Research article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

Factors of Development Actions Sustainability In Agriculture: The Case of Innovation Platforms on Mango In Benin

AGONGNON Hounwanou Jérôme[1]*, HOUNGBO Nounagnon Emile[2], BOKONON-GANTA H. Aimé[3], SINZOGAN Antonio[4] and OLOUNLADE Abiodoun Pascal[5]

[1*]Doctoral student, Laboratory Society Environment (LaSEn) / University of Parakou, Benin, BP: 27 Parakou, Phone: (+229) 94185983/66984259, jeromeagongnon@gmail.com
[2]Agricultural Economist, School of Agribusiness and Agricultural Policy, National University of Agriculture, 05 BP 774 Cotonou (Republic of Benin)
[3]Entomologist, Faculty of Agriculture, University of Abomey-Calavi, 01 BP 526 Cotonou (Republic of Benin), Phone: (+229) 95 56 31 23 / 96 14 96 18, aimehbg@yahoo.com
[4]Entomologist, School Faculty of Agriculture, University of Abomey-Calavi, 01 BP 526 Cotonou (Republic of Benin), Phone: (+229) 9708 56 26, sinzogan2001@yahoo.fr
[5]Biochimist, Laboratory of Animal and Halieutic Sciences, National University of Agriculture, 01 BP 55 Porto-Novo (Republic of Benin), Phone: (+229) 97 08 54 68, abiodouno@yahoo.fr

ABSTRACT

In the aim to cope with the invasion of fruit flies *Bactrocera dorsalis* that causes significant losses in mango orchards, the Regional Plan project against Fruit Flies (RPFF) in West Africa has disseminated four technologies since 2014. The technologies previously developed were namely the use of the GF-120 treatment product, the collection and burial of infected mangoes (sanitary method), the method of fruit flies mass trapping and the method of ants weavers use. In support to the dissemination of these technologies in order to increase and sustain their adoption, three innovation platforms were set up in November 2015 throughout all Benin subdivided into three regions: the south-central region, the Atacora-Donga region and the Borgou-Alibori region. This study aimed to assess the state of operation and evolution of these innovation platforms since their creation. The methodology used was essentially qualitative and based on the Structure-Conduct-Performance (SCP) paradigm. The information and data were collected on each platform through focus group sessions first with the executive committee and then with the actors of the mango sector in at least two Communes covered by the platform. The results revealed that the actors have strongly appreciated the initiative of innovation platforms setting up, but these didn't really work. The actors are still unaware of the expected mode of operation of the platforms as well as the executive committees ignored the strategies they could usein their respective areas. The structural reorganization and the definition of a governance mechanism adapted to the platforms remained necessary.

KEY WORDS: Innovation Platform, Dissemination of technologies, Adoption, SCP Paradigm, Benin.

***Corresponding author:**
AGONGNON Hounwanou Jérôme
Doctoral student, Laboratory Society Environment (LaSEn)
University of Parakou, Benin, BP: 27 Parakou,
Phone: (+229) 94185983/66984259, jeromeagongnon@gmail.com

