stakeholders develop common vision and action plan through undertaking a series of meetings where functions and agenda of the platform is redefined, management structure established, roles and responsibilities of each stakeholderare identified, required resources for implementation of the platform activities is identified and mobilized, modes of the meetings identified, first plan of action is developed, and maintain stakeholders commitment (Homann- Kee Tui *et al.*, 2015). The third stage is management; during this stage, stakeholders define the objective of the platform and agree on the ways of operating the platform such as rules and regulations, communications, leadership and facilitation (Makini *et al.*, 2013). Planned activities are implemented at this stage and regular meetings are organized and facilitated by the individual with knowledge and skills in facilitation, different activities are conducted such as demonstrations, field visits to enable actors to share their experience (Lema, 2014). Besides that, stakeholders develop indicators of monitoring and evaluation which will be monitored by identified platform member (Homann- Kee Tui *et al.*, 2105). However, Nederlof and Pyburn, (2012) indicated that in management stage power and balance should be managed, conflict resolution mechanism should be developed, gender issues should be considered, understand socio-cultural norms of the members should be understood and building the capacity of the stakeholders in the platform.

The fourth stage is sustainability; after existing issues or challenges are already solved, new issues or challenges emerge and these issues lead to departure some of old stakeholders from the platform and new stakeholder join the platform to address the emerged issues (Lema, 2014). However, the emerging issues or challenges can be influenced by individual or organization with the knowledge in those new issues or has knowledge to bring relevant interventions to address the new emerging issues or challenges (Ampadu-Ameyaw *et al.*, 2016; Lema, 2014). Moreover, for the future existence of the platform require the continued delivered benefits or improved benefits to the members which acts as the incentive to the members to influence their participation in the platform activities. In addition to that good facilitation skills, capacity building among the actors, teamwork, information sharing and transparency are also important for sustaining IP (Makini *et al.*, 2013).

Table 1. Steps for innovation platform formation.

Author	Steps for innovation platform formation
Amankwah *et al.*, 2015	4 Steps: Initiation with stakeholder identification; Identification of common objectives and problems; Search for solutions and implementation of action; Evaluation of the action.
Adekunle *et al.*, 2010	10 Steps: Location of sites for activities; Identification of commodity or system of focus; Stakeholder identification; Engagement of researchers; Development of governance and management guidelines; Facilitation interaction of stakeholders; Development of business plan; Implementation of business plan; Establish monitoring and evaluation measures; Review implementation and lessons learnt
Nyikahadzoi *et al.*, 2012	6 Steps: Site selection; Identification of potential IP actors; Development of common research agenda; Formation of work plans; Development monitoring and evaluation protocols; Development of knowledge and sharing mechanism

Author	Steps for innovation platform formation
Homann-KeeTui *et al* 2013	7 Steps: Initiate; Decide the focus; Identify options; Test and refine solutions; Develop capacity; Implement and scale up; analyze; Learn.
Tenywa *et al*., 2011 Adenkule *et al*., 2013	6 Steps; Identification research and development challenges, Site selection, Consultative and scoping study, Visioning and stakeholder analysis, Development of actions plans; Implementation of action plans.
Makini *et al*., 2013 Ampadu-Ameyaw *et al*., 2016	4 Steps: Initiation; Establishment; Management and Sustainability
Nederlof and Pyburn, 2012 Mur *et al*., 2014	4 Steps: Scoping; Process management; Learning and restructuring; Renegotiating
Schut *et al*., 2017	7 Steps: Initiation; Decide the focus; Create joint understanding of the problems and identification of entry points; Test and refine solutions; Develop capacity; Out scaling and up scaling; Transition.
Fatunbi *et al*., 2016	9 Steps: Location of sites; Identification of target commodity and analysis of its market chain; Stakeholder identification and validation; Engagement of researchers; Development of governance and management guidelines; Facilitation interaction of stakeholders; Development and implementation of business plan; Establish monitoring and evaluation measures; Review implementation and lessons learnt
Nerdelof *et al*., 2011b	5 Steps: Delimination of the innovation platform; Initial local stakeholder mapping and selection; Joint innovation system analysis and identification of promising entry points for action; Development of a joint action plan agreement on division of tasks; Sustainability and scaling up

Adopted from Boogaard *et al*., 2013b and Priesemeister, 2015.

Operation levels of the innovation platform

IP can operate at different levels such as Local level or community level, regional level or provincial level and national level (Homann-KeeTui *et al*., 2015; Wennick and Ochola, 2011). IP at the local level or community focuses on identifying opportunities or practical solutions to local problems by linking different stakeholders at local level.

