

Full Length Research Paper

Cotton Institutions and perverse Incentives for Fertilizer Traders in Benin

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Agricultural development in Benin is constrained by low productivity mainly due to low use of mineral fertilizers and improved seeds. After more than two decades of the cotton state company's monopoly, a market liberalization program is being implemented since the 1990s but still fail to meet farmers' needs for quality fertilizers and efficient supply-chain services. This paper discusses Benin's state-controlled licensing system, which forms the market liberalization program's institutional basis. Empirical evidence is given of the relationships between the theory of institutions and transaction costs, and its application in the fertilizer supply chain management. In Benin, the licensing system particularly illustrates a case of institutional failure, where distorted rules of the game and collusion between traders and market regulation institutions in the play of the game provided perverse incentives to private oligopolies in the liberalized market. Indeed, the distortions were beneficial for the trade alliances which were in a position to largely influence the setting and application of the rules, thereby discouraging other traders to compete with better fertilizer quality and marketing service delivery. Tests on operations management, competition and entrepreneurship were performed to demonstrate that competition is lacking, and that in this condition other traders cannot create value in the cotton-oriented fertilizer supply-chain and promote a liberalized entrepreneurial economy.

Key words: Cotton institutions, fertilizers, licensing system, perverse incentives, competition, operation management, marketing service delivery.

INTRODUCTION

Agriculture in Benin contributes about 35% to GDP and employs 80% of the active population, but its annual growth (3.6% in 1990 to 2005) is still below population growth (3.2% p.a.). Cotton provides about 37% of the country's export revenues and 70% of agricultural exports (AProCA, 2008; Kpadé, 2011). It accounts for about 80% of fertilizer use (IFPRI-LARES, 1998; Adegbidi et al., 2000; Honfoga, 2007). However, low productivity and non-sustainability of agriculture in cotton zones has become real development concerns. Although these zones are the most suitable for agricultural production, cotton yields are low (in average 1 kg/ha against a potential of 3500 to 4000 kg/ha) due to low and decreasing fertilizer use per ha, while food crop production is lagging far behind and cannot meet the growing

urban food demand.

Specific policies which intended to promote food crops include, among others: (a) the "Orientations de la Politique Economique du Bénin" or "Directives for Economic Policy of Benin" (1995 to 1997), which set precise targets for main food crops with the aim of linking them to more rewarding markets; and (b) the "Programme National de Sécurité Alimentaire (PNSA)" (2008 to 2015), a comprehensive food security program aiming to increase food availability and accessibility through production intensification, agricultural diversification and value-chains development. The PNSA has become part of the "Plan Stratégique de Relance du Secteur Agricole (PSRSA)" or "Strategic Plan for Boosting the Agricultural Sector" (2009 to 2015). These

policies evolved from implementation, review and rectification of structural adjustment programs, but in the practice they have not been visible in enhancing food crop production. In general, the terms of trade of cotton-producing countries have been declining since the mid-1990s and recent increases in fertilizer prices are more than three times crop price increases (Ivo, 2008).

Structural adjustment programs (SAPs) have been implemented in Benin during the mid-1980s to limit the state budgetary deficits and restore productivity and economic growth (Minot et al., 2000; Minot and Daniels, 2002). In the early 1990s, SAPs became effective in the agricultural sector, and the private sector was encouraged to take up inputs' procurement and distribution, especially for cotton production with regard to its contribution to the country's economy. In the early years of market liberalization, fertilizer consumption dropped but increased rapidly thereafter as a result of the cotton boom in 1994 which followed the CFA franc devaluation; in 1999, it reached 114,000 metric tons, the highest level ever observed in the country. Between 1999 and 2000, total fertilizer consumption dropped by 40%, when the state marketing board (SONAPRA) withdrew from the input market but remained the major seed cotton buyer in the country. Thereafter, in spite of a slight recovery in the northern regions, fertilizer consumption remained around only 80,000 metric tons/year until 2004. Average fertilizer use intensity was only 10.4 kg/ha in 2004, and crop yields, especially for food crops, remain far below the potential. In 2005, total consumption fell to 50,000 metric tons (SNV, 2005). The subsector's recovery remained slow so far. This backward trend unveiled the confusions in the cotton sub-sector's institutional reforms and the subsequent market crisis.