INTRODUCTION

In Sub-Saharan Africa, agriculture is the main activity and source of income of rural populations, contributing significantly to the gross domestic product (GDP) of the countries (Awa *et al.*, 2004; FAO, 1995)[1,2]. Mainly dominated by smallholders, the agricultural sector has remained for a long time compromised by challenges related to the archaic nature of working tools, the insufficiency of technological packages and even more to the inefficiency of the approaches of intervention in rural area. This inventory of fixtures far from brilliant, factor of under-development, has drawn the attention of actors such as researchers, governments, civil society, technical and financial partners (TFPs) as well to make the necessary changes for breathing a new dynamic into the sector with a view to its adaptation to current transformations characterized by the recurrence of climate change. The innovation system then was emerging in the late 1980s following the realization of a number of successful innovations that stemmed from the existence of institutions and networks through which researchers and entrepreneurs from public and private sectors have co-constructed knowledge to cope with the demands of economic and technical conditions (Touzard *et al.*, 2014)[3]. Thus in coherence with the farmers' expectations, these innovations, from a wide variety, are developed in order to solve as well the problems of technical nature (improvement of plant material cultures, synthesis of chemical or organic fertilizers, etc.), organizational (creation of professional agricultural organizations), as marketing of agricultural products (market information system, grouped sale, etc.), with the purpose, whether broad adoption if successful innovation, whether the opposite in case of failure. But it's clearly appear nowadays that the success or failure of agricultural innovations, beyond their intrinsic characteristics and the environment in which they are disseminated (Rogers, 1983)[4], was also linked to the intervention approaches that accompany their diffusion process. This said, research and development initiatives (R & D) employ in creasing multipartite innovation platforms as the most appropriate approaches of development and promotion of agricultural innovations (Ouidoh *et al.*, 2018; Toillier *et al.*, 2015)[5,6]. Implemented across Africa in the advantage of a range of actors, innovation platforms' assignments are to organize stakeholder linkages to using the results of research and innovation in the fields of agriculture and feeding (Kouakou *et al.*, 2017)[7]. Furthermore, their impact on the adoption of agricultural technologies is unquestionable to make them necessary for effective agricultural development actions even if the issues arise as to their operation. This means that innovation platforms can lead to significant socio-technical and institutional changes at a variety of levels,vast areas and agribusiness contexts (Jiggins *et al.*, 2016; Hounkonnou *et al.*, 2012)[8,9]. However, there is almost no study done on the platforms' structure as akey factor to consider in their operation.

In Benin, following the setup in November 2015 of three multi-stakeholder innovation platforms throughout the country by the project in chargeof dissemination fruit fly control technologies in West Africa, the desire was to see a lasting impact in improving the production of mangoes, the income and the state of well-being of the actors in the mango sector, particularly the farmers. One wonders then if this laudable ambition of effective functioning of the platforms is become today a reality.

The objective of this paper is to evaluate the state of operation and development of innovation platforms set up on mango since November 2015. The hypothesis is that these platforms have not reached a satisfactory level of activities compared to the expectations.

EXPERIMENTAL SECTION

Theoretical framework of the study

The theoretical and analytical framework that allowed conducting this study is based on the Structure-Conduct-Performance (SCP) paradigm developed by Cadilhon (2013)[10], in order to assess the impact of innovation platforms on the agrifood value chains development. For this to happen, thisparadigm (Figure 1) stipulate that the structure of innovation platforms has an impact on the conduct of its members, which in turn influences the performance of the platform as to the achievement of results that are set by itself.Rather, the platform'sstructure can have a direct impact on its performance. This performance is measured by appropriate indicators arising from the objectives set by the members whose conduct boils down to five major concepts: information sharing, communication, coordination, joint planning and trust.