The regional and national level IP are based on influencing policy process formation by informing policy makers who formulate policies that will have influence on local level IP activities (Nederlof *et al*., 2011a; Nyikahadzoi *et al*., 2012). Moreover, Akpo *et al*., 2016 and Adekunle *et al*. (2010) delineated that IP can be operated at two levels namely; strategic level and operational level.

The first level is strategic IP level operates at higher level of governance and management where strategies for agriculture development are established. It normally operates at regional and national level (Fatunbi *et al*., 2016). The second level is operational IP level operates at grassroots level or community level such as village level. Their focus is to improve targeted agriculture value chain at the community level or grassroots level (Fatunbi *et al*., 2015).

Sustainable innovation platform concept

Sustainable IP as stated by Makini *et al*. (2013) defined as the platform that is able to continue innovate, consolidate its gains, change its focus when necessary, renew its membership to address new issues and thereby continue to generate benefits for its members over time with relative stability. Dusegemungu (2011) on the other hand define it as the process whereby an IP demonstrates the capacity to continue or extend its activities by its own support after the end of support from different donors. Moreover, Gildemacher *et al*. (2011) described sustainable IP as the process whereby platform continue with its activities and delivered benefits to the stakeholders after the donor funding withdrawn or end.

Factors contributing to the sustainability of the agricultural innovation platform

Motivation, commitment and ownership

Motivation and commitment to the stakeholders as well as ownership of platform by the actors are crucial for the sustainability of the IP (Pyburn and Mur 2014). This is further supported by Eneku *et al*. (2013) that the function of the platform depends on the commitment and willingness of the stakeholders to deliver their knowledge, skills, and resources to the platform. Moreover, the benefits that stakeholders obtain from the platform act as incentives that

generate motivation and commitment among the actors to participate in the platform activities (Makini *et al.*, 2013). However, actor's participation in the platform changes over time depends on the perceived interests of the stakeholders. Thus it is important to assess the interests that act as motivations of stakeholder's participation and incorporate into platform activities. These encourage participation of stakeholders in the platform and also enhance sustainability of the platform (Kawuma and Ouma, 2016).

Based on the findings of Mulema and Mazur (2015) the incentives that motivate stakeholder's participation in the IP vary. For instance the incentives for the farmers are; access to inputs, access to knowledge and skills in crop and livestock production, access to markets, value addition, access to credit and income. The incentives for extension agents are achieving their organization goals of improving farmer's livelihood. Policy makers are motivated by the programmes that improve farmer's livelihood. Processors input suppliers and traders their incentives are, access to products from farmers, Earn more profit, access to credit and access to new market of their products. Brouwer *et al.* (2016) also pointed out that access to knowledge, skills is the incentive that keeps stakeholders in the platform and it makes actors to increase their participation in the platform.

Similarly, Makini *et al.* (2013) indicated that the incentives or benefits that motivate farmer to participate in the platform are access to increase their production, securing credit, access to inputs and access to market, while incentives for the input supplier would be profit-making from the selling inputs, incentives for the processors would be access to available products needed for the production, and the incentives for the researcher and extension agents would be conduct more relevant research to tackle farmers problems and improved technology dissemination that will improve production and livelihood of the farmers. Dangbegnon *et al.* (2011) delineated that in the maize legume IP in Nigeria, stakeholders have different incentives that made them participate in the platform. Farmer's incentive was improvement of maize legume production, input suppliers their incentive was to sell inputs to the farmers, researchers their incentives was to learn new skills from other members, exchange experience with other stakeholders.

Furthermore, time investment is important for maintain actor's commitment to the platform, the facilitator need to elucidate amount of time actors need to invest in the platform, this is because when actor take more time to engage in the platform without obtain expect benefits, their commitment and participation will be low (Boogaard *et al.*, 2013b). Thus the initiator of the IP needs to consider the short-term and long term benefits of the platform to the stakeholders. This is because once the actor achieves its short-term benefits it motivates to continue to participate in the platform. Also, initiator must continue sensitizing stakeholders about long-term benefits of the platform (Mulema and Mazur, 2015; Posthumus and Wongtschowski, 2014).

Resources Mobilization

Resources mobilization is the means that organization employ to secure new and additional resources (Education Research Network for West and Central Africa, 2010). Resource mobilization is a very important process of obtaining resources required for the operation of the IP and ensures future existence (Swaans *et al.*, 2014). Thus in order for the platform to function there is need to identify what kind of resources needed, sources of resources and strategies can be employed for sustained sources of resources (Makini *et al.*, 2013). The most required resources by the IP are; time, financial resources like funds; human resources such as facilitator, stakeholders, coordinator, and researchers; physical resources such as land, meeting venue, Seeds, transport and research technologies (Schut *et al.*, 2017).