Considering the strong relationships between economic development, agricultural productivity increase and fertilizer use (Mokwunye et al., 1996), this paper addresses the impediments to fertilizer use in Benin with particular emphasis on domestic market-related constraints. The following sections include: (1) a short literature review that brings forth the main concepts of the study; (2) analytical methods and hypotheses; and (3) results and discussion, including: an overview and discussion on the rules of the game in the fertilizer market in Benin (licensing system); the play of the game in response to that system, along with changes in the cotton sub-sector; an analysis of the quality of distribution service and incentives in the supply-chain, through a discussion on marketing services and prices prescribed by the licensing system. This leads to the test on operations, that is, hypothesis 1: higher profits accrue from superior quality; the tests on competition and entrepreneurship (hypotheses 2 and 3) through a discussion that highlights the impediments to both concepts by the licensing system and the perverse incentives for traders thereof. Finally, conclusion is drawn and policy recommendations formulated.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Liberalization and institutions in West-African cotton sub-sector

Effective agricultural development policies are once more at the centre of international development policy and research, as the 2008 World Development Report "Agriculture for Development" testified. A rethink was prompted by the disappointing outcomes of market liberalization and structural adjustment policies implemented over the last 30 years. Despite early expectations, these policies have not generally resulted in increases of yield or market volume of food and cash crops (Shepherd and Farolfi, 1999; Poulton et al., 2004; Dorward et al., 2004). The explanations for this disappointing state of affairs include incomplete implementation of liberalization policies, with poor sequencing and policy reversals (Jayne and Jones, 1997; Jayne et al., 2002); weak market institutions, property rights, information systems and infrastructure (World Bank, 2002); and transaction risks and coordination problems in smallholders' commodity chains (Dorward et al., 1998; Dorward, 2001). Therefore, African governments are now tempted to reconsider the organization of their agricultural markets and assess the functioning of the institutions that supervised the agricultural supply chains so far.

Liberalization of the cotton subsector in Benin aimed at a more efficient allocation of resources by means of responsible institutions which would establish transparent regulations to encourage competition among private entrepreneurs. The shift was worth it, as adjustment policies in the past were regularly criticized to have neglected the need for coordination in the chains (Kydd and Dorward, 2004; Poulton et al., 2004). Yet, in spite of that shift the results have been disappointing. The new institutions seem to reflect the interests of some stakeholders that have been successful in defending their positions. Studies in other countries reveal that political motivations explain the distortions that occurred in liberalized African agricultural markets. These include: dependency on former colonies for foreign trade and protection of interest groups such as pre- or post-colonial wealth clusters (North, 1994); deficit of democracy and poor legal settings (Hodgson, 1998); rent-seeking behavior of public agents, corruption and diversion of newly established market institutions from transparency (Wallis and Dollery, 1999; Ellis, 1992; Dedehouanou, 2002); and finally limited access to information due to class-oriented diffusion (Atkins and Bowler, 2001), high illiteracy rate among consumers, poor communication infrastructure and absence of independent market information systems. As a result, transactions costs are high in African liberalized agricultural markets, as institutions failed to enforce transparent rules that encourage competition among traders.

