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INNOVATION PLATFORM: METHOD TO ENGAGE CROP-LIVESTOCK STAKEHOLDERS IN WEST AFRICA

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ABSTRACT

With an objective to understand the process on how can research (ers) in innovation platforms contribute in engaging crop-livestock stakeholders in mixed –farming systems of the semi-arid tropics of West Africa, five innovation platform meetings were initiated by the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) together with national research institutes: Centre for Dryland Agriculture, Bayero University, Nigeria and Institute National de Recherche Agronomique du Niger between February to October, 2014. The trans boundary transect between Nigeria and Niger called as Katsina Kano and Maradi (KKM) five villages was purposively selected as action site. Apart from innovation platform methodology, mixed methods using quantitative and qualitative methods like- structured questionnaires, focused group discussions, interviews (semi structured, face to face, unstructured) with farmers and stakeholders; direct observations, information from participants in various meetings and discussions during innovation platform meetings and site visits were undertaken. Following the analytical framework of innovation methodology data was coded and characterized to identify the role of researchers in innovation platforms to contribute in engaging crop-livestock stakeholders in mixed –farming . Results indicated that research and innovation platforms can engage stakeholders for a win –win situation. Demand driven research strengthens innovation platforms: researchers work is better informed, more systematic and more authentic. Researchers help in understanding in the Innovation platforms challenges faced by different stakeholders, through diagnostic exercises, visioning, and needs assessment. Platforms strengthen research by feedback so that it is more likely to be adopted. Researchers contribute to innovation platforms through traditional research, b) by knowledge management and action research; c) enabling environment; d) network brokering and mobilising funds. However, researchers face constraints associated with innovation platforms sustainability because of fixed budgets, staff time and resources. For sustainability of innovation platforms it should governed locally.

Keywords: Innovation platforms, crop-livestock, Niger, Nigeria.

INTRODUCTION

The top to down approach or traditional approach to research assumes that researchers generate knowledge, which farmers and others adopt, resulting in change. In reality, such a linear approach often has a limited impact: the research turns out to be inappropriate, and the findings are not adopted. Consequently, much research has shifted towards more collaboration between researchers and other stakeholders by using concepts such as Innovation platform.

Theoretical Framework

Operationalization of Innovation Platform: A number of definitions exist for innovation. An innovation can be an idea, knowledge, a belief, a social norm, a product or service a technology or process, even a culture as long as it is perceived to be new (Singhal *et al.*, 2012). An innovation platform(IP) is a space for learning and change comprising of a group of individuals (representing organizations) with different backgrounds and interests, farmers, traders, food processors, researchers, government, officials etc. (Tui *et al.*, 2013). IPs are composed of a range of actors, often with very different backgrounds, who discuss and address

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challenges and opportunities around a particular issue or area (Nederlof *et al.*, 2011). IPs may operate at local, national and international levels. Innovation platform involves 6 platform phases (Varma *et al.*, 2009): i) identify stakeholders; ii) establish learning alliance, assessment, iii) knowledge sharing and consensus building; iv) visioning and prioritizing; v) planning and implementation; vi) monitoring and evaluation. Stakeholder engagement broadly refers to a framework of policies, principles, and techniques which ensure that communities, individuals, groups, and organisations have the opportunity to be engaged in a meaningful way in the process of decision-making that will affect them, or in which they have an interest (Yee, 2010) In essence, 'innovation platforms' are a worthwhile idea because we know that meaningful change happens in networks of interdependent actors, who can not change if others do not simultaneously change (Boogard *et al.*, 2013).

This paper demonstrates the process and findings of the five innovation IP meetings in agricultural contexts of the Niger and Nigeria, which were funded by the Consultative Group on International Agricultural Research Program on Drylands Systems addressing the key question:

- How can research (ers) in innovation platforms contribute in engaging crop-livestock stakeholders in mixed-farming?

