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INNOVATION PLATFORMS IN AGRICULTURAL RESEARCH FOR DEVELOPMENT

Ex-ante Appraisal of the Purposes and Conditions Under Which Innovation Platforms can Contribute to Agricultural Development Outcomes

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SUMMARY

Innovation platforms are fast becoming part of the mantra of agricultural research for development projects and programmes. Their basic tenet is that stakeholders depend on one another to achieve agricultural development outcomes, and hence need a space where they can learn, negotiate and coordinate to overcome challenges and capture opportunities through a facilitated innovation process. Although much has been written on how to implement and facilitate innovation platforms efficiently, few studies support *ex-ante* appraisal of when and for what purpose innovation platforms provide an appropriate mechanism for achieving development outcomes, and what kinds of human and financial resource investments and enabling environments are required. Without these insights, innovation platforms run the risk of being promoted as a panacea for all problems in the agricultural sector. This study makes clear that not all constraints will require innovation platforms and, if there is a simpler and cheaper

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alternative, that should be considered first. Based on the review of critical design principles and plausible outcomes of innovation platforms, this study provides a decision support tool for research, development and funding agencies that can enhance more critical thinking about the purposes and conditions under which innovation platforms can contribute to achieving agricultural development outcomes.

INTRODUCTION

Multi-stakeholder alliances or platforms are an increasingly popular approach to enhance collaboration and innovation within the agricultural research for development (AR4D) sector (Dror *et al.*, 2016; Lundy *et al.*, 2005; Neef and Neubert, 2011), as well as in other sectors such as healthcare (McHugh *et al.*, 2016), natural resource management (Faysse, 2006; Misiko *et al.*, 2013; Steins and Edwards, 1999; van Rooyen *et al.*, 2017; Warner, 2006) and infrastructure (Klijn and Teisman, 2003). In the AR4D sector – the focus of this paper – multi-stakeholder innovation platforms (henceforth referred to as 'innovation platforms') are promoted to bring together groups of individuals (who often represent organisations) with different backgrounds, expertise and interests – farmers, traders, food processors, researchers, government officials – and to provide them with a space for learning, action and change (World Bank, 2006). The fact that previously disconnected stakeholder groups come together to diagnose agricultural and broader livelihood problems, identify opportunities and find ways to achieve their goals is among the main benefits of innovation platforms (Klerkx *et al.*, 2012). As the name indicates, innovation platforms have an 'innovation' objective, that is, the introduction and utilisation of any new knowledge (technological or other) in an economic or social process (OECD, 1999).

Depending on the level at which an innovation platform is established (e.g. village, regional and national), and on those initiating the platform, the objective might be to tackle a specific technological, organisational or institutional challenge in a value chain (e.g. access to high quality potato seeds), or a more generic problem that needs to be addressed across different value chains (e.g. farmers' access to credit). Once the innovation platform has achieved its objective, its members may (or may not) decide to take up new challenges (Davies *et al.*, 2018; Hounkonnou *et al.*, 2012). Innovation platforms can start as informal networks and some may transit into more formalised structures, such as public–private partnerships or a cooperative, with the goal of becoming self-sustaining entities (Schut *et al.*, 2017a).

Over the past years, innovation platforms have increasingly been established within the framework of AR4D initiatives (Dror *et al.*, 2016). The innovation platform approach is particularly being embraced as a model for achieving development outcomes through participatory action research (Chave *et al.*, 2012; Ottosson, 2003). The existing literature mainly focusses on providing step-by-step advice on how to implement and facilitate innovation platforms for technological or institutional change. Such implementation and facilitation advice can be found in Adekunle *et al.* (2010), Makini *et al.* (2013), Brouwer and Woodhill (2016), Francis *et al.* (2016) and Nederlof and Pyburn (2012). What currently lacks in the literature are discussions on the usefulness of innovation platforms in overcoming a range of agricultural challenges. In particular, there is a lack of decision support tools that can stimulate

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critical *ex-ante* reflection on when and for what purpose innovation platforms are an appropriate mechanism for achieving development outcomes. This poses the risk of innovation platforms being promoted as a panacea for all research and development problems in the agricultural sector, something for which authors analysing multi-stakeholder partnership models in other sectors have warned for (e.g. Warner, 2006).

The objective of this study is to complement the existing body of scientific literature by focussing on the usefulness question of when and for what purpose innovation platforms are an appropriate mechanism for achieving agricultural development outcomes. In doing so, this study contributes to generating more realistic expectations about what innovation platforms can and cannot achieve in AR4D initiatives. As the implementation of innovation platforms can consume significant time, energy and other human and financial resources, this study is geared towards providing decision support to development practitioners, researchers, funding agencies or farmer unions in determining whether the innovation platforms can help them to achieve their objectives. Data for this study were collected through literature review, and sourced from the practical experiences of the authors, who all contributed significantly to the design and implementation of innovation platforms across different value chains and continents.

The next section elaborates on the rationale for using innovation platforms in AR4D. This is followed by a section that discusses the conditions that should be in place for innovation platforms to be effective. Subsequently, we explore what can realistically be the expected outcomes of innovation platforms. This provides the basis for a decision support tool that can help research, development and funding agencies in more critical reflection on whether and how innovation platforms can truly strengthen their AR4D approaches and programmes. The final section summarises the main conclusions from this study.

RATIONALE FOR USING INNOVATION PLATFORMS IN AR4D

Before adopting an innovation platform approach, one should carefully reflect on whether or not innovation platforms are the most useful and cost-efficient vehicle to achieve project or stakeholder objectives. Questions that can guide decision making include (1) what are the expected functions of the platform; (2) what can innovation platforms achieve efficiently and (3) when are innovation platforms particularly useful?

What are the expected functions of innovation platforms?

In an effort to create space for learning, action and change, innovation platforms can fulfil a collated range of functions and related activities in AR4D processes (Table 1). Innovation platforms do not necessarily fulfil – or indeed need to fulfil – all of these functions and activities. Depending on the composition of the innovation platform, as well as its specific objectives, specific functions and activities may be more or less relevant (Klijn and Teisman, 2003; Lamers *et al.*, 2017). Furthermore,

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Table 1. Innovation platform functions and activities (adapted from Hekkert *et al.*, 2007; Kilelu *et al.*, 2011).

Innovation platform functions	Description of activities to fulfil the functions
Knowledge generation and brokering	Experimentation, learning, knowledge development and exchange as central elements of innovation, with better integration and synergies among technical, organisational and institutional options.
Facilitation of multi-directional information flows	Exchange of information and views of those concerned through networks, allowing information to spread. Identifying and linking different actors, stimulating new actor relationships.
Creation of, or an increase in, momentum for change	Generating solutions in context, on the basis of shared expectations and vision, creates buy-in and unity among innovation platform members and legitimacy for the innovations being generated. It motivates collective action to develop and test innovations in a real-world context.
Guidance of research, policy and investment priorities	Prioritisation of challenges and innovation options based on preferences or expectations of informed stakeholders, for targeted resource allocation. Challenges and options can include access to information, technologies, finance or institutional gaps.
Market formation	Facilitation of (niche) market creation, in marginal areas, post-conflict zones, illustrating market opportunities, creating trust in market agents, transportation of produce to faraway markets.
Capacity development and building entrepreneurial skills	Creation of business opportunities by deploying new technologies, markets, learning and networking. Developing the system's inherent capacity to learn, self-organise and innovate, incubating new organisational forms, nurturing its members' skills (entrepreneurship, representation, coordination and communication).
Policy development and advocacy	Institutional support: facilitating and lobbying for institutional change (for example, policy innovation and new business models)
Resources mobilisation	Assembly of diverse resources (e.g. financial, human, social and physical resources) required to leverage change.

the functions and activities outlined can be undertaken in various orders, either sequentially or parallel to one another.

What can innovation platforms achieve effectively?

