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Performance of Institutional Innovation: The Case of Maize-Related Warrantage in Benin, West Africa

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Abstract – **Following an institutional analysis framework, this study aims to characterize and assess the performance of warrantage models in Benin. The methodological approach combines both qualitative and quantitative methods. A "snow ball" sampling technique was used to identify the warrantage promoters in Benin. With the focus on maize, information related to the warrantage objectives, the stakeholders involved in the process, the financial parameters and the number of warranted products depositors were collected through unstructured interviews with promoters. This information was processed by using discourse analysis approaches.. The performance indicator was the growth rate of the number of warranted product depositors, referring to the new memberships per warrantage model. As a result, the marketing-based warrantage, the inputs-based warrantage, the Income Generating Activities-based warrantage, and the plural warrantage were found as the main financial schemes characterizing warrantage in Benin. Furthermore, the performance of an institutional innovation such as warrantage in Benin was related to the organizational environment, the types of stakeholders and their working strategies.**

Keywords – **Benin, Institutional Innovation, Performance, Warrantage.**

I. INTRODUCTION

Institutional innovation refers to a substantial change of an initial set of actors in incremental or discontinuous way to enable collective action [1]. It contributes to the creation of opportunities through the interaction of a set of actors to meet specific needs [2]. Yet, the performance of institutional innovation is often questioned because of their shortcomings that require technical and institutional changes of their structure and functioning [3]. This performance depends on the organizational environment, implemented strategies and the organizational capacity of the stakeholders [4]. Indeed, there is no typical structure and functioning that ensure or guarantee the performance of institutional innovation [4]. As a matter of fact, there is a growing theoretical debate about the factors that could potentially explain the performance of institutional innovation. To contribute to this debate, the current study explores the drivers of the performance of different forms of warrantage as institutional innovation implemented in Benin.

The lack of financial means is one of the important barriers for the appropriation of innovations by rural population in sub-Saharan Africa [5]. Microfinance institutions (MFIs) are very reluctant to invest in rural credit for reasons such as increased operating costs, risks linked to productions and non-repayment of loans [6]. According to the Plan Stratégique de Relance du Secteur Agricole (PSRSA) in Benin, only 18.3% of the smallholder farmers had access to credit in 2007 [7]. Farmers who did not have access to credit usually sell off their agricultural products to re-buy them at very high prices (over 56% increases) in the meantime before the new harvests [9]. Such farmers experience continuous decreases of agricultural productivity and income [9; 10] since they have limited financial means to intensify their production systems and engage other income generating activities [11].

In this context, a warrantage system has been introduced and implemented in Benin to facilitate the rural population access to inputs-based credits or loans for income generating activities (IGA) [12]. Warrantage is broadly defined as a financing scheme that allows farmers to place their products in a secure warehouse for receiving in return a loan from a financial institution [13]. Studies on warrantage revealed its advantages and limitations. In Nigeria for instance, warrantage systems Funded by Non-Governmental Organizations (NGOs) and farmers' organizations (FOs) enable farmers to benefit from increased selling prices in the ranges of 55%, 81% and 92% for rice, cowpea and soybeans, respectively [14]. The loans obtained from warrantage are further used to finance agricultural activities, income generating activities (IGA) and other social needs [14; 15]. In Niger, through inputs-based credits obtained from warrantage, farmers could record 19% to 113% gains on capital investment within six months [13]. As a result, warrantage provides farmers with benefits such as access to agricultural inputs and higher

seasonal prices [16]. Despite these advantages, the warrantage system is not scaling up in Benin. Introduced since the 2000s, warrantage has produced its first results encouraging as from the year 2011. Among others, the prices of warranted products are highly volatile, compromising the repayment of loans. As well, there is not a licensed warehouse to secure the warranted products and therefore, farmers are reluctant and less willing to get involved in any warrantage system [17]. Against such background and with the focus on maize as warranted product, this study aims to analyze the structure, functioning and performance of warrantage in Benin.

