

# Innovation platforms and value chain: technological interactions and sustainability in Ivoirian plantain sector

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## Introduction

Public policies to improve agricultural productivity in sub-Saharan Africa have rehabilitated in recent decades the need to create socio-technological networks (Doray and Lapointe, 1992) in order to support development projects designed to obtain food sovereignty challenges (Brunel, 2009 ; Charlier, 2017). Socio-technical networks in developing countries can also underpin organizational components that will constitute even the existence of a sector (Hugon, 1985) as a system. These networks would then be characterized by a grouping of several actors, categories of actors and institutions of an agricultural and / or food chain. In our work, these networks are polarized by innovation.

In Côte d'Ivoire, so-called strategic crops (plantain, maize, cassava, yam and rice) have been identified in studies on the development of a National Agricultural Investment Plan (PNIA) for their significant impact on poverty reduction and economic development (PNIA, 2010). The process has been carried out and is still being carried out by the Program WAAPP\_CI, with a view to improving the productivity of these food crops. The diffusion of this improved plant material is supported by the creation of the Innovation Platforms in the main geographical areas of production of these food crops.

The classical and diffusionist model of technological and varietal innovation in this PED is based on the presence of technical rural development agencies (ANADER<sup>4</sup>, INADES Formation) which disseminate (sale or free distribution) to producers, agricultural inputs developed by companies or research. The setting up of innovation platforms appears as an attempt to diversify this model to introduce the role of the market as an innovation steering institution (traders, distributors, consumers).

These new supports are therefore a means of renewing mechanisms for the transfer of knowledge and technologies through learning and capacity building through collective coordination of actors around an innovation process. These diffusion models differ from the old linear diffusion methods (pools technology) carried out by national agricultural extension and advisory agencies or by NGOs which provide various forms of technical and / or financial support, or by agri-food companies which draw up sales contracts with suppliers.

We examine in our study how these innovation platforms implemented in Côte d'Ivoire since 2013 play a role or not in the existence of a systemic dynamics focused on the innovations mobilized in the specific case of technological transfers. We propose in this work to evaluate how the designing of this experimental device in a diffusionist logic based on technologies, make the actors of the sector interact and finally reconfigure the system, therefore in itself, generate new organizational innovation.

This study uses the conceptual and theoretical framework of the economics of value chain (Temple *et al.*, 2011) to analyse an innovation process. It aims to provide an answer to the question of how the conception of technological innovations in a methodological approach in terms of "Value Chain" is more innovative in terms of efficiency of this network of selected transfers, contrary to that based solely on the sector of the production of a chain, privileged during decades in the PED.

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This article is organized into three sections. In the first, we describe the conceptual framework of the economics of the chain and methodological framework of the analysis which guided the data collection. Results are analyzed in the second section. In final section, we discuss the appropriateness of using a new approach that we call “Innovative Chain System, SFI”. Recommendations and research perspectives will help to conclude the study.

## **Methods and Data**

### *Theoretical and conceptual framework*

In a theoretical frame of reference for the dominant development economy, which bases African agricultural development on the transfer of technologies developed in industrial agriculture (Badouin, 1975, Assidon, 2002), this study uses the conceptual approach of analysis in terms of “Chain System” and the methodological referential of “ Meso-Analysis Chain, MSF” (Hugon, 1994). However, we propose to update the use of benchmarks for the analysis of chains in view of the recent development of “value chain” approaches (Temple *et al.*, 2011, Palpacuer, 2015) and “Innovation System “(Touzard *et al.*, 2015) to describe these new institutional arrangements.

### *Methodological and analytical framework*

The collection of primary data was carried out in April 2016 during a fact-finding mission to the leaders and members of the five PIPs. Semi-directional interviews were also conducted between June 2015 and August 2016, with the Ministry in charge of agriculture and food safety, technical and agricultural advisory structures, research centers, executing agency Firca\_Waapp.