Financial resource is the most important resource that platform need to have in order to operate effectively and effeciently both in the present and in the future (Kusters *et al.*, 2017). This is because IP activities such as; trainings, meetings, workshops, exchange visit, demonstrations, communications, marketing, and facilitation role of bringing actors together entail funding (Makini *et al.*, 2013).

However, most of the IPs are initiated by the projects and obtains their financial resource from those projects, but after a certain period of time projects financial support ends (Akpo *et al*., 2016). Therefore, for the sustainability long-term funding is required for running Platform activities (Adekunle *et al*., 2012). Funding for sustaining IP activities may obtain from various sources such as; Membership fees, monthly contribution, volunteer services members, government support, Non-governmental organizations (NGO's) and private sectors support (Schut *et al*., 2017; Wennick and Ochola, 2011; Akpo *et al*., 2016).

What most important is financial resources should come from the business model that developed by the platform members. For example Kiene IP in Kenya initiate income generation activities that are not related to platform objectives, by purchase plastic chairs for hiring in order to obtain fund to run platform activities (Makini *et al*., 2013).In addition to that Adenkule *et al*. (2013) proposed that financial resources may also obtained by developing capacity of platform members to write proposal for funding. A case example is the Focal area development committee IP and Bungoma south farmer's IP in Kenya. These IPs in Kenya wrote proposals and obtained funds (Makini *et al*., 2016).

Capacity building

Capacity building is a major component of Agricultural Research for development (Aerni *et al*., 2015). The Presidents Emergency Plan for AIDS Relief (2012) defined capacity building as the process of strengthening and maintaining the abilities of people, organizations, and society to perform core functions sustainably and to continue to improve and develop over time. According to Kusters *et al*. (2017) IP stakeholders need to have access to relevant knowledge and skills. That will enable them to manage IP as well as for developing joint activities. Nevertheless, Leeuwis *et al*. (2014) highlight capacities that are needed in order to innovate at the multi-stakeholders level which are; capacity to identify and prioritization of the problems and opportunities, mobilize the resources, take risks, collaborate, coordinate and linkage with other actors. Capacity building in the IP can be done at individual level and organizational level (Pyburn and Mur 2014).

i) Capacity building at individual level

Capacity building at individual level focuses on the strengthening the facilitation techniques of the individual who facilitate the process of multi-stakeholders interaction in the platform as well as strengthens abilities of the stakeholders in the platform to innovate (Makini *et al*., 2013). The success of IP depends on the good facilitation skills that a facilitator of the platform possesses and applied it to facilitate the interaction among the stakeholders (Homann-Kee Tui *et al*., 2015; Lema, 2014; Posthumus and Wongtschowski, 2014). A facilitator as stated by Mur *et al*. (2014) defined as an individual or organization that help a group of people to understand their common challenges, opportunities and objective and assist them to search for inclusive solutions and to build sustainable agreements and make plans to realize them. Nederlof *et al*. (2011b) pointed out that facilitation processes of the IP require multiple skills that the facilitator should possess and it is very rare to find the facilitator with all skills, therefore facilitator needs to be capacitated in order to acquire more skills of facilitation.

According to Tukahirwa *et al*. (2013) and Lema. (2014) identified skills and characteristics that a good facilitator should possess in order to facilitate interaction among the stakeholders are; listening and able to give feedback, respect opinion of others, understanding audience and group dynamic, trust people and their capacities, flexible in changing methods and sequence, self-awareness and openness to learning new thing, confidence without arrogance, presentation skills, positive and consistent skills, good listening skills and patience, able to create capacity of confidence among the participants and good sense of arrangement. Again, Brouwer *et al*. (2016) depicted out three type of roles that facilitator should play to enhance interaction among the stakeholders in the platform. The first role as a convener, which means bringing stakeholders together and stimulate interaction, through identify key stakeholders, their role and motivate them to participate in the

platform. The second role as a catalyst based on stimulate the stakeholders to think outside the box and enable them to develop solution and implement and third role as the moderator based on manage stakeholders their different and support the process of mutual learning to enhance their collaboration.