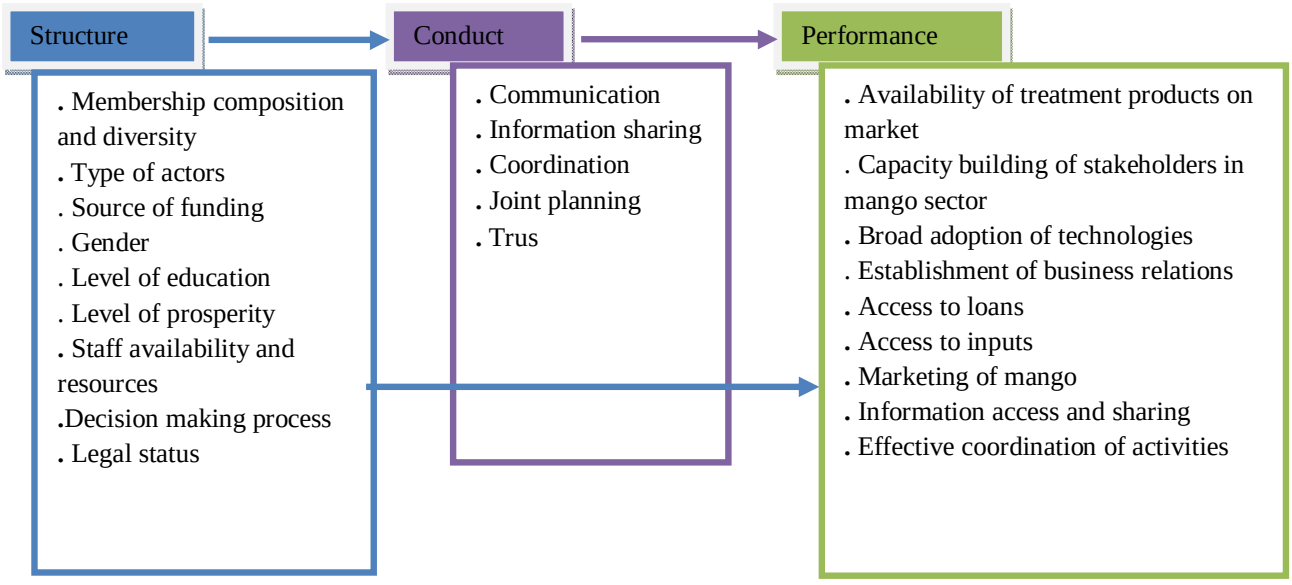

Figure 1: Analysis paradigm of operation of innovation platforms in mango sector

Source: Adapted from Cadilhon (2013)[10]

The platform's structure encompasses elements such as membership composition and diversity, types of actors, source of funding, gender, level of education of members, level of prosperity of members, availability of staff and resources, decision-making process, and legal status. In this case in point, the three innovation platforms set up by the fruit fly project are structured per area as follows: members from various Communes in the area; actors such as mango farmers, processors, financing institutions, traders and management structures. The platform has an executive committee. The women, strongly positioned on the market link in the chain, are represented. The platforms cover the regions such as south central, Borgou-Alibori and Atacora-Donga, and it is expected that each platform must be represented later in the Communes of its area.

The second element of analysis is the conduct of platform members. It is about to appreciate whether there is a good communication between the governing body (the executive committee) and platforms' actors on one hand; if the trainings received by the responsible persons of executive committee from the project are replicated on actors at the base, on the other hand. The same is true for the distribution of sample processing products such as the GF-120 and Tim aye offered free of charge by the project for the boards' use.

The performance of a platform stems from the first two components mentioned above that are platform's structure and the conduct of its members. Availability of processing products on market, capacity building of stakeholders in mango sector, broad adoption of technologies, establishment of business relations, access to loans and inputs, marketing of mango, information sharing and access, effective coordination of activities are decisive indicators ofaforementioned performance have been taken into account in this study. The emphasis is put on effective coordination of activities and appropriate self-financing mechanisms of platforms. However, this performance takes a long time to be reached because an innovation platform set up over a project of only three or four years could not be effective (Toillier *et al.*, 2013)[11].

In line with the project's objectives, which focus mainly on the adoption of technologies, the restitution of trainings by managers who were trained on the use of innovations is important and decisive for the platform performance. Moreover, it is paramount that the farmers have access to the processing products so that the fightcould be effective and efficient.

Study area

The study has been conducted from August to October, 2018 on the three innovation platforms, which are:

-the « Save Mango of Atacora and Donga » platform (PSaM/AD),of the north-western region, which covers Atacora and Donga Departments;

-the « Beautiful Borgou-Alibori Mango »platform (PLABEMBA),of the north-eastern region, which covers Borgou and Alibori Departments;

- the « Mango is treasure »platform(PLAMAT/SC),of the south-central region, which covers the Departments of Collines, Zou, Mono, Couffo, Ouémé, Plateau, Atlantic and Littoral. The Communes visited are shown in table 1:

Table 1: Communes visited for the study

	PlaMaT/SC		PSaM/AD		PLABEMBA	
	Interview with the board	Interview with the actors	Interview with the board	Interview with the actors	Interview with the President of the board	Individual interviews with actors
Communes visited	Bantè	Ouessè Dassa-Zoumè	Natitingou	Natitingou Djougou	Parakou	Parakou, Tchaourou Bembèrèkè

Instead of the group interview with the executive committee and actors of PLABEMBA platform have been held individual interviews with some actors and the interview with the President of the committee.