Innovation platforms aim to counter weaknesses in agricultural innovation systems by building interaction amongst different kinds of actors and their organisations, promoting change in practices, institutions and policies and to effectively deploy available human and financial resources to solve problems and capitalise on opportunities (Davies *et al.*, 2018). Regardless of whether innovation platforms are established at local or higher levels, they can explore technological, organisational and institutional solutions, making them ideal for addressing problems in an integrated manner (Flor *et al.*, 2016; Sanyang *et al.*, 2014; Schut *et al.*, 2016a). In a way, the formation and operation of innovations platforms is an organisational or institutional innovation in itself (Schut *et al.*, 2016a). It entails changes in ways of collaborating, interacting and in relationships between actors and organisations to overcome obstacles and improve the impact of their collective action (Ngwenya and Hagmann, 2011; Swaans *et al.*, 2014).

In AR4D, innovation platforms can support participatory action research. Participatory action research combines both conducting research together with key

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stakeholders, as well as performing outcome-oriented research (Minh *et al.*, 2014). The involvement of key stakeholders is important for three reasons. First, stakeholder groups can provide various complementary insights about the biophysical, technological and institutional dimensions of the problem, thereby broadening the knowledge base. Thus, by engaging in a social learning process with one another, stakeholders can negotiate what type of innovations are technically feasible, economically viable and socio-culturally and politically acceptable (Esparcia, 2014; Hermans *et al.*, 2011; Schut *et al.*, 2014). Second, through their interaction and participation, stakeholder groups become aware of their different interests, needs and objectives, but also of their fundamental interdependencies and the need for concerted action across different levels to overcome their constraints and reach their objectives (Leeuwis, 2000; Messely *et al.*, 2013; Schut *et al.*, 2013). Third, stakeholders are more likely to support the implementation and scaling of innovations when they have been a part of the design and testing process (Faysse, 2006; Neef and Neubert, 2011).

Doing action- and outcome-oriented research requires flexibility, as innovation platforms operate in dynamic contexts, and themselves aim to promote change. Action research takes the innovation platform members through cycles of *designing* interventions, *testing* in practice, *observing* whether activities bring about desirable change, *reflecting* on what goes well and what can be improved, which results in a new phase of *(re)designing* the interventions (Ottosson, 2003). Members, as well as their supporting organisations, need to be prepared to adapt their approach and expectations and, in some cases, for failure.

The effective innovation platform size depends on the specific innovation challenge or opportunity at hand. For farm-level experimentation, working with 20–40 participants may be appropriate (e.g. Andres *et al.*, 2016), whereas innovation platforms aiming at market or regulatory change are more likely to be smaller in size to enhance flexibility and decision-making (Fichter, 2009; Klerkx *et al.*, 2009). Innovation platforms that aim to create economies of scale (e.g. by accessing or distributing inputs or by jointly supplying to private processors) may actually be much larger in size (e.g. Woomer *et al.*, 2016). Furthermore, membership and size may change over time as new farmer groups can join or new members are invited to address specific challenges, or partners may lose interest or leave the platform if their needs have been met (Lamers *et al.*, 2017).

When are innovation platforms particularly useful?

In general terms, innovation platforms are useful when (1) persons or organisations that represent different socio-economic backgrounds, interests and perspectives have a stake in a particular problem or solution; (2) multiple persons or organisations want or need to experiment jointly on aspects that they cannot solve individually or that benefit from synergies; (3) new solutions require a combination of new technologies (technological innovation), effective collaboration (organisational innovation) and/or new rule, funding and incentive structures (institutional or policy innovation) and (4) actors and organisations are willing to share knowledge, resources, benefits and risks,

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as well as sufficient common interest and trust to engage in collective innovation to address a common challenge (Buerkler, 2013). These conditions are also frequently mentioned in relation to other types of multi-stakeholder approaches such as public-private partnerships (e.g. Hall, 2006; McHugh *et al.*, 2016; Van der Meer, 2002).

Additional questions related to (1) the specific problem at stake, (2) the specific type of solution or innovation needed to overcome that problem and consequently (3) the types of innovation partners that should be engaged and (4) the most cost- and time-efficient partner engagement model can further guide decision making on the need for an innovation platform, or for other innovation and partnership approaches (Hermans *et al.*, 2017). If addressing problems does not require the involvement of multiple stakeholder groups and/or organisations, then simpler and more short-term partner collaborations or formal bilateral arrangements may be more desirable (Head, 2008).

When an innovation platform approach is deemed the most useful innovation and partner engagement model, then it is advised to first make an inventory of existing stakeholder platforms and networks (Boogaard *et al.*, 2013). If the purpose, modus operandi and power dynamics of these existing platforms are in line with the objectives and needs of the involved stakeholders, then building on these existing platforms and networks may be more efficient and quicker than initiating a new innovation platform (Boogaard *et al.*, 2013; Cullen *et al.*, 2013, 2014a, 2014b; Schut *et al.*, 2018).

WHICH CONDITIONS SHOULD BE IN PLACE FOR EFFECTIVE INNOVATION PLATFORMS

Once the usefulness of an innovation platform has been identified based on the criteria mentioned in the above section, five key conditions for effective innovation platforms need to be met: (1) ability and mandate to pitch the platform at the right level(s); (2) conducive institutional environment for an innovation platform approach; (3) availability of sufficient capacities and skills; (4) organising monitoring, evaluation and learning (ME&L) and (5) adequate funding for innovation platform implementation.

Ability and mandate to pitch the platform at the right level(s)

Innovation platforms can be established at different levels such as village or community level, district level and even province or national level (Tucker *et al.*, 2013). The guiding question should be 'At what level or levels can a challenge be addressed most efficiently?' For example, a problem of access to good quality planting material may be best tackled at the village or community level, whereas exploring irrigation options would require the involvement of stakeholders at the watershed level (e.g. van Rooyen *et al.*, 2017). As problems at local level are often rooted in, and interrelated with, problems at higher levels (e.g. lack of input certification leading to poor quality fertiliser on the market), the strategic involvement of national level policy actors may be desirable (Schut *et al.*, 2016b). Local innovation platforms might resolve concrete

agronomic or organisational issues but, without linkages to decision makers at higher level, will most likely not have enough weight to foster structural changes at higher levels (Lamers *et al.*, 2017). Conversely, higher level innovation platforms may be less relevant for farmers with specific needs but can serve to review and, ideally, shift the rules of the game to make the overall system more amenable to farmer interests and overall public goals such as sustainability, incomes, competiveness, etc. (Hounkonnou *et al.*, 2012; Hounkonnou *et al.*, in press).

Making changes at higher levels often requires more time and is political by nature, which may not well align with the perceived mandate of AR4D organisations (Schut *et al.*, 2016b). Nevertheless, the spin-offs from achieving changes at policy level may lead to the desired agricultural development outcomes. AR4D organisations can find strategic partners who are experienced in engaging high-level decision-makers. Davies *et al.* (2018) describe how the engagement of an influential representative of a local chamber of agriculture in Burkina Faso developed a basis for gaining support from regional development policy actors, which created an enabling environment for the innovation platform to achieve its objectives.

Is the institutional environment conducive for an innovation platform approach?

Through their demand-driven approach and their capacity to expose and balance existing power inequalities, innovation platforms can create tensions within AR4D establishments (Hounkonnou *et al.*, in press). Innovation platforms may request AR4D organisations to work on themes, commodities or value chains that are outside of their normal mandate or comfort zone (Schut *et al.*, 2016a). Such institutional tensions and the institutional innovations to deal with them are often the unintended consequences of working through innovation platforms, and can have widespread impacts in the sense of how organisations identify demand, work action-oriented and try to be relevant for their next- and end-users (van Paassen *et al.*, 2014). Schut *et al.* (2016a) pointed out that many AR4D organisations face challenges in supporting and institutionalising innovation platform approaches and principles due to inflexible mandates, incentive structures, procedures and funding mechanisms. They questioned whether in the absence of such an enabling environment or unwillingness of organisations to embrace these tensions, innovation and other multi-stakeholder platforms can lead to real change, or whether that would just result in a continuation of 'business as usual'. Similar tensions, and institutional and strategic barriers have been observed in other partnership approaches such as public–private partnerships, both within the AR4D sector (e.g. Hall, 2006; Kilelu *et al.*, 2017; Poulton and Macartney, 2012; Spielman and von Grebmer, 2006), as well as in other sectors (e.g. Faysse, 2006; Klijn and Teisman, 2003; Warner, 2006).