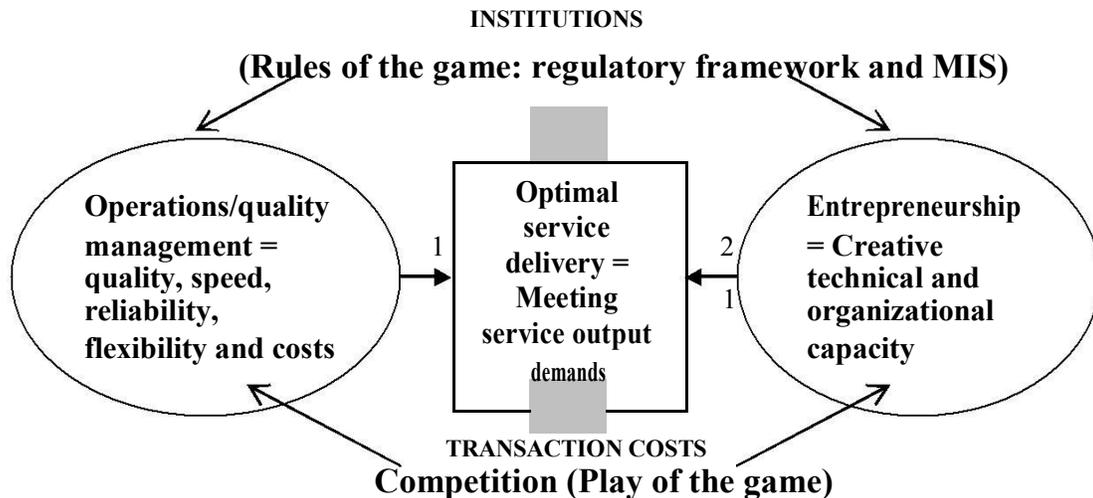


Figure 1. Traders and supply chain management in the business environment. MIS = Market information systems; 1 = Cost reduction strategies and innovations; 2 = Innovations for harnessing profitable business opportunities. The dominant type of innovations is on top of the arrow. The combination of 1 and 2 by traders evolves with time (technological progress and institutional maturity), leading to the dynamic efficiency of a market chain

There is a widespread consensus that existing institutions that coordinate exchange in African agricultural supply chains are deficient and form a major explanation for the disappointing agricultural production (Fafchamps and Gabre-Madhin, 2001). The theory of institutional economics provides the theoretical foreground to understand the strength of this argument.

North (1991) defines institutions as follows: "Humanly devised constraints that structure political, economic, and social interactions. They consist of both informal constraints (sanctions, taboos, customs, traditions and codes of conduct) and formal rules (constitutions, laws, property rights)." Consequently, institutions are rules that coordinate transactions between firms in the supply chain and therefore determine the incentive system for each of the actors involved. Understanding these incentives helps explain why certain business relationships flourish while others perish. Indeed, institutions are important to understand the business relationships between firms in the chain. The more institutions will be prompt to promoting transparent trade rules, the lower transactions costs will be. Good institutions create transparency in the market, help reduce transaction costs in the supply chains by formulating clear rules of the game, and enable smooth negotiations and contract drafting among channel members. Williamson (2000) uses a similar approach and makes a distinction between two concepts: institutional environment and channel governance. The institutional environment, that is, the rules of the game, refers to constitutions, laws and especially property rights. Such an institutional environment, which is laid on good governance by public trade regulatory agencies and market information systems, forms the basis for competition and allows efficient operations' management in the

supply chains by traders. Channel governance, that is, the play of the game, concerns the attempts of economic actors to adjust their incentive structures to the institutional environment and take advantage of the given opportunities. In order to understand the changes in fertilizer distribution in Benin, this study applies these concepts. The rules of the game define the formal rules, while the play of the game shows how actors reacted to these formal rules and grasped available opportunities.

Traders apply their innovativeness (creative technical and organizational capacity) to increase their efficiency in service delivery (entrepreneurship). This leads to lower costs of operations, more profitable business opportunities harnessed, and better quality of services tailored to the needs of consumers. In Figure 1, institutions indirectly influence entrepreneurs, but directly determine the conditions for competition (vertical shadowed band). Subjected to these conditions, traders/entrepreneurs operate along the horizontal arrows with the goal of optimal service delivery.

Liberalization of fertilizer distribution is constrained by the fact that major economies of scale exist (Geroski et al., 1990). This implies that small scale entry is difficult and, therefore, monopoly power may dissolve the positive effects of liberalization. In the specific market under study, this implies that the actions of the relatively powerful fertilizer distributors need to be regulated in order to protect the fragile position of farmers.

The rules of the game should accommodate this danger and prescribe some appropriate limits for the play of the game. Yet, over-emphasizing this concern (that is, regulatory prescriptions and controls) may hamper competition and block innovative propensity or entrepreneurship. Liberalization needs regulation but also

encouragement for entrepreneurship. This paper describes formal institutions that regulate fertilizer market in Benin and how they are enforced. It aims to contribute to understanding why market performance is disappointing.

Trade operations, supply chain management, marketing flows and quality of service delivery

A supply chain is the succession of market actors who ensure the transfer of goods from its place of production to where consumers want to get it. It is economically efficient when trade operations (marketing flows) are conducted at the lowest costs possible, according to the knowledge and techniques available to provide consumers with the product at desired quality (ILRI, 1995; Coughlan et al., 2001). The desired quality embraces physical and non-physical aspects. It proceeds from the quality of marketing flows' management or supply chain management by traders. Such management includes the methods of selling and buying, which implies a careful study of how to deliver various marketing services, and to design specific approaches to satisfy different client groups or market segments (Coughlan et al., 2001).