The facilitation process in the IP is dynamic in the sense that once research institution or development organization establish IP and take role of facilitation at the early stage there is need to exchange to other members of the platform to take the role of facilitation for the sustainability of the platform (Homann-Kee Tui., 2015; Akpo *et al.*, 2016). This is further supported by Brouwer *et al.* (2016) platform should be facilitated by outsider at the beginning and later on transferred to insider. But new members who will take the facilitation role should be capacitated on how to manage and facilitate IP as the way to sustain it (Pali and Swaans, 2013). For instance, in India and Mozambique once IP was formed to improve goat production. Then initiators take the role of facilitating it at the early stage and later on actors in the platform were trained on the facilitation skills and take over the facilitation role (Swaans *et al.*, 2014). Likewise, Van Rooney *et al.* (2017) show out that IP which was implemented in six irrigation schemes from Tanzania, Mozambique and Zimbabwe local facilitator were trained to facilitate the interaction of actors in the platforms so as to continue innovate and sustained it. Furthermore, Mur, *et al.*, 2014; Lema, 2014; Schut *et al.* (2017) documented that the facilitation role should be shared among the stakeholders in the IP and this it develop the sense of ownership among the actors.

According to Pyburn and Mur (2014) capacity building of the stakeholders to innovate and engage in the IP activities is important for the continuity of the platform, this is because actors need training that will develop their abilities to work with other actors and innovate so as to address challenges. This is depicted by Homann-KeeTui *et al.* (2015) that actors like input suppliers and traders need training on cost-benefit analysis and ways to communicate market requirements to farmers, while Project team needs training on the operations of the IP which will help them to initiate the platform. Similarly Dusengemungu *et al.* (2016) reported that in the IP producers need to be capacitated on business skills and use of technical knowledge and skills. Researchers and extension agents need to be capacitated on participatory and multi-disciplinary engagement with stakeholders and communication skills. Processors and input suppliers need to be capacitated on value addition, business skills and post- harvest handling. Financial services providers need to be capacitated on communication skills, counseling, motivation and marketing credit services to clients and lastly local leaders and policy makers need to be capacitated on knowledge in agriculture related laws and regulations.

In another study Schut *et al.* (2017) argued that it is important to strengthen the capacity of the stakeholders in the platform to enable them to address their challenges. For instance, farmers need training on different techniques of production that will improve their production, farmer's organization need training on how to organize themselves and how to manage marketing their products, research institutions may need training on how to facilitate and manage interaction among the actors in the platform. For example in Tyolo district in Malawi, IP was formed to promote vegetable production, farmers were trained on the types of vegetable customers need, production techniques of the quality vegetable and basic business management principle. In addition, farmers visit various supermarkets to collect information about demand of vegetable, price of vegetable and payment methods (Nyikahadzoi *et al.*, 2012). On the other hand, Mahonge, (2013) reported that training activities during implementation of the project activities, as the one of way to build capacity to stakeholders. Because it develops skills and knowledge which will scale out the project activities and ensure its sustainability.

ii) Capacity building at organization level

Capacity building at organization focuses on developing the ability of an organization to achieve its objective. It based on the level of formalization and institutionalization of the IP.

Formalization of the IP as stated by Wennink and Ochola (2011) defined as the legal registration of the platform as an association or any other form of organization by government authorities and the existence of rules, regulations, and structure that govern the activities of the platform. Formalization process it can sustain the existence of the platform and help platform to be recognized by other organizations or other entities like government authorities and also get legitimacy to represent group of people (Nederlof *et al.*, 2011b). For example, Bungoma South farmers IP in Kenya decide to register their platform in order to be recognized by the government (Makini *et al.*, 2016). Moreover, in Uganda Bubare IP was registered as a community-based organization in order to get support from local government (Adenkule *et al.*, 2013).

Furthermore, Nederlof and Pyburn, (2012) stated that IP can be formal or informal depend on the situation of the country where it operates. On the other hand, Homann-Kee Tui *et al.* (2015) believe that the formality of the IP can affect the flexibility of the stakeholders in the platform because it fixes who will be the member while the platform needs change overtime. But Makini *et al.* (2013) point out that whether platform is formal or informal it needs to have ground rules that govern the interaction of the actors in the platform. Those ground rules should define how actors make decision, the role and responsibilities of stakeholders, how new stakeholders join and leave the platform and how conflict is resolved among the actors in the platform. On the contrary, Nederlof *et al.* (2011b) suggest that IP should avoid any kind of formality that will limit the flexibility of the stakeholders in the platform, but should have formality that encourages the flexibility of the members in the platform.

Moreover, the existence of the governance structure with coordination body such as committee it is important because it makes platform more transparent and trustworthy (Posthumus and Wongtschowski, 2014). However, Schut *et al.* (2017) pointed out that the governance structure of the IP should be coordinated by executive committee which is responsible to run the affairs of the IP on behalf of other members. While the role of excutive committee include; work together with facilitator to call the meetings, organizing meeting venue, resolve conflict, documenting all minutes of the meetings and other activities and keeping track of any financial cost used in the platform activities. For instance the study conducted by Dusengemungu *et al.* (2014) indicated that maize IP in Rwanda is managed by executive committee composed of president, vice –president, secretary, treasurer and two counselors who are accountable towards the affairs of the platform.