MATERIALS AND METHODS

The study respondents were the actors/stakeholders which included- farmers, researchers, private partners and governments of Niger and Nigeria. The research design used quantitative and qualitative methods like-knowledge attitude practice questionnaire, interviews (structured, unstructured, face to face), focus group discussions with minimum of 15 respondents. In order to ensure effective stakeholder engagement innovation platform methodology was deployed: stakeholders identification, face to face meetings, technical consultations, documentation of agreed upon roles and responsibilities, work plan development, strategic planning and training workshop. The innovation platform process involved building on existing networks and creating new networks. A total of five villages were purposively selected three in Nigeria and two from Niger based on 0.35 aridity index (AI) and 70 habitation km² population density (PD) thresholds. In Kano, Nigeria innovation platforms, which were already established at Bebeji (Kano) and Zango villages (Katsina)

in Nigeria and likewise : Gourjia (Altitude 438m ; N : 13o 22' 39.1 ; E : 008o 00'44.7) and Milli (Altitude : 414m ; N : 13o 28' 24.3 ; E : 0070 52'48.1) villages in Maradi (Niger) were selected. The level of these innovation platforms were at actual sites as well as national and international levels. The data was collected from February to October, 2014. Other data sources included direct observations, information from participants in various meetings and discussions during innovation platform meetings and site visits. Following the analytical framework of innovation methodology data was coded and characterized to identify the role of researchers in innovation platforms to contribute in engaging crop-livestock stakeholders in mixed-farming.

RESULTS AND DISCUSSION

Crop-livestock interaction in the KKM transect was comprehended through series of face to face stakeholder consultations (19 in number) in Niamey, Niger so as to identify the various partners working in the country from February 3rd 2014 to April 2014. Together with ICRISAT-Kano, Nigeria 3 stakeholder meetings were conducted with a purpose to achieve successful implementation of 2014 research for development activities. As a result, new partnerships were forged and existing partnerships were extended by signing contracts between International Crop Research Institute for Semi-Arid Tropics (ICRISAT) together with national research institutes: Centre for Dryland Agriculture, Bayero University, Nigeria and Institute National de Recherche Agronomique du Niger in Niger thus bringing role of institutions. Building on the already established innovation platforms, at Bebeji (Kano) and Zango (Katsina) in Nigeria and Gazaoua (Maradi) in Niger Republic, these meetings were aimed at review and experience sharing of farmer-problems, opportunities and needs of all stakeholders involved.

Research in Innovation Platform Meeting at Bebeji, Kano Nigeria: In Bebeji the meeting was held on 29th April, 2014 and was attended by total of 132 members, out of which 80 were farmers. The members were traditional rulers, scientists from university, national and international research centres, researchers, extension agents, agrochemical companies, seed companies, processors and women groups. This innovation platform was set up in 2013. The platform was also used for conducting integrated soil fertility management trials and farmer field days. One of the farmers mentioned aphid infestation on and rosette

disease in his groundnut crop which was followed by rosette. To this, experts recommended Groundnut varieties Samnut 23, 24 which were resistant to rosette. Another farmer concern was regarding termites attack on groundnut crop at maturity. A staff of Jubaili Agrotec (Agrochemical Company) informed the farmers about the chemical that when used before planting worked as a preventive measure for control of termites. These were available in liquid concentrates or as granules. Alhason Nigeria Limited (a commodity broker) also shared the market opportunities available to the farmers for different crop, while Tecni Seeds (Seed Company) and Jubaili Agrotech also presented their products to the participants. The seed and agrochemical companies were challenged to make their products readily available to farmers, especially those in rural areas, while the farmers on the other hand were encouraged to create business linkages between them and the companies to make those inputs easily accessible to them. Farmers liked high yield and early maturing soybean, groundnut, maize and sorghum varieties given to them in 2013. However, they were displeased because of late delivery of inputs. Apart from that in mixed farming system context, farmers' participation and engagement was sought on use of crop residue. Farmer used crop residue of ground nut, cowpea, sorghum stover as livestock feed. The fodder was not chopped for animal feeding because of lack of awareness. Therefore, training need was voiced by the farmers on that aspect. Research intervention on use of Chopper to demonstrate the efficient use of crop residues (stalks and fodder) into forms that can easily be consumed and reduce wastage was felt. Further, women farmer shared they were interested in dual purpose groundnut varieties as the current variety leaves fell, and normally groundnut stover was sold as livestock feed. Based on anecdotal evidence Camapala a local groundnut variety gave more fodder than grains and women farmers were interested in camapala seed multiplication.