Competition and entrepreneurship

Competition refers to a situation where traders can propose different quality levels of marketing services at prices that correspond to consumers' choices and reflect the lowest costs possible, under a regulatory setting that prevents cheating or abuse of consumers. Entrepreneurship includes strategies developed by entrepreneurs to harness business opportunities and meet consumers' demands. As opposed to planning, entrepreneurship is driving liberalized economies (Audretsch and Thurik, 2004). In the modern entrepreneurial economy, business formats evolve quickly and firms have to innovate continuously. According to the principles of entrepreneurship in the market process (Kirzner, 1991), traders/entrepreneurs combining their knowledge of information gaps with their ability to harness profitable business opportunities is the key to a dynamic trade that fosters economic development. Entrepreneurship implies that the remuneration structure encourages entrepreneurial initiatives. In liberalized markets, traders should be encouraged to diversify their supply-chains through relevant innovations in service delivery. At the same time, they should be allowed to harness the benefits of their innovative efforts by institutions that facilitate the process of 'rules of the game and play of the game'. Indeed, the role of goods trade institutions is to allow a commensurate share of innovation benefits among channel members, an attitude that fosters the provision of better services to consumers.

Competition, entrepreneurship and operations management are normally correlated, and this is even unavoidable (Figure 1). Entrepreneurship and operations management refer to the internal management of the supply-chain, that is, the conduct of channel flows by the members of the supply-chain, while competition refers more to the external environment of the chain. Competition is bound by market institutions that should prevent unlawful rush to clients and encourage traders' inclination for trade ethics and quality service delivery. In the play of the game, traders develop initiatives to adapt themselves to, or to take advantage of the rules of the game set by institutions in the sense of reducing transaction costs and searching new profitable market opportunities, for example, new business-to-business or business-to-consumers relationships (Ghauri et al., 2003). In doing so, they embark on entrepreneurship in the market process and innovate for a greater satisfaction of consumers (Kirzner, 1991).

On the contrary, if traders negatively adapt to the regulatory framework by colluding with, or diverting market institutions from transparency, then such institutions are weak or rent-seeking driven, and may be therefore giving perverse incentives to traders. Overall, anything that reduces or hampers the economic performance of the supply-chain, especially by giving abnormal advantages to traders at the expense of consumers, is negative and called in this paper "perverse incentive for traders". Therefore, if the tests on competition and entrepreneurship lead to rejection of the related hypotheses—a result that should be the same for the test on operations—then perverse incentives are prevalent in the marketing system.

Analytical framework and hypotheses

This analysis of the liberalized fertilizer market in Benin consists of three building blocks which derive from a practical operationalization of the conceptual framework. Firstly, it describes the rules of the game and the play of the game, and the institutional changes that occurred therein, through an analysis of institutions and supply chains, and how coordination of transactions evolved. Secondly, it highlights quality of distribution service and incentives in the supply chains: higher profits should come from delivery of superior quality of service; a method is developed to measure the quality of distribution service and its relationship with distribution costs and firm profits. Finally, it explains the nature of competitive pressures and entrepreneurship in the fertilizer market in Benin. This involves an analysis of how competition and entrepreneurship are influenced by the institutional environment.

Therefore, the three major tests: test on operations, test on competition and test on entrepreneurship are done to verify the following hypotheses, using qualitative/-

descriptive and quantitative methods:

Hypothesis 1: There is a positive correlation between service quality index and profitability, that is, profits are being harnessed by entrepreneurs as a reward for their innovative efforts for quality improvement.

Hypothesis 2: A transparent market control/regulation system that encourages dynamic efficiency exists to legitimize the issuing of import licenses to traders and encourage competition in Benin.

Hypothesis 3: Liberalized market institutions foster entrepreneurship, that is, such institutions enable traders to innovate in service delivery (meeting the desired service output demands), and to gain the accruing benefits (incentive structure) while being responsible for eventual damages to society.