In addition, Brouwer *et al.* (2016) argued that to ensure future existence and progress of the IP holding regular meeting is important, and each meeting should have clear agenda and proposed time for meeting to guide the members. In addition to that, Posthumus and Wongtschowski (2014) proposed that during the regular meetings actors should participate in planning, implementation, and discussion of achievements and report their progress activities. Besides that, executive committee in collaboration with facilitator should take responsibilities of ensuring that the regular meetings are conducted according to the arrangement made by the platform members (Makini *et al.*, 2013).

Linkages

IPs are operating at different location and at different levels such as; local level (community/ village), intermediary level (regional) and national level (Nederlof *et al.*, 2011b). However, platforms that are working on the similar issues but at different levels can be interlinked between them to promote innovation at given sector or sub-sector (Homann-KeeTui *et al.*, 2015). On the same, Lema, (2014) indicated that linkages between IPs need to be created so as to enable platforms to exchange knowledge and information between them. There are two types of linkages which are; horizontal linkage and vertical linkage (Rogers and Coates, 2015). Horizontal linkage refers to relationships created to connect platforms working at the same level. While vertical linkage refers to the relationships created to connect platforms working at different levels (Tucker *et al.*, 2013).

Linkages across the platforms can be formed through regular joint platforms meetings in which one or two representatives from each platform attend the meetings of other to share experience and discuss common issues. Organizing joint fields visit between platforms that working on similar issues to learn how others address problems. Also, invite higher level platforms to participate in the activities of local platforms to enable them to learn and see the reality. Joint trainings and workshops in which platforms representatives come together to learn and share the experience together (Mur and sanyang, 2014). According to Tucker *et al.* (2013) and Posthumus and Wongtschowski, (2014) linkages between IPs enhances cross learning, developing value chains, empowering local actors to influence policy, sharing success innovation, and fostering dialogue in policy making.

The findings of the study by Rogers and Coates, (2015) indicated that linkage to government is important to sustain resources, capacity, and motivation in the projects. However, when platform creates linkage with government authorities, the government can support platform through funding and capacity building. Also the government can set policies and approve by-laws that regulate the value chain of the commodity that will positively support platform activities (Amede and Sanginga, 2014). For instance, Tanga dairy platform in Tanzania, after creating linkage with regional public administration, the platform managed to remove the limitation proposed by Tanga city council of limiting dairy farming activities in the urban area. More important, platform managed to lobby policy makers to reduce value added tax on dairy inputs and products, by influence national assembly at national level to reduce the value added tax from 18% to 0% on all dairy inputs and products (Cadilhon *et al*., 2016).

Conclusion and future directions

To conclude, this paper aiming at reviewing the factors contributing to the sustainability of the AIP. Based on the literature reviews it was observed that four factors namely: motivation, commitment and sense of ownership, resources mobilization, capacity building and linkages, are important for sustaining AIP. Based on this review; the recommendations towards enhancing sustainability of the AIP include the following; during establishment of AIP and implementation of its activities the interests of each stakeholder should be incorporated. This will promote motivation, commitment and ownership among stakeholders and increase their participation in the platform. Platform members should also be empowered with skills in business development and financial management such as how to obtained and sustain financial resources.In addition to that, membership contribution among platform members should be emphasized in order to generate their own revenue. Moreover, capacity building through field days, exchange visit, trainings and workshops should be encouraged in the platform because it enable actors in the platform to innovate and address their constraints. Furthermore, executive committee should be capacitated on leadership and facilitation skills in order to enable them to manage platform. Horizontal linkage and vertical linkage should be emphasized in the AIP. This is because horizontal linkage enable stakeholders to learn how other platforms address the similar issues while vertical linkage enable stakeholders at higher level to learn and see the real situation of the community and this will help to develop policy that will address the real situation of local community at grassroots level.

Acknowledgement

The authors would like to thank the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) for funding this study through RUFORUM community action research project (CARP) Grant No: RU-2014-CARP-06.

Conflict of interest

We the authors of this paper hereby declare that there are no competing interests in this publication.

References

Adekunle A, Fatunbi A, Jones M. 2010. How to set up an innovation platform. A concept guide for the sub-Saharan African Challenge program (SSA CP). Forum for Agricultural Research in Africa (FARA) Accra, Ghana.