Data collection and analysis

The collection of information was done in three phases: the preparatory phase, the exploratory phase and the interview phase. The preparatory phase of the study has been devoted to making contact with the presidents of the executive committees of the three innovation platforms set up. It took place in the first fortnight of August, 2018.

The exploratory phase of the study allowed meeting both the platforms executive committees of Atacora-Donga and the one of South Center. The executive committee of the Borgou-Alibori platform has not been met because of the resistance that has opposed its President least open-minded to group dynamics comparing to others responsible persons. For the Borgou-Alibori region, it was thus necessary to identify in isolation the farmers in the communes of Parakou, Tchaourou and Bembèrèkè who were able to give their opinion on the possibility for them to participate to the activities in a distant Commune or not in the framework of the platform. Fortunately, all these actors contacted have spoken and expressed the desire that the project activities and their platforms may develop more. A farmer contacted in Tchaourou, Mr. S.K, did not hesitate to declare that: "If you call us, we'll come. It's about our interest. "

The constitution of platforms executive committees was already allowing getting some elements of stakeholder typology for the study. In fact, it has enabled the farmers, mango tree pruners, traders and nursery men to be involved in the interview group, with regard to the gender aspect. The interview groups were therefore well triangulated. They were not homogeneous.

In each region, except for the north-east region, interviews have been conducted with the executive committee and two groups of actors in the mango sector, in different communes.

RESULTS AND ANALYSIS

Structure and conduct of the platforms

The three innovation platforms set up by the fruit fly project are structured per zone as follows: the members come from various Communes in the area; actors such as mango farmers, processors, nursery growers, financing institutions, traders and management structures. The platform has a management office. The platforms cover the south-central areas, Borgou-Alibori and Atacora-Donga, and it is expected that each platform will be represented in the communes of its area afterwards. It turns out that the architecture of the platforms set up by the project has omitted some steps that essentially refer to the setting up of basic structures. Within the platforms, there is a communication gap between the executive committee and the members. This often results in information asymmetry that favors kinships to the detriment of professional relationships. The observation remains the same as for the coordination of the activities which is limited to the only persons in charge, in this case the Presidents of the platforms with the consequence of a unilateral and controversial planning leading to the rupture of confidence of the members. In addition, it can be seen that the platforms do not have a body for regulating and controlling the management of office members such as the board of directors (BD), the lack of which opens the way for a trend towards " Taking hostage " of these and bad governance. This practice justifies the low motivation of the actors to contribute to the proper functioning of these platforms. Another absent lever in making the scale of the three platforms is the facilitator that could support executive committees in operation, including the definition of the mechanisms of operational organization and mobilization of resources for financial autonomy.

There is a very unfavourable climate in the platforms. Indeed, most of the actors, frustrated by the lack of information and especially the discrimination regarding the transmission of knowledge about the use of technologies, adopt the conduct of mistrust and reluctance about initiatives likely to give impetus to the unifying set of platforms. It is not uncommon to hear some of these actors say about a particular training session: "We are not aware, because we do not count among the privileged." These statements prove to many ways discomfort seating at platforms and weakening the group dynamics and collective action. This hampers the possibilities of establishing business links between the different actors who hardly meet each other around a discussion table.

Functionality of the platforms

The finding is not interesting. None of the platforms is actually working, while designated responsible person shave been trained during several sessions and some monitoring and evaluation visits were made to them. It is true that the project has stopped a little fishy in December, 2016, because there was not a minimum time of accompaniment in terms of support for these platforms; it does not any less than the expected efforts of the actors are not observed. The platforms raise the lack of financial means and technical support frameworks for their technical supervision, even in the first year of their existence. The current state of the platforms does not, therefore, augur the possibility that they will become stronger and acquire certain autonomy in terms of the ability to stand on their own. This is a major obstacle to the effectiveness of the fight against fruit flies since 2014. This also lays a problem of inefficiency if the relevant instrument of capitalization, sustainability and documentation of the project which are platforms get slow to emerge.

By analysing, we realize that the creation of platforms has not gone to completion. The actors and members of platforms are still unaware of the expected way of functioning of the platforms as well as the executive committees. They also ignore mechanisms for mobilizing the necessary resources and financing the operation of the platforms including their committees. The intervention approach for the animation of platforms to lead to the acquisition of their functional and financial autonomy is not clearly defined and known by the actors. Here are some reasons for example about why the actors claim that the financial means and travel have to be allocated to officers to enabling them to accomplish their mission.