Are sufficient capacities and skills available?

Innovation platforms consist of multiple and heterogeneous groups of stakeholders with different interests, ideas and competencies in terms of what they can offer to the platform. Bringing together a group of stakeholders with diverse needs,

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interests and objectives is likely to lead to tensions, conflicts, manoeuvring to seek advantage and even group displacement, which can hinder collective action towards achieving development outcomes (Hinnou *et al.*, 2018; Kilelu *et al.*, 2013, 2017; Ruttan, 2008; Thiele *et al.*, 2011). Innovation platforms are known to become arenas of struggle, as solutions for some members may create new obstacles for other members (Leeuwis, 2000). Moreover, power differences exist between different members (e.g. farmer versus government official), and not all members may have equal discussion and negotiation skills (Brouwer *et al.*, 2013; Cullen *et al.*, 2014b). Facilitation of interactions, collaborations, power dynamics and actions is needed to arrive at commonly agreed upon objectives (Tenywa *et al.*, 2011). Innovation platforms are also known to have successfully contributed to prevention of conflict and resolution of disputes (in crop-livestock systems) (Davies *et al.*, 2018). Depending on the specific body of literature, such facilitation has been referred to as 'championing' (Klerkx *et al.*, 2013), 'brokerage' (Madzudzo, 2011), 'boundary spanning' (Fleming and Waguespack, 2007) or 'promoting' (Fichter, 2009).

Researchers and development practitioners engaged in AR4D projects are increasingly called upon to act as facilitators (Cadilhon, 2013b). Stakeholders in an innovation platform that is in its early stage may not feel confident to facilitate; they may look to project implementers and researchers to take the lead (Glin *et al.*, 2016). When researchers act as facilitators, conflicts of interest may arise, and they may confront problems about ambiguity of roles and responsibilities, or they can be viewed by other actors as competitors rather than as neutral or legitimate facilitators (Devaux *et al.*, 2010; Klerkx *et al.*, 2009). Facilitation may also be shared between various people, e.g. through establishment and IP coordination and facilitation team (Hinnou *et al.*, 2018) which can in itself be a strategy to build a collaborative ethos and shared ownership in the innovation platform.

To effectively support innovation platforms, competence and skills of facilitators may need to be strengthened through training, coaching and mentoring (Sanyang *et al.*, 2016). Competencies and skills often go beyond fulfilling solely knowledge brokerage or knowledge management roles, but also require stimulating demand articulation, collective problem analysis with diverse stakeholders, supporting joint decision-making, multi-level network building, mobilising institutional and political support and managing overcoming power inequalities (Kilelu *et al.*, 2011; Schut *et al.*, 2011). In doing so, facilitators do much more than just organise and manage platform meetings. They ensure transparency of discussions and negotiations, and that innovation platforms stay solution- and action-oriented so they can reach their objectives. Additional competencies of facilitators can include (1) bringing about changes in the values, attitudes and self-perception of those who engage in innovation platform activities; (2) keeping an innovation platform functional even without external funding; (3) developing the innovation platform's capacity to move from individual to collaborative activities, with the ability to self-organise and learn; (4) providing mechanisms for accountability and feedback within the innovation platform

and (5) establishing lessons with other innovation platforms for learning and collective action. Facilitation requires substantial financial investments (Cadilhon, 2013b; Glin *et al.*, 2016; Swaans *et al.*, 2013b).

Organising effective monitoring, evaluation and learning (ME&L)

Impact assessment of innovation platforms and their effectiveness is a contentious issue, and suitable ME&L tools for multi-stakeholder innovation processes in AR4D are limited (Davies *et al.*, 2018; Swaans *et al.*, 2013c). They produce either qualitative case studies from which data cannot be easily generalised or quantitative impact assessments that do not provide insights into ongoing process dynamics (Sartas *et al.*, 2017). New tools to effectively monitor, evaluate and learn in innovation platforms have been developed and tested. Cadilhon (2013a) developed a conceptual framework, using quantitative research methods to assess the impact of innovation platforms. The framework has been applied in Ghana and Tanzania to evaluate the impact of innovation platforms on marketing relationships (Adane-Mariami *et al.*, 2015; Pham *et al.*, 2015). Another is the learning system for agricultural research for development (LESARD), which provides integrated quantitative and qualitative data collection and analysis tools to assess the performance of multi-stakeholder processes (Sartas *et al.*, 2017).

Without appropriate ME&L mechanisms, innovation platforms run the risk of not being able to provide proof of their success or share important learning experiences. ME&L also provides a mechanism to have quick feedback from the innovation platform members so that that a timely adjustment in the innovation platform focus or strategy can be made. This reduces the risk of investing valuable time, energy and financial resources in activities that do not lead to the desired outcomes. The need for continuous reflection, learning and adaptation based on robust ME&L is an essential design principle of innovation platforms (Swaans *et al.*, 2013a).

What are the costs of innovation platforms?

There is very little information on the costs of innovation platforms in an AR4D project, and – to the best knowledge of the authors – no cost or cost-benefit analysis has been conducted on innovation platforms in an AR4D context. As mentioned before, innovation platforms are human- and financial-resource intensive, and research and development donors will require evidence on the return on investments. Innovation platform costs vary, depending on the (1) type of organisation that is implementing/supporting the innovation platform (average staff costs in international organisations are usually much higher than average staff costs in local NGOs); (2) type of innovation that is being explored, e.g. planting distance or intercropping practices (relatively cheap) versus local processing that requires machinery (relatively expensive); (3) level at which the innovation platform is operating (higher level platforms are usually more expensive); (4) number of innovation platform members (more farmers or other members involved can increase operational and support

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costs); (5) level of platform support functions required (e.g. facilitator, logistics, documentation, and so forth); (6) spin-off activities that emerge as the platform starts to operate (innovation platforms must have flexibility to cover unplanned but important activities); (7) proximity of facilitators to implementation sites (platform facilitation has to be monitored, so having a local facilitator can make a difference to operational costs) and (8) time for preparing, holding and following-up on meetings, and for general exchange, searching for compromises and documentation (transaction costs).

As becomes clear from Box 1, most of the initial costs of innovation platforms are investments in the institutional set-up of the platform or the organisation in general. These are not costs that often quickly result in benefits or outcomes. Buizer (2016) conducted cost analysis of two innovation platforms and its overarching steering committee in Uganda. She concluded that the innovation platform costs are approximately US$83.29 per farmer per year (Box 1). We are aware that we cannot use the Ugandan case to draw firm conclusions on whether innovation platforms provide value for money. To do that, we need to compare the costs of innovation platforms with other approaches of innovation design, testing and dissemination. That is, compare the costs of a platform with the costs of dissemination through extension services or the services provided by agribusinesses (contract farming approaches) to their members. Work by IFAD (1998) published in Quizon *et al.* (2015) demonstrated that for Farmer Field Schools (FFS) in Uganda, high allowances, transportation costs and several layers of supervision programmes could make extension cost up to US$53 per FFS-trained farmer for a one-season long training, excluding the costs of trainer salaries. Several studies show that diffusion of innovation to non-FFS participants has been disappointing (e.g. Rola *et al.*, 2002). Empowerment and innovation skills of FFS participants were expected to generate economic multiplier effects and more long-term behavioural change of participants, which is similar to the expected outcomes of innovation platforms. When comparing costs of innovation platforms with the costs of government extension services in Uganda, we calculated that the costs per farmer are US$7.36 per farmer[1]. Using an alternative analysis, we could also conclude that the innovation platforms that Buizer analysed, should at least benefit 2357 farmers in order to be competitive with the FFS approach, or even 16 974 farmers in order to be competitive with the incumbent government extension services system.

[1]The total Uganda government budget projection for the agricultural sector in 2016/17 is US$187.68 million. The estimated total budget that is related to extension services and research is US$111.21 million including wages, which translates to US$7.36 per farmer per year.

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Box 1. Cost-analysis of two innovation platforms implemented under the CGIAR Research Program on Integrated Systems for the Humid Tropics (Humidtropics) in Uganda.