Research in Innovation Platform meeting at Zango: The innovation meeting at Zango LGA, (Katsina), Nigeria took place on 30th April, 2014 and was attended by various stakeholders including farmers, traditional rulers, scientists from university, national and international research centres, international researchers, extension agents, agrochemical companies, seed companies, processors and women groups. Innovation platform spearheaded as the officials were

elected by all stakeholders. Farmers participatory trials were successfully conducted in some villages and field days were also carried out through which crop varieties and their management practices were introduced to other farmers. Through these field days, farmers developed interest in cultivation of Samnut-24 a groundnut variety which had high demand by the farmers because of the knowledge disseminated about them and their performance. Farmers shared that Samnut-24 variety of groundnut did not record any problem, was high yielding, had good fodder and performed better than their local cultivars. One of the farmers, Mallam Sabiu Ibrahim said he planted Samnut-24 last season and made 6 bags from a bag. He added that he observed in the variety pod formation started at 6 weeks, matured in 72 days and was higher yield than what his neighbours crops depicted. The farmers continued that he sorted the seeds and used the shrivelled/broken ones to extract oil and obtained about 3 litres of oil from 5 mudus (10 kg). This showed that the variety had high oil content. During the interactive session, Jubaili Agrotec (agro-chemical company) and Green Spore (Seed Company) informed farmers that they can form a group and purchase at ease as a dealer. An agro-dealer connected with Jubaili Agrotech to obtain agrochemicals at cheaper rate. Use of chopper demonstration was discussed with farmers as green and dry fodder are not chopped. The farmers however said they feed livestock unchopped stover and use the leftover as fuel. Farmers were advised to try the use of the machine to reduce the space unchopped fodder occupies and they can always keep some stalks for fuel. Further, farmer demanded a chopping machine, which could chop the ground nut and stover because ground stover is sold as feed. Training needs identified at Zango; were processing of animal feeds, and general agronomic practices involved in crop production.

Research in Innovation Platform meeting at Gazaoua: The IP meeting in Gazaoua, Niger Republic was conducted on the 2nd May, 2014. The participant of meeting were: scientists from Nigeria and INRAN, Niger, Prefect of Gazaoua, traditional ruler, livestock agent, farmers, government officials of agriculture department. The Prefect of Gazaoua –in the meeting pledged their full support as leaders, through government. There was a need of interactions between researchers, farmers, agro-dealers, agrochemical companies, seed companies, etc. In addition to it, there is also a need to elect IP officials in

Gazaoua to coordinate all activities. Partnering with, INRAN in 2013 successful millet (5 varieties-HKP-99001, Zatib, 89305, 99001- CT6), sorghum (4 varieties Samba-CF, CF-NR and Kat487), groundnut (2 varieties Samnut-23, Samnut 24) and cowpea (variety-IT99K-573-1-1) trials, community and household surveys were conducted at Gourjia and Milli villages. Farmers also complained of late arrival of inputs like seeds and fertiliser in the last year. Green and dry fodder chopping was also not practiced as reported by the farmers.

Research in Innovation Platform Meeting in Kano: An innovation platform meeting was organised by ICRISAT Nigeria at the Center for Dryland Agriculture (CDA), Bayero University, Kano, on 5 August 2014. Members participated from, Federal Ministry of Agriculture and Rural Development, the Chairs and Secretaries of Poultry and Sorghum Farmers Associations of Nigeria, Bayero University staff, representatives of Kano State ministries, and the United States Agency for International Development (USAID) –MARKETS project and Institute National de la Recherche Agronomique du Niger (INRAN)-Niger. The main objective of the meeting was to address the key problem facing poultry production in Niger and Nigeria is the inadequate supply and high cost of feed ingredients, for which maize is the main energy source. Alternative energy sources such as sorghum may help reduce the high cost of poultry feed. This IP meeting was funded under the collaboration between Consultative Group on International Agricultural Research (CGIAR) Research Programs on Dryland Systems and on Dryland Cereals. Based on the IP meeting, broilers experiments were initiated in Niger and Nigeria to determine the nutritional value of broiler diets formulated with either imported maize or locally produced sorghum grains. The goal was to demonstrate the merits of diets based on locally produced non-tannin sorghums at 0, 25, 50, 75 and 100% levels of inclusion.