III. Analytical Framework Of The Study

Warrantage is a credit transaction in which a product deposited in a secured warehouse is used as collateral to guarantee a funding requested by the product owner [18]. The requested funding may be used for IGA, purchasing of agricultural inputs, fattening of small ruminants, investments in trade, etc. [19; 14; 15]. A warrantage system involves several types of actors such as FOs, MFIs, inputs suppliers and warehouse keepers [20]. The monthly interest rate applied by MFIs can be between 2.5% and 4.2% [21; 20]. Warrantage is therefore a collective action with objectives, types of actors and financial parameters depending on the promoters or initiators [16]. Hence, the objectives, the types of actors and the financial parameters were the main criteria use to characterize the warrantage models in this study.

The analysis of the performance of an institutional innovation must from its organizational environment, the working strategies and the organizational capacity [22]. The organizational environment reflects the relationships and interactions among the involved actors with respect to their requirements and expectations, and the nature regulations/rules within the group. The working strategies refer to how the organization is structured as to achieve different objectives. Put another way, the strategies show the harmony of the roles of each actor towards the implementation of the institutional innovation. The organizational capacity reflects the ability of the actors' synergy to achieve the objectives of the institutional innovation. It is hence linked to the working strategies.

Douillet and Maillard pointed out the influence of the organizational environment on the performance of institutional innovation [23]. According to them, an institutional innovation that has been successful in a given environment may fail in another one. The authors also commented that failure can be explained by similarities and dissimilarities observed in the implementation process [23]. As a result, the sole characteristics of an institutional innovation do not guarantee its performance [24]. According to Bélanger et al. and Rizopoulos and Kichou, the difference in performance of an institutional innovation can also be explained by the types of actors involved or the new memberships (entry of new actors), the technical means and the targeted objectives [25; 1]. The involvement of different types of actors or new actors to problem solving improves the performance of institutional innovation [25].

In sum, the drivers underlying the performance of institutional innovation are likely to the organizational environment, the working strategies and organizational capacity (Fig 1). The organizational environment in this study refers to the relationship between actors and the financial parameters characterizing each type of warrantage. The working strategies and the organizational capacity are analyzed through the objectives of each type of warrantage, the types of actors involved in and their roles.

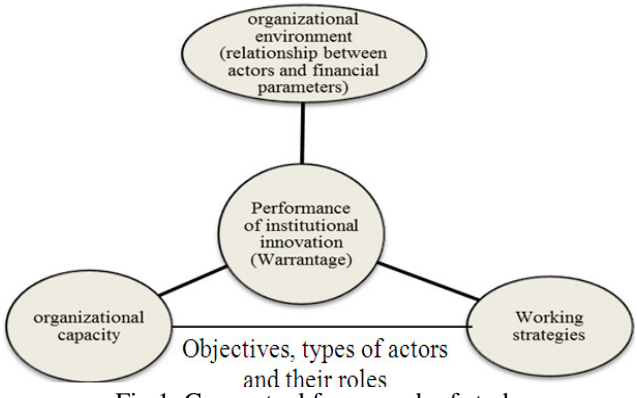

Fig.1. Conceptual framework of study

IV. Methods Of The Study

The methodological approach combines both qualitative and quantitative methods. The "sonw ball" sampling technique was used to identify the warrantage promoters in Benin. This sampling technique enabled to reach the next informants starting from the first, by making regular contacts until getting full information. Out of the nine warrantage models listed in Benin, five were studied in deep according to its old (Table 1). The selected warrantage models are the ones of the "*Projet Intrants Non Coton* (PINC)" of IFDC (International Fertilizer Development Center), the "*Projet d'Appui à la Déconcentration, à la Décentralisation et au Développement économique local (PA3D)* ", the "*projet de Lutte Intégrée pour la Sécurité Alimentaire* (LISA)" of *Louvain Cooperation*, the "*Union Communale des Producteurs (UCP) de Zogbodomey (UCP-Z)"* and finaly the *"Service du Développement Economique Local (SDEL)*".