Buizer (2016) conducted cost analysis of two innovation platforms implemented under the CGIAR Research Program on Integrated Systems for the Humid Tropics (Humidtropics). Two calendar years (2014 and 2015) of innovation platform activities were analysed. One innovation platform focussed on indigenous vegetables and pigs, the other on intercropping soya beans and maize. A national level steering committee was formed to coordinate the work across the two innovation platforms and to link them to policy and other public agencies and the private sector. The two innovation platforms reached approximately 1500 farmers in the areas where they were operating.

To analyse the costs, the study differentiated between (1) basic costs for platform events, coordination of meetings of intervention actors, reflection and preparation for meetings and (2) theme-specific costs for conducting trials, providing training, data collection, etc. The idea behind this separation is that the basic costs will be approximately the same for all innovation platforms, regardless of their specific topic or theme. To organise basic meetings and activities and to hire most of the basic staff, US$71 677 was spent in 2014 and US$64 216 in 2015. Of the total basic costs, expenditure on human resources accounted for the largest part (39% and 42% in 2014 and 2015, respectively). Basic staff include the national facilitator (responsible for facilitating the steering committee as well as the two innovation platforms), a project coordinator, a communications officer, an ME&L expert and drivers and other support staff. When including the theme-specific events and staff costs, the costs were significantly higher: US$109 607 in 2014 and US$140 255 in 2015.

The cost of basic events decreased between 2014 and 2015 for the two innovation platforms and the steering committee. This is mainly because the platform attracted investments from other organisations. Meeting costs were the largest cost category and represented 64% and 59% in 2014 and 2015, respectively. Meeting costs included renting the meeting venue and lunch or transport refunds for participants such as farmers or government officials. Meeting costs decreased after the first year because of a decrease in the number of people attending meeting as the platform's focus had become clear. Fuel costs and participants' transport reimbursements formed the second largest cost category.

In conclusion, establishing and maintaining the two innovation platforms with one overarching steering committee in Uganda, reaching an estimated 1500 farmers, cost at least US$71 677 in the first year and US$64 216 in the second year (total US$135 893 for 2 years). If the theme-specific costs are added, reaching the estimated 1500 farmers cost US$109 607 in the first year and US$140 255 in the second year (total US$249 861 for 2 years). The average cost per farmer per

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year was calculated at US$83.29 ((US$249 861/2 years)/1500 beneficiaries). The innovation platform facilitator accounted for the largest share of the basic human resource costs ($1000 per month). The cost per farmer is likely to decrease if the innovation platform is supported by local government and/or local NGOs, instead of being implemented and coordinated by an international agricultural research organisation.

More detailed information can be found in Buizer (2016) and Schut *et al.* (2017).

Innovation platforms are resource intensive, and research and development donors will require evidence on the return on financial and human resource investments against outcomes and impacts. Mapping the costs of innovation platforms is an important first step towards conducting (long-term) cost-benefit analysis and showing whether innovation platforms can provide value for money. International NGOs and AR4D organisations often provide funding to kick-start innovation platforms. However, this funding is usually available for a limited period and may not be sufficient to meet all the costs associated with the establishment and facilitation of the platform. Continuous support may moreover have a reversed effect on platform ownership, as innovation platform members may not feel fully responsible for the costs and investments. Innovation platforms that are supported through AR4D projects should therefore develop strategies for reducing (financial) dependence on these projects. If engaging in the platform results in obvious benefits, the innovation platform can attract financial resources or other types of support from the private or public development sector. In Bolivia, for example, the private sector took a more proactive role and sought additional funding for the ANDIBOL (*Andino Boliviana*) multi-stakeholder platform for linking smallholder farmers to value chains (Thiele *et al.*, 2011). Davies *et al.* (2018) explain that 'In Amantin and Savelugu [Ghana], the registration of the IP as a cooperative was identified as a factor that explained its outcome because this structure was considered to balance the self-interest and shared interest of members.' Cadilhon *et al.* (2016) illustrate this using the case of the Tanga Dairy Platform that successfully lobbied policy makers to reduce value-added tax on dairy inputs and products, and remove limitations on urban dairy farming in Tanga City, Tanzania.

WHAT OUTCOMES CAN BE REALISTICALLY EXPECTED FROM INNOVATION PLATFORMS?

Innovation platform outcomes should be considered on two levels. The first level concerns the direct beneficiaries (the platform members) and the second level concerns the indirect beneficiaries (the target population or region beyond the platform's direct influence). To reach the second category, some form of scaling is required (Hendrickx *et al.*, 2015). The three leading questions that need to be addressed are (1) what are the benefits for innovation platform members; (2) what strategies can support the scaling of innovation platform processes and outcomes and

(3) which additional mechanisms and arrangements may be needed to broaden the coverage and impact of innovation platforms?

What are the benefits for innovation platform members?

Innovation platforms can create different types of benefits for its members. These benefits include, but are not limited to (1) a space where each platform member has access to a variety of experts who could enhance their skills, including farmers, researchers, private sector and government; (2) a protected niche where a group of people can experiment, learn and make mistakes without it having huge negative consequences; (3) increased credibility and legitimacy as a result of speaking with a collective voice when the objective is to create change at different levels; (4) a better power and bargaining position as a group for accessing knowledge, inputs, finance, markets and other types of services and (5) network building for developing new initiatives, enterprises and projects (Boogaard *et al.*, 2013).

Among organisations that implement innovation platforms, there is debate on whether and how innovation platform members should be compensated for being part of the innovation platform, and in line with Nederlof *et al.* (2011) we advise against financial incentives for platform members. Reimbursement of – for example – transport costs can be considered, especially for those participants who are not supported by their constituencies. Benefits should result from the above-mentioned activities and the opportunities that platform membership provides. As membership in innovation platforms is voluntary, members who feel that the platform is not benefitting them sufficiently are free to leave it.

As elaborated earlier, innovation platforms need financial and human resource investments. Facilitation, platform establishment, platform activities and ME&L incur costs that cannot be expected to be carried by the platform members from the beginning. That said, the platform should develop a strategy for becoming independent of permanent outside financial and technical support (e.g. through a development project). Innovation platforms are known to transit into cooperatives (Davies *et al.*, 2018) where platform members make a small financial contribution to the platform's costs. Platforms can also cease to exist once its members feel the mission has been accomplished, or when motivation levels have dropped.

What strategies can support the scaling of innovation platform processes and outcomes?

Innovation platforms initiated through AR4D projects often have the ambition to have impact beyond the initial target area or direct beneficiaries (Duncan *et al.*, 2015). Such processes of scaling innovation platform processes and outcomes should be an integral design element of innovation platforms and the manner in which they are implemented. The literature (e.g. Hermans *et al.*, 2017) distinguishes between two types of scaling: outscaling and upscaling. Outscaling refers to the horizontal diffusion of innovations to individuals or organisations at the same level (e.g. from one district to another district). Upscaling refers to the embedding of processes or technologies at higher levels (e.g. institutionalisation of new cropping practices in policies). For

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the innovation platform members (e.g. farmers), the scaling of innovations may not always be beneficial. If there is competition among platform members and secondary beneficiaries, then scaling is challenging. There need to be clear benefits for the platform members to scale out, for example, developing a local brand or production standard that requires a critical mass or a large buyer who requires a minimum quantity produced in one region. An example is the maize innovation platform established by the DONATA Project in The Gambia where women farmers collectively packaged, labelled and sold maize flour and grits in standard bags (Sanyang *et al.*, 2014). Another example is from the Bante and Glazoue rice innovation platforms established under the SARD-SC project in Benin that developed brands for local white and parboiled rice (Sanyang *et al.*, 2016).