The empiric model used here illustrates the relationship between the theory of institutions and transaction costs on the one hand, and its application in supply chains through operations management, competition and entrepreneurship on the other hand. Now, we describe for each test the variables or specific chain performance criteria for which data were collected.

Test on operations

Operations management generally distinguishes five performance criteria: quality, speed, reliability, flexibility and costs (Slack and Lewis, 2002; Dornier and Fender, 2007). Quality refers to the physical characteristics of the product. Speed concerns the time the operations take. Reliability verifies whether delivery promises are kept and flexibility refers to ability to change the operations at clients' request. Finally, the cost component analyses whether the operations are conducted at the lowest costs that are congruent with desired quality grades of marketing service (Coughlan et al., 2001). Some of these performance indicators are used in this paper to assess the effectiveness of fertilizer distribution in Benin. The test of hypothesis 1 will put emphasis on the 'quality-cost' relationship. For the purpose of empirical analysis, the quality of distribution service is broken into three major categories of marketing services, as usually distinguished in the fertilizer marketing literature: 'fertilizer quality' (nutrients' content and physical characteristics), 'availability' (storage facilities and supply network management) and 'accessibility' (price, promotion, credit and client approach packages). Hypothesis 1 is tested to verify the congruence between quality management (product's quality, availability, accessibility) and cost. Indeed, in a functioning market system good performance needs to be remunerated by the system. This means that in regions where farmers have high service delivery expectations, the profits of fertilizer suppliers need to be relatively high. If the relation is negative the market system provides perverse incentives.

Test on competition

Hypothesis 2 relies on the concept that in a competitive environment, legitimacy of market institutions is key to supply chain efficiency and good market performance, that is, an autonomous market authority exists to avoid monopoly power using a transparent market information system with equal access for all customers.

Test on entrepreneurship

Hypothesis 3 is drawn on the idea that in underdeveloped fertilizer markets, 'institutional pull' or capacity-building support to traders is more relevant than 'institutional railing' which rather set rules to limit the side effects (environmental damages, income gaps and social exclusion) of capitalistic growth in developed countries. Meeting the needs of poor farmers for sustainable food and income security should guide entrepreneurship in developing countries.

METHOD OF DATA COLLECTION

Data used for the above described tests proceed from a research conducted from 2003 to 2007 on fertilizer distribution in the liberalized cotton sub-sector in Benin. They concern fertilizer supply-chains and traders' marketing strategies under the licensing system. A field survey was done in the two main cotton-producing regions – Zou-Collines (ZA) in the center and Borgou-Alibori (BA) in the north – of the country to collect primary data on fertilizer use and farmers' evaluation of fertilizer marketing services. The sample was made of 577 farmers selected in 191 villages of 14 communes (8 in ZA and 6 in BA). Communes and villages were chosen purposively taking into account different levels of fertilizer use, crop production diversity and levels of soil degradation. Farmers were "randomly" chosen from lists of members of village-level cotton producers' organizations so as to get small-, medium- and large-scale farmers according to area cultivated. The resulting sample was therefore representative of cotton producers in the two zones. Selected farmers were interviewed on: (a) their technical skills in fertilizer use, (b) how they rate (poor or good) the marketing services presently offered to them by traders under the licensing authority's prescriptions, and (c) what improvements or different needs in future service delivery they desire (service output demands).

The fertilizer use aspect (a) addressed technological variables (area cultivated, area and crops fertilized, fertilizers quantities, doses of application, intensity of fertilizer use, rate of diffusion, complementary inputs/technologies, etc.). The service quality aspect or marketing survey (b and c) is the main data source for this paper. It addressed the total quality of marketing services (referred hereafter as 'service quality'). For both types of survey, structured questionnaires were administered to farmers from October 2004 to February 2005, while non-structured interviews were held with traders and national-level organizations and institutions involved in fertilizer distribution in Benin. These include traders' organizations and the cotton sub-sector's administration which oversees the licensing system. Additional qualitative information was also obtained through secondary sources. While the structured questionnaires provide data for the test on operations management, interviews with traders and cotton institutions, and