In Niger- a total of 240 1-day-old broiler chicks of the Early Bird strain were randomly allocated to 20 pens (12 birds per pen) with four pens per treatment and five treatments, from June 6 2014 at the Maradi Government poultry farm in Niger, for seven weeks. Results showed that birds fed maize-based, sorghum-based or maize-sorghum-based diets had similar growth performance and carcass characteristics. Thus, tannin free sorghum had nutritional value comparable to that of maize and in West Africa local sorghum is a good alternative for poultry feeds when grains price are similar. It is

important to make sorghum grains available for poultry producers and other processors.

In Nigria, ICRISAT collaborated with the Sorghum Transformation Value Chain of the Nigeria Agricultural Transformation Agenda to carry out several stakeholders' design studies to evaluate the replacement value of some sorghum varieties selected from the broad groups based on seed characteristics present in the country. Kaura represents the broad group with light yellow seed coat colour, Farfara represent the group with bold bright white seed coat and Red sorghum represents the broad group of several landraces found in the Guinea savannas with a reddish brown seed coat. ICSV400, an improved released variety with the typical light creamy color associated with most of the introduced varieties and the few hybrids available in Nigeria, was evaluated. The results were positive especially in the first four weeks. Except for the red sorghum, the feed samples based on the other three sorghum varieties (Farfara, ICSV400 and Kaura) were better than or as good as maize-based feed. In the broiler finisher trial, there were no significant differences among the sorghum varieties and between the average sorghum values and the maize-based feed for final bodyweight gain. Although the feed conversion ratio appears higher for maize, sorghum-based diets had significantly lower feed to weight gain cost. This implies that farmers can replace maize in poultry feed at a 50% or 100% level with sorghum and, during the seven months of the year when the sorghum price is lower than maize, feed and poultry production costs can be significantly reduced by use of sorghum as the main energy source in poultry feeds. To showcase to value-chain actors the performance of the birds fed a sorghum ration, a large field day was organised on 11 December 2014 at the research farm in Imawa, Kura LG Kano State in collaboration with the desk office of the Sorghum Value Chain. More than 100 participants, including poultry farmers, poultry feed millers, male and female sorghum farmers, traditional and political leaders graced the occasion. Feedback from the field day, which also helped forge links between actors, included a request by poultry farmers for the value chain to conduct similar demonstrations with layer birds. This challenge has been taken up in 2015 activities by ICRISAT, the Centre for Dry Land Agriculture at Bayero University Kano and the Sorghum Value Chain.

Research in Innovation platform meeting- Crop-livestock training: Training needs were assessed in the previous 4 IP meetings therefore an international crop – livestock training was organised from 27th to 31st October 2014 by ICRISAT West and Central Africa (Niger and Nigeria) along with Centre for Dryland Agriculture, Bayero University at Kano, Nigeria. Stakeholders were engaged using innovation platforms with an objective to train the trainers in use of food-feed crop combinations so as to address seasonality, produce more quality, quantity grains and fodder, improving soil fertility and efficient use of local available materials for livestock feeding for increase in income of stakeholders. Forty-one participants (73% men), took part; representing six universities from Benin, Niger, Mali, Burkina Faso and Nigeria; national and international institutes such as the Institute for Agricultural Research, International Livestock Research Institute, Mercy Corps International, non-governmental organizations such as AMEDD Mali, SHARE-USAID Sokoto, Women Farmers Advancement Network; public departments like the Federal Ministry of Agriculture of Nigeria and Rural Development, Kano State Agricultural and Rural Development Authority and National Agricultural Extension Research and Liaison Services; and private farms like Rahama Integrated

Farms, Kano. There were no women participants from Benin, Burkina Faso and Mali, although three came from Niger and 11 from Nigeria. Most of the male respondents were from Nigeria, followed by Niger, Mali, Benin and Burkina Faso. A knowledge, attitude and practice survey was conducted before and after the training to assess the current level of knowledge, beliefs and practices in relation to crop-livestock production and management. The assessment topics covered related to cropping system, large ruminants, small ruminants, poultry, use of innovation platform and gender. Most of them had previous training on these topics. More partners were able to make a self-assessment about their knowledge before and after the training, indicating an existing very good level of knowledge. The assessment topics covered related to cropping system, large ruminants, small ruminants, poultry, use of innovation platform and gender. Most of them had previous training on these topics (Figure 1).