Innovation platforms can fulfil an important function in the pathway leading to the scaling of agricultural innovations. Through their participatory approach to identifying and analysing problems, and designing and testing innovations to overcome those problems, they have a higher likelihood to result in solutions that are not only technically sound, but also affordable for farmers and coherent with government policies and objectives. However, if the basic innovation platform features are not respected (e.g. innovation platforms for implementing pre-cooked AR4D projects, with limited participation space for farmers and scaling partners to influence the AR4D agenda), the basis for scaling of innovation may be compromised (Wigboldus *et al.*, 2016). As mentioned before, the involvement of farmers, policymakers and the private sector in decision-making and innovation processes provides an important precondition for supporting the wider use and spread of validated technologies and other types of innovations developed in innovation platforms. Public and private scaling partners can be strategically engaged from the early stages of innovation platform establishment, be allocated explicit roles in the innovation platform (e.g. in an advisory or steering committee) and/or be involved in the developing strategies that align with their core business, values and strategies (Klijn and Teisman, 2003; Lamers *et al.*, 2017).

Whether innovation platforms can support or play a role in large-scale diffusion or scaling of agricultural innovations also depends on their institutional embedding. A recent meta review in Schut *et al.* (2018) of mature innovation platforms concluded that innovation platforms need to be firmly embedded in private or public mechanisms and broader networks that have the capacity to reach target populations beyond the original scope of the innovation platform. Innovation platforms run the risk of staying solitary initiatives if they are not firmly linked to such existing mechanisms and networks, which reduces the chance of having impact beyond the direct beneficiaries.

Which additional mechanisms and arrangements may be needed to broaden the coverage and impact of innovation platforms?

Once an appropriate combination of stakeholders is defined, it is critical to define the process and associated institutional arrangements for collaboration. Innovation

platforms may start off with a very focussed approach to addressing a specific or number of problem(s). In an initial stage, a rather loose arrangement, based on clearly defined goals, roles, activities, results and resource needs, may suffice. As the number of stakeholders and the size of operations increases, more formalised institutional arrangements may be needed to govern the innovation platform, its process and its benefits. This may involve the creation of subgroups with specific contracts within and between them. Over time, it may also be worthwhile to consider obtaining a legal entity (e.g. as cooperative) for an innovation platform to enhance its sustainability in terms of independence, its (monetary and non-monetary) benefits for its members, and its potential to become eligible for donations or credit. A comparative case study paper by Davies *et al.* (2018) providing examples of improved financial access for innovation platform members as a result of the innovation platform's negotiation with finance providers.

DECISION SUPPORT TOOL FOR RESEARCH, DEVELOPMENT AND FUNDING AGENCIES

The above-mentioned design principles and expected innovation platform outcomes are brought together in flow diagram to support project developers, funding agencies and implementers in deciding whether or not innovation platforms are the most appropriate pathway towards achieving their development outcomes (Figure 1). The diagram focuses on the critical questions that research, development and funding agencies need to ask themselves before deciding to embark on implementing innovation platforms in their AR4D projects and programmes. These questions include the following:

1. For what main purpose are innovation platforms being used?
    i. For developing and testing new technological innovations (e.g. home vegetable gardens) or institutional innovations (e.g. a contract-farming model or improved market access).
    ii. For tailoring technological or institutional innovations to the specific needs of end-users or agro-ecological areas (e.g. composition of seed kits for home vegetable gardens for specific households in different districts).
    iii. For outscaling of existing technological or institutional innovations for the benefit of large numbers of end-users (e.g. disseminating seed kits for home vegetable gardens to thousands of farmers).
    iv. For upscaling of existing technological or institutional innovations to influence policy, development and business sectors (e.g. embedding distribution of seed kits for home vegetable gardens in nutrition and agricultural policy or markets).

A number of additional questions related to whether innovation platforms would result into the desired development outcomes bring us to the second key question as follows:

2. Do we have sufficient resources as well as institutional support and flexibility to support the implementation of impactful innovation platforms?

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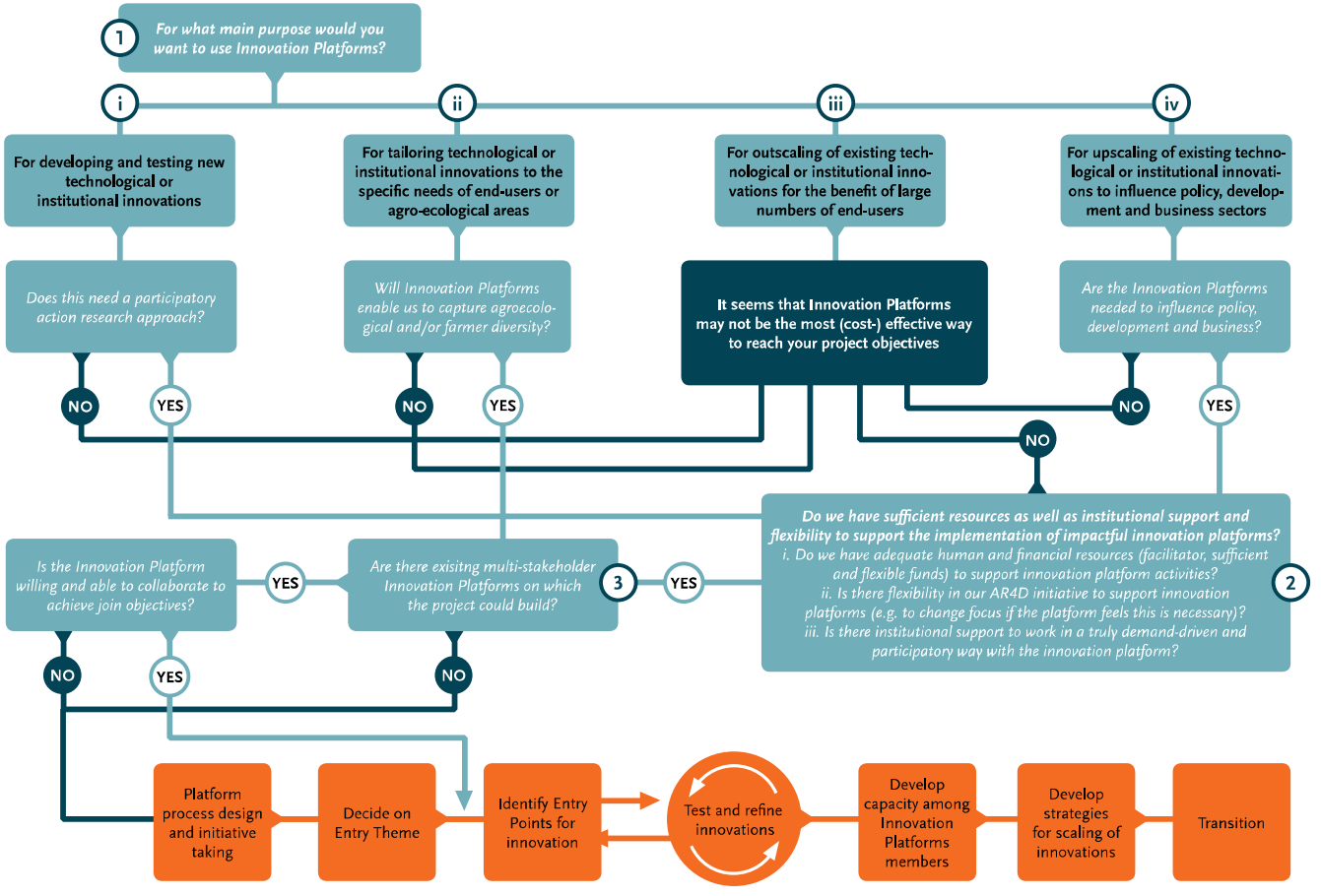

Figure 1. Flow diagram to support decision-making on whether or not innovation platforms are the most appropriate vehicle for reaching a desired research or development outcome. The innovation platform phases (orange boxes) are derived from Homann-Kee Tui *et al.* (2013).

i. Do we have adequate human and financial resources (facilitator, sufficient and flexible funds) to support innovation platform activities?
ii. Is there flexibility in our project to support innovation platforms (e.g. to change focus if the platform feels this is necessary)?
iii. Is there institutional support to work in a demand-driven and participatory way with the innovation platform (e.g. is AR4D leadership supportive of the innovation platform approach; are there investments in capacity building of staff)?