Adekunle AA Ellis-Jones J, Ajibefun I, Nyikal RA, Bangali S, Fatunbi O, Ange A. 2012. Agricultural innovation in sub-Saharan Africa: experiences from multi-stakeholder approaches. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Adekunle AA, Fatunbi AO, Buruchara R, Nyamwaro S. 2013. Intergrated Agricultural Research for Development: From concept to practice. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Adekunle AA, Fatunbi AO. 2012. Approaches for setting-up multi-stakeholder platforms for Agricultural Research and Development. World Applied Sciences Journal **16(7),** 981-988.

Aerni P, Nichterlein K, Rudgard S, Sonnino A. 2015. Making agricultural innovation systems (AIS) work for development in tropical countries. Sustainability **7(1),** 831-850 Available at: http://doi:10. 3390/su7010831.

Akpo E, Monyo ES, Rubyogo J. 2016. Setting and facilitation of functional innovation platform: Training of TL III project support teams in groundnut and common bean seed systems in Tanzania and Uganda. Training manual, Tropical legume III (TL III).

Amankwah K, Shaltovna A, Kelboro G, Hornidge AK. 2015. Acritical review of the follow-the-innovation approach: Stakeholder collaboration and agricultural innovation development (No.138) ZEF working paper series.

Amede T, Sanginga P. 2014. Innovation Platforms for sustainable land management in East Africa landscapes: Stewardship, incentives and challenges. Journal of soil and water conservation **69(4),** 127A-132A.

Ampadu-Ameyaw R, Omari R, Essegbey OG, Dry S. 2016. Status of Agricultural innovations, innovation platforms, and innovations Investment.2015 PARI project country report: Republic of Ghana. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Birachi E, van Rooney A, Some H, Maute F, Cadilhon J, Adekunle A, Swaans K. 2013. Innovation platforms for agricultural value chain development. Innovation platforms practice brief 6. ILRI, Nairobi, Kenya. Available at: http://r4d.dfid. gov.uk/pdf/outputs/waterfoodCP/Brief6.pdf.

Boogaard B, Dror I, Adenkunle A, Le Borge E, Van Rooney A, Lundy M. 2013a. Developing innovation capacity through innovation platforms. Innovation platforms practice brief 8. ILRI, Nairobi, Kenya. Available at: http://r4d.dfid.gov.uk/pdf/ outputs/WaterfoodCP/Brief8.pdf

Boogaard BK, Schut M, Klerkx L, Leeuwis C, Duncan A, Cullen B. 2013b. Ctitical issues for reflection when designing and implementing Research and Development in innovation platforms.

Brouwer H, Woodhil J, Hemmati M, Verhoosel K, vanVugt S. 2016. The MSP Guide: How to design and facilitate multi-stakeholder partnerships. Wageningen University and Research, CDI, and Ruby, UK: Practical Action Publishing. Available at: http://dx.doi.org/10.3362/9781780446691.

Cadilhon JJ, Pham ND, Maass BL. 2016. The Tanga dairy platform: Fostering innovations for more efficient dairy chain coordination in Tanzania. International journal of food system dynamics **7(2),** 81-9.

Dangbegnon C, Tarfa BD, Mando A, Amapu IY, Ezue SK, Ahmed B, Saleh MK, Abu ST. 2011. Improved Maize –Legume production system in Nigeria. In: Nederlof ES, Wongtschowski M, Van der Lee F. Eds. Putting heads together: Agricultural innovation platforms in practice. Amsterdam, Netherlands: KIT Publishers p.88-95.

Dror I. 2015. Capacity development, and innovation systems and platforms. Capacity development brief 5. ILRI, Nairobi, Kenya. Available at: https://cgspace. cgiar.org/bitstream/handle/10568/69205/capdev_brief5_web.pdf

Duncan A, Teufel N, Ravichandran T, Hendrickx S, Ballantyne P. 2015.Innovation platforms to improve smallholder dairying at scale: Experiences from the MILKIT project in India and Tanzania.

Dusengemungu L, Kibwika P, Kiazze FB. 2014. Enhancing Food Security Through innovation platforms: Experiences from Research into use project in Rwanda. Global Disclosure of Economics and Business **3(1),** 23-30.

Dusengemungu L, Kibwika P, Kyazze F. 2016. Assessing the capacity for effective multi-stakeholder participatation in innovation platforms: The case of Research-Into-Use Project in Rwanda. African journal of Rural Development **1(1),** 1-11.

Dusengemungu L. 2011. Capacity for sustaining agricultural innovation platforms in Rwanda: A case study of research into use project. Msc dissertation, Makerere University, Uganda.