In this context, the platform that seems to be better working is PSaM/AD, in front of PlaMaT/SC and PLABEMBA. Indeed, the executive committee of the PSaM/AD meets a little more regularly, even though the frequency remains very low: once per quarter. This platform has managed to set up "security brigades" to help it in its tasks. These brigades of five (5) members are installed in the Communes in which it has been identified many orchards. As far as the communes concerned are Toucountouna, Boukoumbé and Natitingou. The security brigades play a monitoring role to quickly inform the officers of disease problems and infestations observed.

The actors' level of satisfaction

Overall, the project on fruit flies and the platforms set up have received a favourable opinion from the actors. The stakeholders have seriously appreciated this initiative because it has brought back hope within theactors in the mango sector. The various information and trainings received have already tangible effects on the management of the orchards and the productions of them. Nevertheless, the actors deplore the sudden stop of the project in December, 2016. They note that the

number of people trained is very insufficient and the training did not touch all the Communes concerned by the issue of fruit flies. The worst thing is the unavailability of processing products on the market in Benin. Interviewees have often expressed the need to acquire the GF-120 product, but they cannot find it. The training system of actors, whose are becoming more and more interested by the initiative, does not exist; which discourages them. Finally, setting up of the platforms left a taste of uncompleted to the actors. They believe that there is still some support needed to ensure that actions on the ground are realized and sustained.

We can easily conclude that the hypothesis emitted for the study is accepted, and one can be said in a nutshell that the multi-stakeholder innovation platforms on mango supported by the fruit flies project in Benin have not reached a level of satisfying activities compared to the expectations. There is no organizational and operational mechanism formally established by the executive committees of the platforms. The functional existence of the platforms in the Communes is not effective. The creation of platforms seems being not gone to completion, to the point that targeted accompanying measures on a specified period are still needed to make autonomous platforms in achieving their missions.

Measures for the platforms strengthening

Given the weaknesses that hinder the smooth operation of the platforms, corrective measures are necessary. To correct the first weakness related to the treatment productsunavailability, it is desirable:

1. to complete all the administrative and technical formalities necessary for the treatmentproducts, especially GF-120, in order to make them available and accessible to be used by farmers;
2. to inform thestakeholders through the platforms at regional and communal levels ofthe products procurement process. To this end, it would be more useful to put the platforms executive committees intonetworks so that information flows more freely. We must avoid creating a region-commune hierarchy between the boards in order not to block the flow of information in case one will encounterunscrupulous regional board president, as it occurs today in PLABEMBA executive committee.

To correct the second weakness related to the incompleteness of the platform creation process, it is desirable:

1. to continue the platform creation process by setting up a platform boardin each commune. This would facilitate proximity exchanges and reduce operating costs. Subject to participatory evaluation, regional platforms were not necessary, unless it subsequently came

under the initiative of the communal boards. The number of people trained could thus increase exponentially by the effect of cascade formation towards the Communes;

2. to develop in a participatory way, the model specifying the intervention approach chosen for these platforms created. The support of this model will have to indicate the modalities according to which the platforms will be able to evolve towards functional and financial autonomy.

DISCUSSIONS

Diversity of actors of mango platforms in Benin

The presidents of the three platforms executive committees set up by the project for fighting against fruit flies all belong to the same category of actors (category of farmers). Moreover, there is not in any of these platforms a facilitator that can help making the scale of broadcast technologies. One notes a lack of organization of these grassroots actors that result in the inexistence of local units and/or regional (cooperatives, producers' groups, etc.) which would have increased the membership and significantly the structure of the aforementioned platforms. In fact, farmers are scattered in villages and communes, they are not all aware of the existence of platforms and are rarely invited for activities (once or twice per year at most). This situation makes them believe that the platforms are just the affair of a few privileged persons (office managers) who reap the benefits with their close friends whose often receive restitution oftraining sessions as well assamples of technologies offered by the project for experimentation. We can deduce that the main actors who are the mass of farmers at the base are still unaware of the actions of the platforms in their regions. This implies more worrying the communication coupled with asymmetric information is deficient and does not reach the potential members of the platforms. Under these conditions, the executive committees of the platforms are unable to mobilize the financial necessary resources for their operation with the actors at the base. And this is what justifies the inefficiency of the platforms that do offer almost no technical service, organizational and marketing of mango to members; and whose leaders are obsessed with the funding they expect from the project. This is what we hear from the President of the Atacora-Donga platform when he declares: "The platform is not set upfrom the farmers at the base. We were abandoned in the air and the project let us go. Not having sufficient means, we have given back the trainings to some of the farmers since we cannot move them all. It was necessary to go to the base and have basic structures in each village, but the platform was set up early. "