On the empirical level, this objective will be tested on three improved varieties of plantain introduced successively in 2012 (Pita 3, Fhia 21) by the National Center for Agronomic Research (CNRA) and then in 2014 (Big Ebanga) by the Interprofessional Fund for Research and Agricultural Council (FIRCA), the agency in charge of implementing this productivity improvement WAAPP program.

## **Results**

### *Impact of the PIP on the reconfiguration of relations between actors in chain*

Five PIPs were set up in Côte d’Ivoire since 2013 to accelerate the diffusion of technological innovations: (i) PIP of YEBOYEKON in Abengourou, (ii) those of N’DÈ N’FENIN-TÔH of Agboville, (iii) WOYÈ of Adzopé, (iv) PIP of Issia and (v) PIP of NAWA in Soubré. The number of direct actors in this chain involved varies by implementation area and by groups of actors (Table 1).

Three relationships between the actors of the sector were most significant: relations between research and development institutions and management structures, those between management structures and producer groups, and then between professionals in the field and research. The PIP promoted the introduction of the Big Ebanga hybrid in 2014, the dissemination of three improved varieties of plantain and the transfer of technologies for plantain cultivation.

### *Return on the relevance of using an SFI approach to structure innovation*

Taking the methodological framework of an SFI approach to structure an innovation process is based on a fundamental assumption that the complementarity between the different segments of the sector. In this study, two interdependent elements must be highlighted for the applicability of this hypothesis, namely: make good use of the concept of the sector in the concept of platforms to test innovation; and institutionalizing the sector to better manage the implementation of innovation.

### **From the incompleteness of the use of the concept of the value chain in the concept of platforms to experiment innovation**

Initially, PIP produced remarkable results on the governance of the innovation process. Indeed, we have witnessed the performance of the PIP to drive the first level of innovation which is the experimentation

of the new varieties. These PIP then fostered the integration of the opinion of the target populations for a reorientation of the choices of the public policies in terms of selection of the varieties introduced taking into account the needs of plant material of the producers and the preferences of the consumers. In a second step, a gap in the use of the chain approach by innovation platforms is however to be noted since we recall that these are mainly industrial varieties witch destined much more for industrial use (flour, pastry, chips)..

### **To the lack of formal institutionalization to drive the implementation of innovation**

For the chain to emerge as a guiding element of technological innovation it must be formally institutionalized with rules, standards and organizational forms, in which all players in the agri-chain recognize themselves, since they have contributed to their progressive development. However, for the moment it did not show any institutionalization of this Ivorian plantain value chain.

In order to achieve this, it would be necessary to establish networks of actors or colleges much more homogeneous and transversal to the 5 PIPs composed mainly of actors from each level / segment of the chain (production, marketing and processing).

### **Conclusion**

This study examines how platforms have seized the value chain referential and mobilized it in the specific case of technological innovations in the food sector in Côte d'Ivoire. It therefore relies on the conceptual and methodological framework of the economics of the sectors to analyse an innovation process. It proposes to contribute to the definition of a new conceptual concept in terms of "Innovative Chain System, SFI" combining methodological approaches in terms of "Meso-Analysis Sector" and "Sectorial System of Innovation".

Our results show that these PIPs are as successful as failures. Their success lies in resolving the stakes involved in coordinating actors in a sector around the experimental test for the introduction of plantain varieties. However, their failures are explained by the failure to respect the central hypothesis of the chain approach, which is to integrate all the actors. The designing and establishment of colleges of actors more homogeneous in the three segments of the plantain value chain will contribute to this institutionalization, which would take the form of a college and then become progressively regional.

Is the concept of "agri-chain" really adapted to integrate the different actors of socio-technological innovation in a co-construction process? Is it finally the right tool in the case of a secondary crop and mostly associated with perennial crops (cocoa, hevea) destined for export ?

The SFI itself is contextual to the creation of innovation platforms that establish a coordination structure. However, the question remains as to whether these platforms are diluted in relation to the external financing that supports them, whether these SFIs will continue to exist.

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