Positive attitudes were reported before and after the training regarding the potential to improve the degraded soils, access to services in crop–livestock systems in terms of basic inputs, favourable by-laws and policies for integrating gender, mechanisation and manure management (Figure 2).

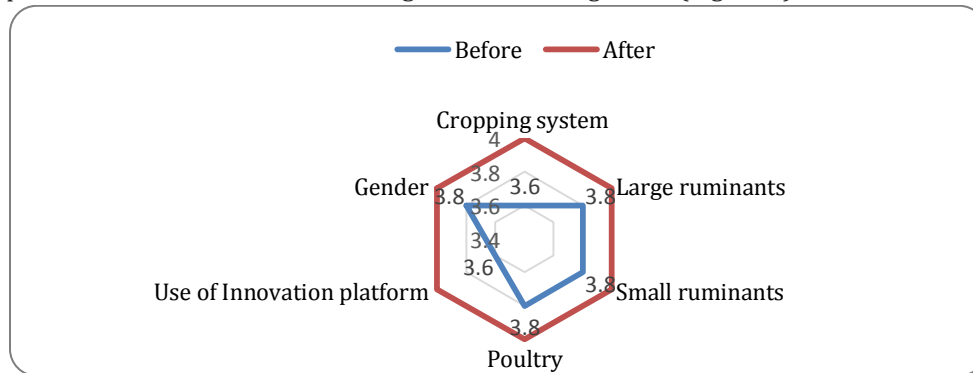


Figure 1. Knowledge of the participants (Where 1= very poor, 2= poor, 3= good, 4= very good).

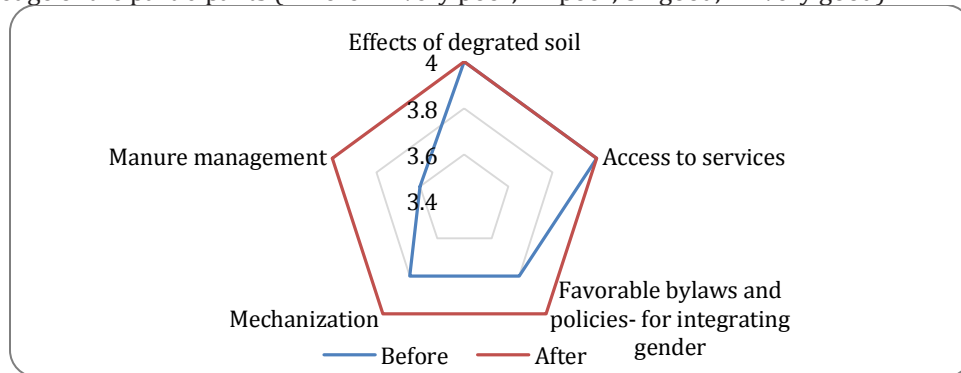


Figure 2. Attitude of the participants (Where 1= very poor, 2= poor, 3= good, 4= very good).

As indicated in the figure 3 crop-livestock practices using chopping green fodder was an activity not practiced in the region. The take home messages as reported by the participants were: i) demand for poultry products is fairly inelastic as such, local production should be enhanced; ii) sorghum should be promoted as a maize-substitute energy source because of its availability, accessibility and reduced cost at some periods of the year; iii) crop residue storage and processing should be encouraged to address seasonality issues of feeds; iv) use of mobile choppers, grinders should be used to reduce drudgery and for efficient utilization of crop residues and forages; v) research findings should be disseminated through innovation platforms; vi) need for training of extension agents and encouraging women to engage in extension activities in crop-livestock activities. It is demonstrated in this paper that research and innovation platforms can engage stakeholders for a win –win situation. Research strengthens innovation platforms: researchers work is better informed, more systematic and more authentic. Researchers' help in understanding in the Innovation platforms demand driven challenges faced by different stakeholders, through diagnostic exercises, visioning, and needs assessment.