If there is sufficient institutional support and flexibility, then an additional third question should be reflected upon as follows:

3. Are there existing multi-stakeholder innovation platforms on which the project could build?
   i. If yes, is that innovation platform willing and able to collaborate to achieve joint objectives?

The answers to the above questions will to a large extent depend on the specific socio-political context in which the innovation platform is supposed to contribute to achieving agricultural development outcomes (Pamuk *et al.*, 2014). In some countries, for example, it will be experienced as extremely positive that rural actors organise themselves, sit down together around joint constraints and self-organise and implement interventions to overcome these constraints. In other countries, such processes may be viewed with suspicion by governments or other dominant parties, who may feel that these platforms are not needed or undermining their role, mandate and function. In line with Hermans *et al.* (2017), we conclude that project designers and implementers need to think more critically about how innovation platforms and their principles align with specific governance or socio-political contexts.

CONCLUSIONS

This study complements the many (case) studies that provide implementation and facilitation principles for, and lessons learned from innovation platforms. By focussing on design principles and setting realistic goals, this article seeks to provide decision support to research, development and funding agencies to think more critically about when, how and in what form innovation platforms can contribute meaningfully to agricultural development outcomes. As the implementation of innovation platforms can consume significant human and financial resource investments, research and development donors will require evidence on the return on investments. This requires investments in structured ME&L, which is missing in many innovation platform initiatives. Furthermore, attaining tangible development outcomes through innovation platforms requires time and flexibility which cannot be taken for granted in the current international AR4D landscape. The study provides decision support to development, research and funding agencies in determining whether and how innovation platforms can help them in achieving their objectives. It is clear in the sense that if the innovation platform approach is not suitable for a specific purpose,

or when enabling institutional conditions are absent, then alternative, more cost- and time-effective approaches need to be considered. It also provides an incentive to better reflect whether development outcomes can be achieved by building on existing platforms and networks, rather than initiating new innovation platforms, which seems to be the mainstream modus operandi in many AR4D initiatives.

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REFERENCES

Adane-Mariami, Z., Cadilhon, J. J. and Werthmann, C. (2015). Impact of innovation platforms on marketing relationships: The case of Volta Basin integrated crop-livestock value chains in Ghana. *African Journal of Agricultural and Resource Economics* 10(4):1–10.

Adekunle, A. A., Fatunbi, A. O. and Jones, M. P. (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. Available at: https://vtechworks.lib.vt.edu/handle/10919/70141.

Andres, C., Mandloi, L. S. and Bhullar, G. S. (2016). Sustaining the supply of organic white gold. In *Innovation Platforms for Agricultural Development. Evaluating the Mature Innovation Platforms Landscape*, 133–150 (Eds I. Dror, J.-J. Cadilhon, M. Schut, M. Misiko and S. Maheshwari). London, UK: Routledge.

Boogaard, B., Klerkx, L., Schut, M., Leeuwis, C., Duncan, A. and Cullen, B. (2013). Critical issues for reflection when designing and implementing research for development in innovation platforms. Report for the CGIAR Research Program on Integrated Systems for the Humidtropics. 42: Knowledge, Technology & Innovation Group (KTI), Wageningen University and Research Centre, Wageningen, the Netherlands.

Brouwer, H., Hiemstra, W., Van Vugt, S. and Walters, H. (2013). Analysing stakeholder power dynamics in multi-stakeholder processes: Insights of practice from Africa and Asia. *Knowledge Management for Development Journal* 9(3):11–31.

Brouwer, H. and Woodhill, J. (2016). *The MSP Guide: How to Design and Facilitate Multi-Stakeholder Partnerships*, 2nd edn. Warwickshire, UK: Wageningen University & Research, CDI The Netherlands, and Practical Action Publishing. Available at: ⟨http://www.mspguide.org/sites/default/files/case/msp_guide-2016-digital.pdf⟩.

Buerkler, E. (2013). Critical success factors for joint innovation: Experiences from a New Zealand innovation platform. *The Innovation Journal: The Public Sector Innovation Journal* 18(2):23.

Buizer, D. (2016). The costs of Humidtropics Innovation Platforms in Uganda. MSc-thesis Wageningen University, *Development Economics*, pp 20.

Cadilhon, J. (2013a). A conceptual framework to evaluate the impact of innovation platforms on agrifood value chains development. In *Paper Prepared for the 138 EAAE Seminar on Pro-Poor Innovations in Food Supply Chains*. Ghent, Belgium.

Cadilhon, J.-J. (2013b). The functions of facilitation in multi-stakeholder learning: Lessons learned from capacity development on value chains management in innovation platforms in Burkina Faso and Ghana. *Knowledge Management for Development Journal* 9(3):174–181.

Cadilhon, J.-J., Diep, P. N. and Maass, B. L. (2016). The Tanga dairy platform: Fostering innovations for more efficient dairy chain coordination in Tanzania. *International Journal on Food System Dynamics* 7(2):81–91.

Chave, M., Ozier-Lafontaine, H., Noel, Y. and Noël, Y. (2012). Towards agricultural innovation systems: Designing an operational interface. *Outlook on Agriculture* 41(2):81–86.

Cullen, B., Lema, Z., Tucker, J., Snyder, K. and Duncan, A. J. (2014a). Navigating power dynamics in innovation platforms: Lessons from the Blue Nile Basin, Ethiopia. In *Innovation in Smallholder Farming in Africa: Recent Advances*

and Recommendations: Proceedings of the International Workshop on Agricultural Innovation Systems in Africa (AISA) (Eds B. Triomphe, A. Waters-Bayer, L. Klerkx, M. Schut, B. Cullen, G. Kamau and E. Le Borgne). Nairobi, Kenya, 29–31 May 2013. Montpellier, France: CIRAD, 79–84. https://cgspace.cgiar.org/handle/10568/35193.

Cullen, B., Tucker, J., Snyder, K., Lema, Z. and Duncan, A. (2014b). An analysis of power dynamics within innovation platforms for natural resource management. *Innovation and Development* 4(2):259–275.

Cullen, B., Tucker, J. and Tui, S. H.-K. (2013). Power dynamics and representation in innovation platforms. Innovation Platforms Practice Brief 4. Nairobi, Kenya: ILRI.

Davies, J., Maru, Y., Hall, A., Abdourhamane, I. K., Adegbidi, A., Carberry, P., Dorai, K., Ennin, S. A., Etwire, P. M., McMillan, L., Njoya, A., Ouedraogo, S., Traoré, A., Traoré-Gué, N. J. and Watson, I. (2018). Understanding innovation platform effectiveness through experiences from west and central Africa. *Agricultural Systems*. Available at: https://www.sciencedirect.com/science/article/pii/S0308521X16309180.

Devaux, A., Andrade-Piedra, J., Horton, D., Ordinola, M., Thiele, G., Thomann, A. and Velasco, C. (2010). Brokering innovation for sustainable development: the Papa Andina case. In *ILAC* Working Paper, No. 12., 32.

Dror, I., Cadilhon, J.-J., Schut, M., Misiko, M. and Maheshwari, S. (2016). *Innovation Platforms for Agricultural Development. Evaluating the Mature Innovation Platforms Landscape*. London, UK: Routledge.

Duncan, A. J., Teufel, N., Ravichandran, T., Hendrickx, S. and Ballantyne, P. G. (2015). Innovation platforms to improve smallholder dairying at scale: Experiences from the MilkIT project in India and Tanzania. International Livestock Research Institute (ILRI).

Esparcia, J. (2014). Innovation and networks in rural areas. An analysis from European innovative projects. *Journal of Rural Studies* 34(0):1–14.

Faysse, N. (2006). Troubles on the way: An analysis of the challenges faced by multi-stakeholder platforms. *Natural Resources Forum* 30(3):219–229.

Fichter, K. (2009). Innovation communities: The role of networks of promotors in Open Innovation. *R&D Management* 39(4):357–371.

Fleming, L. and Waguespack, D. M. (2007). Brokerage, boundary spanning, and leadership in open innovation communities. *Organization Science* 18(2):165–180.

Flor, R., Leeuwis, C., Maat, H. and Gummert, M. (2016). Rice postharvest learning alliance in Cambodia: Comparison of assumptions and implementation of a network approach. *Journal of Development Effectiveness* 8:489–507.