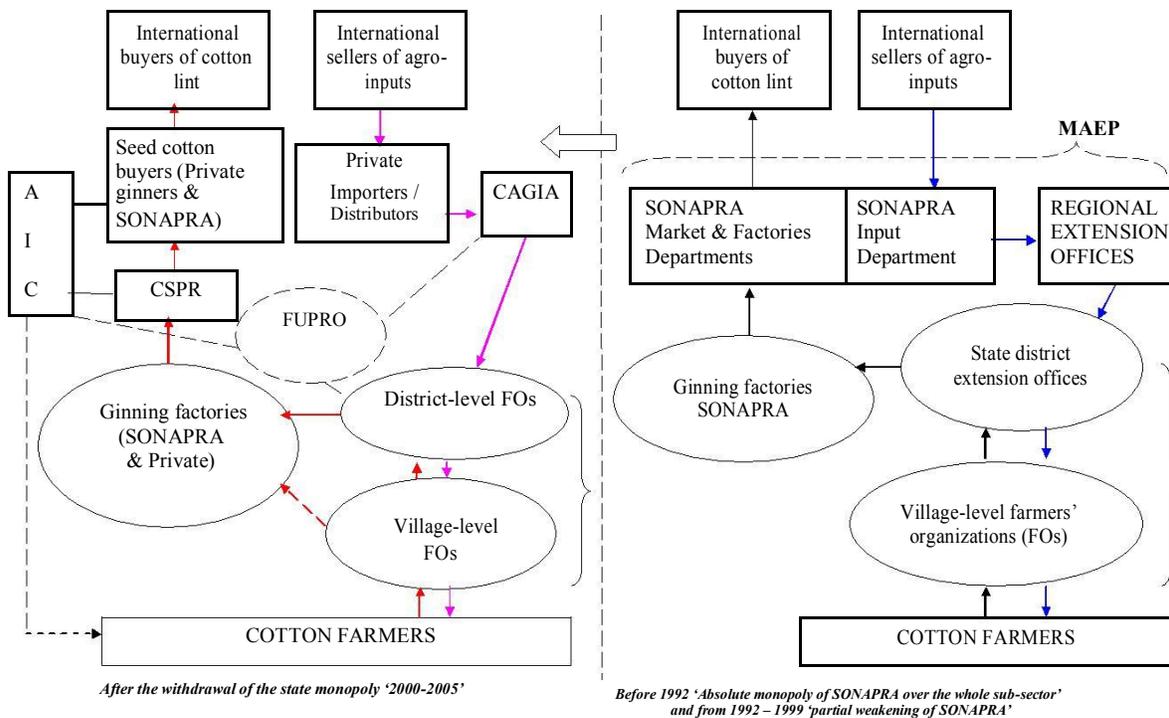


Figure 2. Changes in the cotton sub-sector institutions and operational management in Benin.

other sources of information, generated the database for the test on competition and entrepreneurship.

RESULTS AND DISCUSSION

The rules of the game in the fertilizer market and their justification in Benin

The market liberalization process in Benin evolved over 4 periods: the early years, when entry rules were established to guide and control private businesses (1992 to 1994); the cotton boom period which registered greater entry of private traders because of attractive cotton prices and input supply conditions after the CFA devaluation (1994 to 1999); the withdrawal of the state marketing board (SONAPRA), the setting-up of new market institutions in the cotton sub-sector (1999 to 2005), and the “emergent Benin” period (2006 to 2012) characterized by trans-sectoral and usually shaky reforms. Data used in this paper cover the first three periods. Figure 2 illustrates the changes that occurred in the cotton sub-sector management, that is, how the state marketing board organized input supply and cotton export services before liberalization, and what happened later when the new market institutions/organizations took over. Actually, there has been a substitution of state agencies by an association of private traders’ organizations and FOs’, without the dedicated transfer of know-how, and monitoring and accountability mechanisms.

AIC and the rules of the game

Before 1992, input procurement and supply to farmers as well as seed cotton assembly and processing, and cotton lint export were done by the state monopoly (SONAPRA) under an integrated input-output chain management. But operations management was too costly with poor service delivery to farmers. Private traders were therefore invited to enter the cotton-and-input value-chain. The rules of the game, as set by the licensing system operational guidelines, were elaborated officially “to avoid traders’ cheating/abuse on farmers, most of whom are illiterate”.