The objectives of the warrantage, the geographical area covered, the types of actors involved in, the financial parameters such as interest rates, type of loan, processes of definition of the amount of credit and risk guarantor were the main primary data of the study. These data were collected through unstructured interviews with the promoters and later on processed by using discourse analysis tool. The numbers of depositors during the crop years 2011- 2012 and 2012-2013 were obtained from available reports to calculate the growth rates of depositors. These crop years were used references for reasons of data availability. In the case of the warrantage model promoted by PINC, the number of applicants considered is the population of the municipality of Sinendé since the national data were not available. The growth rate of depositors which accounts for the new

memberships was used as an indicator of the performance of each form of warrantage. It should be also emphasized that the statistical data in the case of the warrantage of "Louvain Coopération" were not available.

Table 1 : Maize-related warrantage models in Benin

Promoters	Starting Year	Infrastructural Environment	Case Studied
PINC/ IFDC	2009	Exploitation of old stores of cotton or infrastructure	Yes
PA3D	2000	Construction, by the project in collaboration with local communities, of two warehouses in the intervention districts	Yes
Project LISA/ Louvain Coopération	2003	Construction, by the project, of a warehouse in the center of each intervention district	Yes
SDEL	2010	Exploitation of old stores of cotton or infrastructure	Yes
UCP-Z	2010	Exploitation a central store of the municipality, built with the financial support of African Development Foundation (ADF)	Yes
UCP of Djidja	2012	Exploitation a central store of the municipality, built with the financial support of African Development Foundation (ADF)	No
UCP of Agbangninzoun	2012	Exploitation a central store of the municipality, built with the financial support of African Development Foundation (ADF)	No
The Hunger Project	2012	Exploitation of a store of the epicentre	No
APIC*	2011	Exploitation of old stores or infrastructure	No

**APIC :* Action pour la Promotion des Initiatives Communautaires

V. RESULTS

A. Characteristics of maize-related warrantage models in Benin

a) Implementation objectives

The objectives and the geographical scale of maize-related warrantage models in Benin vary according to the promoters (Table 2).

Table 2 : Mapping of the objectives of maize-related warrantage models in Benin

Promoters	Objectives of warrantage	Geographical scale
PA3D	- Facilitate farmers access to agricultural inputs and credit (i.e. loan) towards IGAs	Regional (Borgou)
PINC	- Facilitate farmers access to food inputs	National
LISA	- Facilitate farmers access to agricultural inputs and credit (i.e. loan) to meet their social obligations	Regional (Atacora)
UCP-Z	- Facilitate the marketing of food products through cash or inputs credit	Local
SDEL	- Facilitate farmers access to credit (i.e. loan) for IGAs	Regional (Alibori)

Source: Field survey, March 2014

The goal of most of the maize-related warrantage models is to facilitate farmers access to agricultural inputs. However, some models are aimed to provide loans towards IGAs; this is the case of warrantage models promoted by PA3D and SDEL. But in general, promoters are more concerned about farmers access to agricultural inputs than credit towards IGAs.

Most of the warrantage models are established at a regional level. The warrantage model which is at local level is promoted by the UCP-Z, considering the fact that it is a local municipal-level institution of farmers.

b) Actors involved in the implementation of maize-related warrantage

Most of the warrantage promoters are development projects (Table 3). The warrantage model promoted by UCP-Z is the only case initiated by farmers faced with agricultural products marketing problems. Two main groups of actors are represented in the implementation of warrantage. These are the key stakeholders without whom the system cannot operate, and the facilitators who accompany the first group of actors. In general, the key stakeholders (i.e. depositors, inputs suppliers, traders/merchants and MFIs) are found in every model of warrantage. Yet, traders are involved only in the warantage model promoted by PA3D. The models promoted by projects are characterized by more facilitators than those initiated by farmers themselves (Table 3). The presence of the decentralized structure of the state (Secteurs Communaux de Développement Agricole (SCDA)) in the warrantage system is characterized by two main roles (input supply and technical support). SCDA represents the national company of input supply (Société Nationale pour la Promotion Agricole (SONAPRA)) in warrantage models promoting a better access to agricultural inputs.