Francis, J., Mytelka, L., van Huis, A. and Röling, N. (Eds) (2016). *Innovation Systems: Towards Effective Strategies in Support of Smallholder Farmers*. Wageningen, the Netherlands: CTA, CoS, Wageningen University and Research. Available at: https://publications.cta.int/en/publications/publication/1829/.

Glin, L. G., Fatunbi, A. O., Kouévi, A. and Togbé, E. (2016). Facilitation strategies for managing Research for Development in innovation platforms. Accra, Ghana: Forum for Agricultural Research in Africa (FARA).

Hall, A. (2006). Public–private partnerships in an agricultural system of innovation: Concepts and challenges. *International Journal of Technology Management and Sustainable Development* 5:3–20.

Head, B. W. (2008). Assessing network-based collaborations: effectiveness for whom?. *Public Management Review* 10(6):733–749.

Hekkert, M. P., Suurs, R. A. A., Negro, S. O., Kuhlmann, S. and Smits, R. E. H. M. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological Forecasting and Social Change* 74(4): 413–432.

Hendrickx, S., Ballantyne, P., Duncan, A., Teufel, N. and Ravichandran, T. (2015). Scaling and innovation platforms. In *Innovation platforms practice brief 13*. Available at: https://cgspace.cgiar.org/handle/10568/67884.

Hermans, F. P., Haarmann, W. F. and Dagevos, J. L. M. M. (2011). Evaluation of stakeholder participation in monitoring regional sustainable development. *Regional Environmental Change* 11(4):805–815.

Hermans, F., Sartas, M., van Schagen, B., van Asten, P. and Schut, M. (2017). Social network analysis of multi-stakeholder platforms in agricultural research for development: Opportunities and constraints for innovation and scaling. *PLoS ONE* 12(2). Available at: https://doi.org/10.1371/journal.pone.0169634.

Hinnou, L. C., Mongbo, R. L., Kamanda, J. and Sanyang, S. (2018). Innovation platform and governance of local rice value chains in Benin: Between game of power and internal democracy?. *Cogent Food & Agriculture* 4(1):1433346.

Hounkonnou, D., Brouwers, J., van Huis, A., Jiggins, J., Kossou, D., Röling, N., Sakyi-Dawson, O. and Traoré, M. (in press). Triggering regime change: A comparative analysis of the performance of innovation platforms that attempted to change the institutional context for nine agricultural domains in West Africa. *Agricultural Systems*. Available at: https://doi.org/10.1016/j.agsy.2016.08.009.

Hounkonnou, D., Kossou, D., Kuyper, T. W., Leeuwis, C., Nederlof, E. S., Röling, N., Sakyi-Dawson, O., Traoré, M. and Van Huis, A. (2012). An innovation systems approach to institutional change: Smallholder development in West Africa. *Agricultural Systems* 108(5):74–83.

IFAD (1998). Report and Recommendation of the President on the Technical Assistance Grant to the FAO for the East African Subregional Pilot Project for FFS in Kenya, Republic of Tanzania and Uganda. Rome, Italy: International Fund for Agriculture and Development (IFAD).

Kilelu, C. W., Klerkx, L. and Leeuwis, C. (2013). Unravelling the role of innovation platforms in supporting co-evolution of innovation: Contributions and tensions in a smallholder dairy development programme. *Agricultural Systems* 118(0):65–77.

Kilelu, C. W., Klerkx, L. and Leeuwis, C. (2017). Supporting smallholder commercialisation by enhancing integrated coordination in agrifood value chains: Experiences with dairy hubs in Kenya. *Experimental Agriculture* 53(2):269–287.

Kilelu, C. W., Klerkx, L., Leeuwis, C. and Hall, A. (2011). Beyond knowledge brokering: An exploratory study on innovation intermediaries in an evolving smallholder agricultural system in Kenya. *Knowledge Management for Development Journal* 7(1):84–108.

Klerkx, L., Adjei-Nsiah, S., Adu-Acheampong, R., Saïdou, A., Zannou, E. T., Soumano, L., Sakyi-Dawson, O., Van Paassen, A. and Nederlof, S. (2013). Looking at agricultural innovation platforms through an innovation champion lens. An analysis of three cases in West Africa. *Outlook on Agriculture* 42(3):185–192.

Klerkx, L., Hall, A. and Leeuwis, C. (2009). Strengthening agricultural innovation capacity: are innovation brokers the answer?. *International Journal of Agricultural Resources, Governance and Ecology* 8(5–6):409–438.

Klerkx, L., Schut, M., Leeuwis, C. and Kilelu, C. (2012). Advances in knowledge brokering in the agricultural sector: Towards innovation system facilitation. *IDS Bulletin* 43(5):53–60.

Klijn, E. H. and Teisman, G. R. (2003). Institutional and strategic barriers to public–private partnership: An analysis of Dutch cases. *Public Money and Management* 23(3):137–146.

Lamers, D., Schut, M., Klerkx, L. and van Asten, P. (2017). Compositional dynamics of multi-level innovation platforms in agricultural research for development. *Science and Public Policy* 44(6):739–752.

Leeuwis, C. (2000). Reconceptualizing participation for sustainable rural development: Towards a negotiation approach. *Development and Change* 31(5):931–959.

Lundy, M., Gottret, M. V. and Ashby, J. (2005). Learning alliances: An approach for building multi-stakeholder innovation systems. In *ILAC Brief 8*Rome: Bioversity.

Madzudzo, E. (2011). Role of brokerage in evolving innovation systems: A case of the fodder innovation project in Nigeria. *The Journal of Agricultural Education and Extension* 17(2015):195–210.

Makini, F. W., Kamau, G. M., Makelo, M. N., Adekunle, W., Mburathi, G. K., Misiko, M., Pali, P. and Dixon, J. (2013). *Operational Field Guide for Developing and Managing Local Agricultural Innovation Platforms*. Nairobi: KARI and ACIAR.

McHugh, M., Shi, Y., McClellan, S. R., Shortell, S. M., Fareed, N., Harvey, J., Ramsay, P. and Casalino, L. P. (2016). Using multi-stakeholder alliances to accelerate the adoption of health information technology by physician practices. *Healthc (Amst)* 4(2):86–91.

Messely, L., Rogge, E. and Dessein, J. (2013). Using the rural web in dialogue with regional stakeholders. *Journal of Rural Studies* 32(0):400–410.

Minh, T. T., Friederichsen, R., Neef, A. and Hoffmann, V. (2014). Niche action and system harmonization for institutional change: Prospects for demand-driven agricultural extension in Vietnam. *Journal of Rural Studies* 36(0):273–284.

Misiko, M., Mundy, P. and Ericksen, P. (2013). Innovation platforms to support natural resource management. Innovation Platforms Practice Brief 11. Nairobi, Kenya: ILRI.

Nederlof, E. S. and Pyburn, R. (2012). *One Finger Cannot Lift a Rock: Facilitating Innovation Platforms to Trigger Institutional Change in West Africa*. Amsterdam: Royal Tropical Institute.

Nederlof, S., Wongtschowski, M. and van der Lee, F. (Eds) (2011). *Putting Heads Together. Agricultural Innovation Platform in Practice*. Amsterdam, the Netherlands: KIT Publishers.

Neef, A. and Neubert, D. (2011). Stakeholder participation in agricultural research projects: a conceptual framework for reflection and decision-making. *Agriculture and Human Values* 28(2):179–194.

Ngwenya, H. and Hagmann, J. (2011). Making innovation systems work in practice: experiences in integrating innovation, social learning and knowledge in innovation platforms. *Knowledge Management for Development Journal* 7(1):109–124.

OECD (1999). *Managing National Innovation Systems*. Paris: Organization for Economic Cooperation and Development (OECD).

Ottosson, S. (2003). Participation action research: A key to improved knowledge of management. *Technovation* 23(2):87–94.

Pamuk, H., Bulte, E. and Adekunle, A. A. (2014). Do decentralized innovation systems promote agricultural technology adoptionα Experimental evidence from Africa. *Food Policy* 44:227–236.