With the licensing system, the government continued to control marketing flows and prices, and to set entry rules and market shares for traders from 1992 to 1999 (Adegbidi et al., 2000). The state monopoly withdrew from input supply by the end of 1999, as a result of farmers’ claims in 1997 for more transparency. Then SONAPRA transferred its role to private traders’ and FOs but the licensing system was not abandoned; it rather moved into the hands of some new hybrid market institutions (private sector/government/FOs) coordinated by the cotton inter-professional association (AIC). They were set up to intermediate between farmers and the international market under the same argument of farmers’ illiteracy and low capacities in domestic and international business negotiations. With an overarching supervisory role, AIC was established to implement the cotton inter-professional agreement and advise the government on the cotton sub-sector policy. This agreement was the new

business regulatory framework for the sub-sector stakeholders (input importers, cotton ginning companies, farmers, government).

The licensing system prescribes the types of inputs and conditions of service delivery to farmers (pan-territorial cotton input and output prices and uniform marketing services). After liberalization, input traders who apply for a license were requested to prove that their bids meet new specifications and that they are capable of supplying timely the desired amounts of inputs on credit to cotton farmers at farm-gate.

AIC officials alleged that farmers would not accept other inputs or nutrient combinations from free riders and that no foreign factory would be willing to manufacture such new products. This had two important consequences for the distribution channel: no foreign suppliers were attracted to produce inputs in Benin; a standard package of inputs was prescribed for the whole country.

Another important licensing condition is the prescription of credit delivery on the basis of the former state controlled distribution network. This network includes village-level and district-level farmers' organizations, together with central input warehouses that belong mostly to the state district extension offices and FOs' village-level storage huts. That network was "transferred" to private traders through the inter-professional agreement, leading them to accept the compulsory credit

Descending arrows indicated agricultural inputs flows and ascending arrows are meant for cotton flows. Coordination information flows go along with products' flows, while overall supervision was ensured by MAEP via SONAPRA before 1992, and by AIC via CSPR after 1999.

Other prescriptions of the licensing system that affect costs and farm gate prices (the fifth performance criterion of operations management) include: Restriction of input bids to national importers, and the rule of "the unique lowest CIF (cost insurance and fret) price bid per product". With that rule, international reference CIF prices are ignored and only a few local firms which are tied to foreign manufacturers of the approved cotton inputs can bid the presumed lowest prices.

1. Only one distributor to supply a given district, and submission of distribution plans together with other import bid documents.
2. Compulsory whole package supply. The licensing system prescribes that input tenders should concern whole packages (fertilizers and pesticides) for which separate product-wise offers from different traders are not accepted, since only one importer/distributor is authorized each year to supply inputs to farmers in a given district. AIC officials pretended that whole packages or compulsory product association was necessary to ensure that all inputs are jointly delivered so as to avoid delays, given rainfall constraints.
3. Costs of "critical services" (rural roads works, improved

seeds/crop research, agricultural extension) are relatively high. They are provided to farmers by state district extension offices under new negotiations with AIC.

Organizational arrangements for the play of the game

AIC was the main institution established to define the rules of the game and also to oversee the play of the game by private companies and FOs. Its technical branches for field operations supervision included CAGIA for agricultural inputs' distribution to farmers and CSPR for seed cotton assembly and sale to ginning companies. The inter-professional agreement specified that these operations should be conducted in collaboration with technical services of the ministry of agriculture (MAEP) in order to ensure farmers' satisfaction, that is, equitable product quality control and timely credit dispensation.

The input credit system, which is operated by the state monopoly since the 1980s, relies on forecasts of seed-cotton harvests, the latter serving as collateral for input debts. After liberalization, the credit system was maintained, officially to help farmers get timely the desired inputs on credit. The mechanism was managed via bank loans to traders, using future cotton harvests as collateral. In the past, the state monopoly was a broker in this financial arrangement with the banks. After state withdrawal from input procurement in 1999, a new governance structure for credit provision had to be developed.

A central bureau of payment security and debt recovery (CSPR) was therefore created to handle input debts' repayment through the registration of seed-cotton purchases by ginners. It was a kind clearing house for all financial transactions in the sub-sector.