Table 3 : Types of stakeholders according to the warrantage models

Stakeholders group	Types of actors	Projects			FO	Public service
		PA3D	PINC	LISA	UCP-Z	SDEL
Key stakeholders	FO (depositors)	+	+	+	+	+
	MFI (source of credit)	+	+	+	+	+
	Suppliers of agricultural inputs	-	+	+	+	-
	Traders/Merchants	+	-	-	-	-
Facilitators	Local collectivity	+	-	-	-	+
	National MFI	-	+	-	-	-
	National company of agricultural input supply	-	+	-	-	-
	Technical Support Service	+	+	+	-	+
	Municipal FO	-	+	+	+	+
Number of stakeholders		5	7	5	4	5

Note: the signs "+" and "-" means that stakeholders are involved and not involved in warrantage models, respectively.
Source: Field survey, March 2014.

c) Financial parameters of maize-related warrantage models

Three major types of loans are found in the implementation processes of maize related warrantage models in Benin. These are the inputs-based credit towards inputs supply, the IGAs-based credit used to finance IGAs, and the money-based credit for meeting social obligations (e.g. social requirements, social ceremonies such as baptism, marriage, etc.). The warrantage model promoted by PINC is quite different from the other models through the type of loan, the interest rate and the risk guarantor (Table 4). The decentralization support promoters have the same financial arrangements in the implementation of warrantage. The amounts of credit are fixed by bag of 100 kg of product deposited.

B. Performance of maize-related warrantage models in Benin

Regardless of the warrantage model, the number of depositors of different crops (e.g. maize) changed more or less significantly between 2011- 2012 and 2012-2013 (Figure 2). The growth rate of the number of product depositors (i.e new memberships) is positive for all warrantage models except for the one promoted by SDEL. PINC's warrantage model has the highest growth rate rate.

Table 4 : Financial parameters of maize-related warrantage in Benin

Financial parameters	Projects			FO	Public service
	PA3D	PINC	LISA	UCP-Z	SDEL
Types de loans	CIGA	IC	IC + SO	SO	CIGA
Monthly interest rate (in %)	2	1,25	1,5	2	2
Maximum amount of credit	10 000 Fcfa[1]/ bag of stock)	80% of stock	80% of stock	100% of stock	10 000 Fcfa/ bag of stock)
Risk Guarantor	Farmers	PINC	Farmers	UCP-Z	Farmers

[1]1 Fcfa ≈ 550 USD
Note: IC: inputs-based credit; CIGA: IGAs-based credit; SO: Money-based credit
Source: Field survey, March 2014

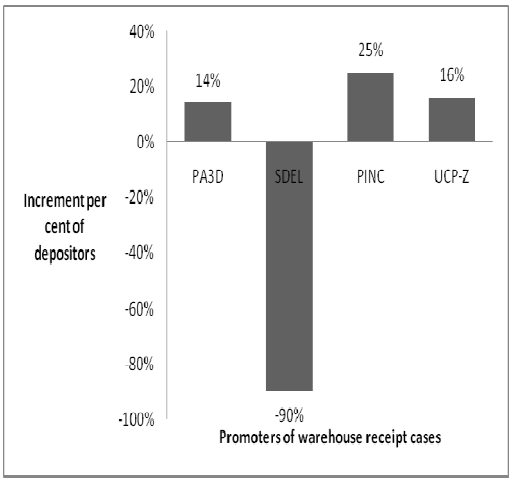

Fig 2 : Increment rate of the number of depositors between entre 2011- 2012 and 2012- 2013

Source: Reports of activities of the promoters (IFDC, 2013; SDEL, 2013; UCP-Z, 2013; PA3D, 2013).