These results confirm those of Ouidoh *et al.* (2018)[5] who found that the low diversity of actors in traditional leafy vegetable (LFT) innovation platforms in Benin, the absence of facilitator and the weak capacity of members to provide solutions to identifying problems have limited their operation.

In addition, the informal nature of platforms as institutions discredits them and undermines any willingness to join. As a result, all the members of executive committees in whom hands the platforms are concentrated are not able to take part regularly to the meetings due to the fact thatthey raise financial problems because of their geographical remoteness. This confirms the works of Kouakou *et al.* (2017)[7] which revealed that classic operating problems related to lack of transportation means for members Office strongly affected their tasks devolved from farmers and members, as is the case in the banana plant innovation platform of Nawa in Soubré in Ivory Coast. Thus, the executive committees must first invest in the formalization of platforms before moving to campaigns to raise awareness of the importance of platforms with a view to attracting the mass support of the actors in the sector. But there is still hope of making these platforms work efficiently, as this usually requires more time, as said by Toillier *et al. (*2015)[11] and Schut *et al.* (2016)[12].

Adhesion level of the actors to the platforms

The low number of members of the platforms is due to a lack of communication, poor coordination of activities and a lack of trust among stakeholders in the sector. In fact, two of disseminated fruit fly control technologies namely GF-120 and Timaye (for mass trapping of flies) were made available to the members of the executive committees by the project for testing purposes. Normally, the members of the offices had to organize themselves and distribute these samples of products, already rare on the Beninese market, to all the Communes, remains only to the leading farmers who would have represented the mass. But we clearly note that this does not happen so, and offices have been privileged in addition to a few farmers with whom they maintain informal relations (friends, parents, neighbours, etc.). Acting in this way, the bulk of actors constituting the sector will be felt not concerned by the platforms, because their concerns are not taken into account by the executive committees. As a result, this weakens the rate of stakeholder engagement. If the platforms have become the business of the officers, their coordination is far from being mastered by the managers who continue to monopolize the management: almost no meetings nor training sessions, exchanges with the actors at the base to try to find solution approaches to theirproblems that are boiling down to the creation of niche markets, the availability of processing products (GF-120, Timaye). These are facts that could contribute to the success of activities as it was the case in Ghana, where training sessions and quarterly meetings have improved the knowledge of the members of the platform Volta2 (Mariami *et al.*, 2015)[13].

CONCLUSION

None of the three platforms is truly functional. Only the Atacora-Donga platform gives some signs of functionality, but that remains very insufficient. Actors and board members are still unaware of the expected mode of platforms operation and their executive committees, mechanisms for resources mobilization and financing the operation of platforms in their respective regions. The reasons for this non - functionality are to be sought at two levels. The creation process of platforms is left unfinished and processingproducts,in whichfarmers have been trained, particularly the treatment product GF-120, are not available on the market. The structural reorganization and the definition of a governance mechanism adapted to the platforms remain necessary. It will be inevitable to continue the creation process of the platforms and to carry out the administrative and technical steps necessary to make the processing products available and accessible for use by the farmers.

ACKNOWLEDGEMENTS

The authors warmly thank the Support Project to the Regional Plan for the fight and Control of Fruit Flies in West Africa, "Applied Research Component" (MFCRA-FSA Project), for its financial support to the study and all responsible persons and actors of mango innovation platforms in Benin for their active participation in the various interviews during thedata collection.

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