Education Research Network for West and Central Africa. 2010. Resource mobilization. practical mini-guide for ERNWACA. Available at: http://www.rocare.org/docs/Training In Resource Mobilisation. pdf

Elo S, Kyngas H. 2008.The qualitative content analysis process. Journal of Advanced Nursing **62(1),** 107-115.

Eneku GA, Wagoire WW, Nakanwagi J, Tukahiriwa JMB. 2013. Innovation platforms: A tool for scaling up sustainable land management innovations in the highlands of eastern Uganda. African Crop Science Journal **21(1),** 751-760.

Fatunbi AO, Adekunle AA, Youdeowai A, Odularu GO, Adisa SA, Ohiomoba I, Akinbamijo AA. 2015. A Resource Manual for Training in Integrated Agricultural Research for Development (IAR4D) in Innovation Platforms. Forum for Agricultural Research in Africa (FARA).

Fatunbi AO, Youdeowei A, Ohiomoba SI, Adekunle AA, Akinbanijo OO. 2016. Agricultural innovation platforms: Framework for improving livelihoods in Africa. Forum for Agriculture Research in Africa (FARA).

Gildemacher P, Oruku L, Kamau-Mbuthia E. 2011. Impact and sustainability. In: Nederlof ES, Wongtschowski M, Van der Lee F. Eds. Putting heads together: Agricultural innovation platforms in practice. Amsterdam, Netherlands: KIT Publishers p. 55-67.

Homan-KeeTui S, Adekunle A, Lundy M, Tucker J, Birachi E, Schut M, Klerkx L, Ballantyne PG, Duncan AJ, Cadilhon J, and Mundy P. 2013. What are innovation platforms? Innovation platforms practice Briefs 1.ILRI, Nairobi, Kenya. Available at: http://r4d.dfid.gov.uk/pdf/ outputs/waterfoodCP/Brief1.pdf7.

Homann-KeeTui S, Hendrickx S, Manyawu G, Rao KPC, Robinson L. 2015. Implementation innovation platforms: A guideline for Dryland Systems Research. Available at: http://oar.icrisat. org/id/eprint/9208.

Kawuma B, Ouma EA. 2016.Multi-stakehodler platforms for smallholder pig value chain development in Uganda.

Kusters K, Buck L, De Graaf M, Minang P, van Ooten C, Zagt R. 2017. Participatory planning, Monitoring and Evaluation of Multi- stakeholder platforms in Integrated Landscape Initiatives. Environmental Management, 1-12 Available at: http://doi.org/10.1007/s00267-0847-y.

Leeuwis C, Schut M, Waters- Bayer A, Mur R, Atta-Krah K, Douthwaite B. 2014. Capacity to innovate from a system CGIAR research program perspective. Panang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems. Program Brief: AAS-2014-29.

Lema Z. 2014. Manual for innovation platform facilitators in Africa RISING Ethiopia sites.

Mahonge C. 2013. Factors behind sustainability of activities in the post-project period in Matengo highlands in Tanzania. Journal of Environmental Sustainability **3(3),** 5.

Makini F, Kamau G, Makelo M, Adekunle W, Mburathi G, Misiko M, Dixon J. 2013. Operational field guide for developing and managing local agricultural innovation platforms.

Makini FW, Kamau G, Makelo M, Mose LO, Salasya B, Mulinge W, Ong'ala J. 2016. Status of Agricultural Innovations Platforms and Innovations Investment .PARI project country report: Republic of Kenya. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Mulema AA, Mazur RE. 2015. Motivation and participation in multi-stakeholder innovation platforms in the Great Lakes Region of Africa. Community Development Journal **51(2),** 212-228.

Mulema AA. 2012. Organization of innovation platforms for agricultural research and development in the Great Lakes Region of Africa. PhD thesis and dissertation. Iowa state university, United States.

Mur R, Pyburn R, Sanyang S. 2014. Facilitating stakeholder interaction. In: Sanyang S, Pyburn R, Mur R, and Audet-Belanger, G. Eds. Against the grain and to the roots: Maize and cassava innovation platforms in West and Central Africa. Arnhem, Netherlands: LM Publishers p. 151-169.

Mur R, Pyburn R. 2014. Getting started. In: Sanyang S, Pyburn R, Mur R, and Audet-Belanger, G. Eds. Against the grain and to the roots: Maize and cassava innovation platforms in West and Central Africa. Arnhem, Netherlands: LM Publishers p.135-147.

Nederlof ES, Pyburn R. Eds. 2012.One finger cannot lift a rock: Facilitating innovation platforms to trigger institutional change in West Africa. KIT Publishers, Amsterdam.

Nederlof S, Gildemacher P, Heemskerk W, van der Lee F. 2011b. Facilitation of innovation: Experiences of RIU innovation Platforms in Tanzania, Rwanda and Zambia. Royal Tropical Institute (KIT) Publishers, Amsterdam.