Pham, N. D., Cadilhon, J. J. and Maass, B. L. (2015). Field testing a conceptual framework for innovation platform impact assessment : The case of MilkIT dairy platforms in Tanga region, Tanzania. *East African Agricultural and Forestry Journal* 81(1):58–63.

Poulton, C. and Macartney, J. (2012). Can public–private partnerships leverage private investment in agricultural value chains in Africa? a preliminary review. *World Development* 40(1):96–109.

Quizon, J., Feder, G. and Murgai, R. (2015). Fiscal sustainability of agricultural extension: the case of the farmer field school approach – Supplementary remarks. *Statewide Agricultural Land Use Baseline* 1:73–75.

Rola, A. C., Jamias, S. B. and Quizon, J. B. (2002). Do farmer field school graduates retain and share what they learn: An investigation in Iloilo, Philippines. *Journal of International Agricultural and Extension Education* 9:65–76.

Ruttan, L. (2008). Economic heterogeneity and the commons: Effects on collective action and collective goods provisioning. *World Development* 36(5):969–985.

Sanyang, S., Pyburn, R., Mur, R. and Audet-Belanger, G. (Eds) (2014). *Against the Grain and to the Roots: Maize and Cassava Innovation Platforms in West and Central Africa*. Arnhem, the Netherlands: LM Publishers.

Sanyang, S., Taonda, S. J.-B., Kuiseu, J., Coulibaly, N. T. and Konaté, L. (2016). A paradigm shift in African agricultural research for development: The role of innovation platforms. *International Journal of Agricultural Sustainability* 14(2):187–213.

Sartas, M., Schut, M. and Leeuwis, C. (2017). Learning System for Agricultural Research for Development (LESARD): Documenting, reporting, and analysis of performance factors in multi-stakeholder processes. In *Sustainable Intensification in Smallholder Agriculture: An Integrated Systems Research Approach* (Eds I. Öborn, B. Vanlauwe, M. Phillips, R. Thomas, W. Brooijmans and K. Atta-Krah). London, UK: Earthscan.

Schut, M., Andersson, J. A., Dror, I., Kamanda, J., Sartas, M., Mur, R., Kassam, S., Brouwer, H., Stoian, D., Devaux, A., Velasco, C., Gramzow, A., Dubois, T., Flor, R. J., Gummert, M., Buizer, D., McDougall, C., Davis, K., Homann-Kee Tui, S. and Lundy, M. (2017a). *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*. Kigali, Rwanda: International Institute of Tropical Agriculture (IITA) and Wageningen University (WUR) under the CGIAR Research Program on Roots Tubers and Bananas (RTB).

Schut, M., Cadilhon, J.-J., Misiko, M. and Dror, I. (2018). Do mature innovation platforms make a difference in agricultural research for development? A meta-analysis of case studies. *Experimental Agriculture* 54(1):96–119.

Schut, M., Klerkx, L., Sartas, M., Lamers, D., Mc Campbell, M., Ogbonna, I., Kaushik, P., Atta-Krah, K. and Leeuwis, C. (2016a). Innovation platforms: experiences with their institutional embedding in agricultural research for development. *Experimental Agriculture* 52(4):537–561.

Schut, M., Leeuwis, C. and van Paassen, A. (2013). Ex ante scale dynamics analysis in the policy debate on sustainable biofuels in Mozambique. *Ecology and Society* 18(1):16. [online] URL: http://www.ecologyandsociety.org/vol18/iss11/art20/.

Schut, M., Leeuwis, C., van Paassen, A. and Lerner, A. (2011). Knowledge and innovation management in the policy debate on biofuel sustainability in Mozambique: What roles for researchers?. *Knowledge Management for Development Journal* 7(1):45–64.

Schut, M., van Asten, P., Okafor, C., Hicintuka, C., Mapatano, S., Nabahungu, N. L., Kagabo, D., Muchunguzi, P., Njukwe, E., Dontsop-Nguezet, P. M., Sartas, M. and Vanlauwe, B. (2016b). Sustainable intensification of agricultural systems in the Central African highlands: The need for institutional innovation. *Agricultural Systems* 145:165–176.

Schut, M., van Paassen, A., Leeuwis, C. and Klerkx, L. (2014). Towards dynamic research configurations. A framework for reflection on the contribution of research to policy and innovation processes. *Science and Public Policy* 41(2014):207–218.

Spielman, D. J. and von Grebmer, K. (2006). Public–private partnerships in international agricultural research: An analysis of constraints. *The Journal of Technology Transfer* 31(2):291–300.

Steins, N. A. and Edwards, V. M. (1999). Platforms for collective action in multiple-use common-pool resources. *Agriculture and Human Values* 16(3):241–255.

Swaans, K., Boogaard, B., Bendapudi, R., Taye, H., Hendrickx, S. and 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.

Swaans, K., Cullen, B., Rooyen, A. V., Adekunle, A., Ngwenya, H., Lema, Z. and Nederlof, S. (2013a). Dealing with critical challenges in African innovation platforms: Lessons for facilitation. *Knowledge Management for Development Journal* 9(3):116–135.

Swaans, K., Cullen, B., van Rooyen, A., Adekunle, A., Ngwenya, H., Lema, Z. and Nederlof, S. (2013b). Dealing with critical challenges in African innovation platforms: Lessons for facilitation. *Knowledge Management for Development Journal* 9(3):116–135.

Swaans, K., Puskur, R., Taye, H. and Haile, A. G. (2013c). A monitoring and evaluation framework to assess the performance of innovation platforms in the context of livestock value chains. In *ILRI Discussion Paper 24*, Nairobi, Kenya: International Livestock Research Institute.

Tenywa, M. M., Rao, K. P. C., Tukahirwa, J. B., Buruchara, R., Adekunle, A. A., Mugabe, J., Wanjiku, C., Mutabazi, S., Fungo, B., Kashaija, N. I. M., Pali, P., Mapatano, S., Ngaboyisonga, C., Farrow, A., Njuki, J. and 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):117–146.

Thiele, G., Devaux, A., Reinoso, I., Pico, H., Montesdeoca, F., Pumisacho, M., Andrade-Piedra, J., Velasco, C., Flores, P., Esprella, R., Thomann, A., Manrique, K. and Horton, D. (2011). Multi-stakeholder platforms for linking small farmers to value chains: Evidence from the Andes. *International Journal of Agricultural Sustainability* 9(3):423–433.

Tucker, J., Schut, M. and Klerkx, L. (2013). Linking action at different levels through innovation platforms. *Innovation Platforms Practice Brief 9*. Nairobi, Kenya: ILRI: 4.

Van der Meer, K. (Ed) (2002). *Public–Private Cooperation in Agricultural Research: Examples From the Netherlands*. Wallingford: CABI.

van Paassen, A., Klerkx, L., Adu-Acheampong, R., Adjei-Nsiah, S. and Zannoue, E. (2014). Agricultural innovation platforms in West Africa. How does strategic institutional entrepreneurship unfold in different value chain contexts?. *Outlook on Agriculture* 43(3):193–200.

van Rooyen, A. F., Ramshaw, P., Moyo, M., Stirzaker, R. and 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.

Warner, J. (2006). Multi-stakeholder platforms: integrating society in water resource management?. *Ambiente & Sociedade* VIII(2):1–20.

Wigboldus, S., Klerkx, L., Leeuwis, C., Schut, M., Muilerman, S. and Jochemsen, H. (2016). Systemic perspectives on scaling agricultural innovations. A review. *Agronomy for Sustainable Development* 36(3):1–20.

Woomer, P. L., Mulei, W. and Kaleha, C. (2016). Humidtropics innovation platform case study. WeRATE operations in West Kenya. In *Innovation Platforms for Agricultural Development. Evaluating the Mature Innovation Platforms Landscape*, 98–116 (Eds I. Dror, J.-J. Cadilhon, M. Schut, M. Misiko and S. Maheshwari). London, UK: Routledge.

World Bank (2006). Enhancing agricultural innovation: how to go beyond the strengthening of research systems. 135 Washington DC, USA: The International Bank for Reconstruction and Development/ The World Bank.