VI. Discussion

A. Typology of maize-related warrantage models in Benin

Four main forms of warrantage are found in Benin. These are the marketting-based warrantage, the inputs-based warrantage, the IGAs-based warrantage, and the plural warrantage.

a) Marketing-based warrantage

This type of warrantage is orientated towards the flow of agricultural products on the market (case of UCP-Z). It is characterized by a reduced hierarchical structure (MFI, SCDA and FO). Technical support is provided by the promoter who hires some agricultural products marketing

technicians. The financial parameters are standard. This form of warrantage is more a kind of speculation tool that enables to improve the average farmers' incomes than a price risk reduction tool like in East Africa and India [16]. Indeed, the marketing-based warrantage promotes sales of agricultural products at a good price [26]. But, it is less profitable when it is related to grains in the socio-demographic and economic context of households in the Sahel countries [18]. As a matter of fact, Coulter and Mahamadou recommend organizing such warrantage in relation with leguminous plants like beans or cowpeas [13]. Nevertheless, the particularity of this form of warrantage in Benin stands in the interest rate applied. The interest rate applied in Benin is lower than that one observed in Niger for instance. In Niger indeed, the lowest monthly interest rate is 2.5% whereas it is 2% in Benin [21; 20]. This figure could significantly affect the performance of marketing-based warrantage. Like in East African countries and in India, UCP-Z has established a market information system to follow-up regularly the prices of warranted products. According to Duffau et al., the market information system allows the progressive construction of reliable price series to monitor and improve the configuration of the warrantage system and to be able to design additional safeguards (i.e. guarantees) required to deal with a negative year [16].

The marketing-based warrantage is often observed in the East African countries (e.g. Malawi, Tanzania and Kenya) [27]. In these countries, banks are involved in the process whereas in Benin the source of credit is a microfinance institution (ibid). As well, the promoters in East Africa are mostly cooperative while they are mostly projects in Benin [27]. The ratio credit/stock is higher in Benin than in these countries (ibid). Indeed, farmers can take (or not) 65% to 75% of the value of the stock at the market price in East Africa. This is the case of USAWA network and the Agricultural Marketing Systems Development Programme (AMSDP) program in Tanzania, and the EAGC system (Eastern African Grain Council) in Kenya [27].

b) Inputs-based warrantage

This form of warrantage is oriented towards a better access to agricultural inputs (case of PINC). It is characterized by a strong involvement of several types of actors, a low interest rate and a guarantee fund to cover risk. Indeed, PINC created the "fonds de garantie projet intrants non coton" which is a special fund of about 168,989,250 Fcfa as initial deposit. This fund was raised through a signed agreement framework agreement between the guarantor (IFDC) and the Faîtière des Caisses d'Epargne et de Crédit Agricole Mutuel (FECECAM). The guarantee fund covers the common risks associated with credit applicants (e.g. deficits or losses of farm products, unwillingness of depositors), the risks of specific natural disasters in the agricultural sector and the risks on financial transactions related to the procedures of credit award and reimbursement. This explains the special financial parameters observed in this form of warrantage.

After the inputs interest expressions (i.e. needs) of by the depositors, PINC send a preformat invoice to SONAPRA for supplying the aforesaid inputs. Yet, FECECAM branches (which are the sources of credits) transfer the money (total value of the supplied inputs) to the public treasury before any input is distributed to the depositors. This explains the involvement of SONAPRA and MFIs in this form of warrantage.

This form of warrantage is the best adapted to improve soil fertility [13]. It has been implemented in Niger, Burkina Faso and Mali to facilitate the adoption of the fertilizer micro-dose by farmers [12]. The amount of credit is defined from stock in Benin, like Niger and Tanzania [20]. In these two last countries, the maximum credit is 70% and 50%, respectively of the stock while in Benin, the maximum amount varies between 80% and 100%, depending on the warrantage model [20].

c) IGAs-based warrantage

This form of warrantage is used as a tool to finance IGAs in a context of decentralization (cases of PA3D and SDEL). It is characterized by the involvement of a few number of actors (FO, MFI, local community, SCDA), by higher interest rates (2%), by the definition of the credit amount per bag of product and the non-consideration of risks associated with the operation. The particularity of this warrantage stands in the involvement of local communities. This is justified by the fact that such warrantage was initiated to strengthen the local economy in a context of decentralization. In Madagascar, the monthly interest rate is 3% against 2% in Benin [28]. In the implementation of IGA-based warrantage in Nigeria, loans were used to finance not only the income generating activities but also for fattening small ruminants, small businesses, etc. [14].