The needs could include access to information, technologies, finance or institutional gaps. Platforms strengthen research by feedback so that it is more applied, more realistic, more acceptable, and more

likely to be adopted (Lema *et al.*, 2013). Researchers contribute to innovation platforms through traditional research by bridging knowledge gaps, b) by knowledge management and action research: through: identifying shared objectives, co- creating knowledge jointly, learning together, documenting processes, best practices, communicating results and capacity strengthening of the platform members; c) enabling environment: by enabling technical, institutional and policy factors researchers can support platform members in influencing policy makers and securing funds d) network brokering – identifying and linking different actors and e) knowledge brokering – Identifying knowledge/tech technology needs and mobilizing and disseminating the technology and knowledge from different sources. However, there are risks associated with innovation platforms for researchers for example compared to other platform members, researchers dominate platform activities owing to education, high social status and communication. Not only that research programs have fixed budgets, researchers are required to complete work done on time while innovation platforms are more participatory, take more time which causes conflicts on researchers time and platforms aims. Researchers may not allocate staff time and resources to activities which they think are less important. For sustainability of innovation platforms it should be demand driven and governed locally.

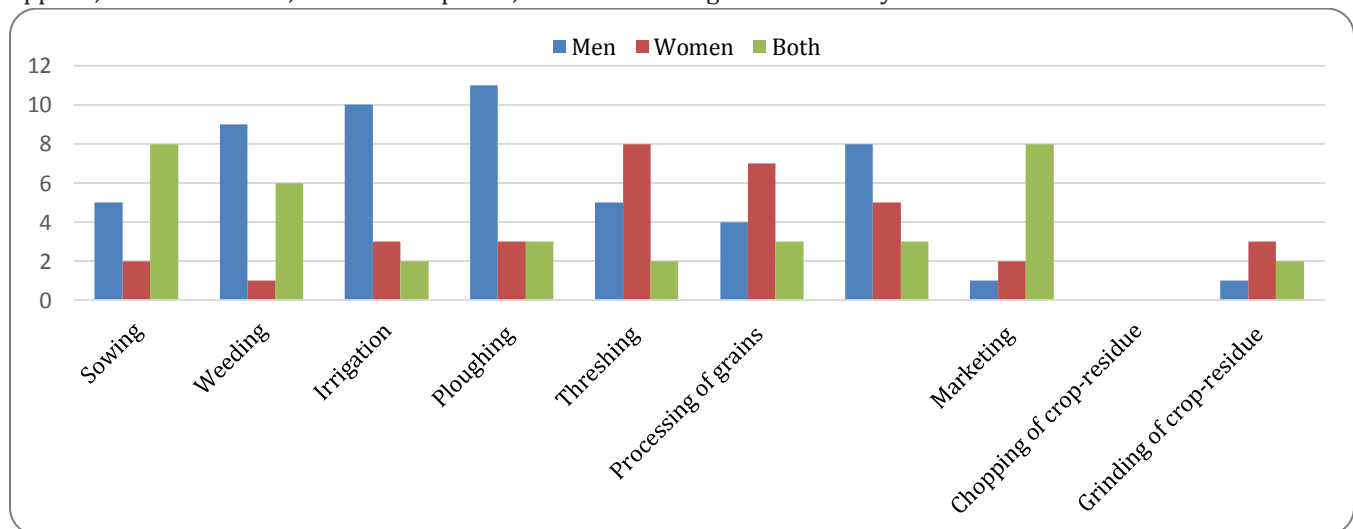


Figure 3. Crop livestock practices.

CONCLUSION AND RECOMMENDATIONS

This paper has demonstrated how research (ers) in innovation platforms can contribute in engaging crop-

livestock stakeholders in mixed –farming systems. A main implication of our study is that Innovation platforms are worthwhile ideas in mixed –farming

context because positive change can engage stakeholders for a win-win situation. Innovation platforms can be instrumental for need based- context fit quality research for development and are dependent on need and motivations of stakeholders. A key policy issue is the sustainability of innovation platforms as mechanisms for enhancing innovation requires funding, planning and institutional structures and procedures. This points to the need to monitor management of researcher managed innovation through innovation platforms. The study also highlights the role of researchers' in bridging knowledge gaps, capacity strengthening and broker of innovation. However there is a need of number of areas for future research such as: strengthening value chain interaction, role of communication in innovation platforms for effectiveness and costs of operating innovation platforms (efficiency) and sustainability of Innovation Platforms. Study has further indicated that different innovation platforms were funded by linking of various stakeholders and their funding programs. Finally, future research should investigate how to monitor management of innovation through researcher managed -innovation platforms vis-a vis local governance and further should investigate whether and how different ways of monitoring can be combined to satisfy the needs of both donors of innovation platform and its stakeholders.

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