Nederlof S, Wongtschowski M, van der Lee F. Eds. 2011a. Putting heads together. Agricultural innovation platforms in practice. Bulletin 396, KIT Publishers, Amsterdam.

Nyikahadzoi K, Pali P, Fatunbi AO, Olarinde LO, Njuki J, Adenkunle AO. 2012. Stakeholder participatation in innovation platform and implications for Integrated Agricultural Research for Development (IAR4D). International Journal of Agriculture and Forestry **2(3),** 92-100.

OECD. 2005. Olso Manual: Guidelines for collecting and interpreting innovation data, third edition .Paris: OECD.

Pali P, Swaans K. 2013. Guidelines for innovation platforms: Facilitation, monitoring and evaluation. ILRI Manual 8. ILRI, Nairobi, Kenya.

Posthumus H, Wongtschowski M. 2014. Innovation Platforms. Note 1.GFRAS Good Practice Notes for Extension and Advisory Services. GFRAS: Lindua, Switzerland.

Priesemeister F. 2015. Setting up an innovation platform for agribusiness opportunities in South Africa. A systems analysis of the preconditions for setting up an innovation platform to stimulate sustainable economic growth in Giyani, South Africa. Msc thesis, University of Utrecht, Netherlands.

Pyburn R, Mur R. 2014. Making a sense of practice. In: Sanyang S, Pyburn R, Mur R, and Audet-Belanger. Eds. Against the grain and to the roots: Maize and cassava innovation platforms in West and Central Africa. Arnhem. LM Publishers p. 29-50.

Rogers BL, Coates J. 2015. Sustaining Development: A synthesis of results from a four – country study of sustainability and exit strategies among development food assistance projects.

Rogers E. 2003. Diffusion of innovations. Third edition, Free Press, New York.

Schut M, Andersson JA, Dror I, Kamanda J, Sartas M, Mur R, Kassam S, Brouwer H, Stoian D, Devaux A, Velasco C, Gramzow A, Dubois T, Flor RJ, Gummert M, Buizer D, McDougall C, Davis K, Homan-Kee Tui S, Lundy M. 2017. Guidelines for Innovation Platforms in Agricultural Research for Development. Decision support for research, development and funding agencies on how to design, budget and implement impactful innovation platforms. International Institute of Tropical Agriculture (IITA) and Wageningen University (WUR) under the CGIAR Research Program on Roots Tubers (RTB). p.88. June.2017.

Swaans K, Boogaard B, Bendapudi R, Taye H, Hendrickx S, Klerkx L. 2014. Operationalizing inclusive innovation: lessons from innovation platforms in livestock value chains in India and Mozambique. Innovation and Development **4(2),** 239-257.

Tenywa MM, Rao KPC, Tukahirwa JB, Buruchara R, Adekunle AA, Mugabe J, Wanjiku C, Mutabazi S, Fungo B, Kashaija NIM, Pali P, Mapatano S, Ngaboyisonga C, Farrow A, Njuki J, Abenakyo A. 2011. Agricultural innovation platform as a tool for development oriented research: Lessons and challenges in the formation and operationalization. Learning Publics Journal of Agriculture and Environmental Studies **2(1),** 118-146.

The Presidents Emergency Plan for AIDS Relief (PEPFAR). 2012. Capacity Building and Strengthening Framework. Available at: https://www.pepfar.gov /documents/organization/197182.pdf.

Tucker J, Schut M, Klerkx L. 2013. Linking action at different levels through innovation platforms. Innovation Platforms Practice Brief 9.ILRI, Nairobi, Kenya. Available at: http://r4d.dfid.gov.uk/pdf/ outputs/waterfoodCP/Brief9.pdf.

Tukahirwa JMB, Tenywa M, Kakuru W, Kamugisha R, Nampala MP. 2013. Establishing Functional Innovation Platforms for Scaling Sustainable Land Management. Handbook for Facilitators. ICRAF publication series p.45.

van Rooney AR, Ramshaw P, Moyo M, Stirzaker R, Bjornlund H. 2017. Theory and application of Agricultural Innovation Platforms for improved irrigation scheme management in Southern Africa. International Journal of Water Resources Development **33(5),** 804-823 Available at http://doi.org/ 10.1080/07900627.2017.1321530.

Wennick B, Ochola W. 2011. Designing innovation platforms. In: Nederlof ES, Wongtschowski M, Van der Lee F. Eds. Putting heads together: Agricultural innovation platforms in practice. Amsterdam: KIT Publishers p. 30- 42.