d) Plural warrantage

This form of warrantage combines both needs to meet some social obligations and to supply inputs (as in Louvain Cooperation). It is characterized by the same types of stakeholders as for the case of marketing-based warrantage. Moreover, in an orthodox system of warrantage, the warranted products are deposited against the certificate of deposit or "warrant" issued by a licensed warehouse, attesting the quality standard of the products [18]. The warrant provides full information to identify the depositor and the warranted product. Orthodox warrantage is usually based on a tripartite agreement involving the financial institution, the borrower or depositor and warehouse [20]. In Benin, there is no licensed warehouse. It is substituted either by FOs themselves which make their stores available (case of PINC and SDEL) or by local authorities who set up a management committee of stores built with the financial support of the promoter (case of PA3D and LISA). In such cases, a warrant is issued to the depositors by FOs. The quality of stored products and stores' standards are certified by a public service packaging and storing officers (SCDA) or a technician of FOs. The stores are carefully locked and the keys are distributed between the FO and the MFI, as in other countries such as Niger, Mali, Tanzania, etc. [13; 16]. The stakeholders' platform of this warrantage in Benin is different from the one reported by Humphreys et al. and Antonaci et al. [19; 20]. The value of the deposit certificate is recognized only by the MFI involved in the

process in a given locality. Hence, the holders of such certificate are not able to use it as to get a loan from another financial institution. However, the implementation of warrantage requires a legal environment where a licensed warehouse is recognized by the laws of the country [27].

B. Explaining the performance of maize-related warrantage in Benin

The inputs-based warrantage recorder the highest growth rate of the number of depositors whereas the lowest growth rate is recorded by the IGA-based warrantage. Indeed, access to inputs is a very important concern for farmers who are constrained to produce less (or no) cotton if they cannot manage to get the required inputs. PINC project involved several types of actors with whom he signed a partnership protocol. As well, a guarantee fund management agreement was signed with the federation of MFIs. The interest rate applied unlike in other forms of warrantage is lower and affordable by farmers. The risks are covered by the guarantee fund set in FECECAM. The inputs supply company (SONAPRA) and the federation of MFIs receive pressures from the promoter. The protocols and agreements framework create a favorable organizational environment for a successful inputs-based warrantage [22]. In the East African countries of and in India, the early involvement of MFIs in the process was a key success factor of the operation [16]. In Niger, according to Antonaci et al., the efficiency of inputs-based warrantage depends on the relationship between MFIs and inputs supplier [20]. The inputs supplier gives priority to depositors in the distribution of inputs. The hierarchical structure defines the roles of each stakeholder in relation to the initial objectives. Farmers are more motivated to deposit their agricultural products to benefit from the inputs. The lack of input supplier in the IGA-based warrantage promoted by PA3D justifies the failure of the inputs distribution system. The negative growth rate of the number of depositors recorded by the IGA-based warrantage promoted by SDEL is due to the lack of store. Indeed, the store is an essential factor in securing of warranted products [29]. When stores are not available or appropriate, the operation becomes risky as the risks are covered by farmers themselves in an unsecured environment. Thus, the performance of warrantage is due to its organizational environment (financial parameters affordable by farmers), the widest hierarchical structure (higher number of actors) and the warrantage objective [23].

VII. Conclusion

The characterization of the maize-related warrantage models through the objectives, types of stakeholders and financial parameters reveals four structures in Benin. These are the marketting-based warrantage, the inputs-based warrantage, the IGAs-based warrantage, and the plural warrantage. Characterized by a larger structure and a favorable organizational environment, the inputs-based warrantage is more efficient. On the other hand, the marketting-based characterized by a reduced hierarchical structure records an average performance. Such figure highlights that the performance of an institutional innovation such as warrantage can be explained by its organizational environment, the types of stakeholders and their working strategies.

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