Analysis of the system and test of hypotheses

Cotton institutions' dynamics and its impact on fertilizer supply chains

Group segregation among partners of the cotton inter-professional agreement: The so-called "transfer of skills to FOs", which occurred in 1999 and is materialized by the vertical braces in Figure 2, was a transfer of roles without technical and management skills for cost-effective input procurement. It concerned only local distribution (district and village level FOs) and not importation which was transferred to private import companies only. Officials (MAEP and AIC) argued that FOs are untrustworthy, most of them have illiterate leaderships and are non-registered cooperatives, and financially weak to deal with international trade; therefore, they should not be transferred the responsibility of importation, as this request world market negotiation skills. As a result, in a distorted application of the "agreement", these capacities were kept centralized within new cotton authorities (AIC,

CAGIA, CSPR), thereby keeping FOs in their blindness about the international market while the licensing system also limits their negotiation window on the domestic market.

The licensing system implicitly limits market access for non-cotton fertilizer importers

Actually, although not designed to regulate input supply for other crops, the licensing system implicitly forms the core regulatory framework for input trade in Benin, as the prescriptions on input quality refer to existing crop health regulations and affect all agrochemicals (fertilizers and pesticides altogether). Should such institutional arrangement be allowed in a liberalized fertilizer market? That is a critical question, considering the debate on the post structural adjustment failures in sub-Saharan Africa. One of the major factor constraining transparency in input tenders was that one or two importers have monopoly over 78 to 100% cotton insecticides (Bidaux and Soule, 2005), whereas the licensing system requires whole package delivery of inputs (fertilizers-and-pesticides). So, traders willing to supply fertilizers alone on more competitive prices are not allowed to bid for the tenders, unless they “negotiate” with that monopoly.

Like under the state monopoly, the new rules of the game after liberalization did not allow for any direct contractual arrangement between traders and farmers and exclude a flexible delivery of marketing services based on farmers’ choices for basic utilities (form/assortment, time, place and possession). The above-discussed product quality and network prescriptions oppose operations management on the ground of four performance criteria: quality, fertilizers (and pesticides) are imposed and do not reflect the needs of farmers in different agro-ecological zones; flexibility, traders are not able to change the operations, for example. if weather predictions indicate risks for crop failure; speed, bureaucratic procedures lead to delays in product delivery to farmers; reliability, farmers and traders have to await the government’s communiqué on approved pan-territorial prices before input procurement and distribution operations can start. Sometimes, inputs are already imported (because of the time pressures of rain-fed agriculture) before official prices are announced, which means the latter are irrelevant in the reality. Dedehouanou (2002) and Minot and Daniels (2002) observed that the new hybrid organizational structure seems to have been established as a shadow-cover for resisting the changes which were recommended by liberalization think-tanks (the World Bank namely).

Market entry control by CSPR and credit dispensation to fertilizer importers

Huge amounts of money are required to import fertilizers

whilst farmers’ purchasing power is low. Most cotton farmers also produce food crops and have relied until then on a state-controlled country-wide credit system to get fertilizers. Apparently, the licensing system aimed not only to guarantee credit-based access to agricultural inputs, but also food and income security for farmers, most of whom are presumed to be poor, and have limited cash to buy inputs (Minot et al., 2000) nor have they collateral to get loans from formal banks. Therefore, since the time of the state monopoly, future seed cotton harvests were used by the government as collateral for bank loans for fertilizers importation. After liberalization, the licensing system kept this arrangement, and managing business ties with seed cotton buyers (ginners) became critical for private fertilizer importers to enter the market. But such ties were artificially regulated. Indeed, CSPR went beyond a simple registration of private ginners for adequate bank loans dispensation, and requested that they should deposit 40% of their future purchase value before they would be allowed to buy seed-cotton on farmers’ fields.

AIC officials defended the new institutional arrangement (especially the seed-cotton purchase regulation) based on the following grounds: (a) the 40% deposit is a partial guarantee for bank loans without which there would be no input available and no seed-cotton produced; (b) most ginners can’t pay cash the total value of their orders; (c) they also don’t have any purchasing infrastructure in the field (warehouses, equipment and trained buying agents) and then have to rely on farmers’ organizations for collecting the produce in thousands of scattered farms (the same apply for input traders); (d) farmers are illiterate and are unaware of international market conditions, and have therefore “delegated” the management of their business relations to the new market institutions through the inter-professional agreement.

However, as one may expect, many ginning companies and input trading companies protested against this new rule of seed-cotton market access regulation. Indeed, the deposit condition was perceived as a strategy to protect a few major fertilizer importers by indirectly refusing market access to their competitors. Righteously, unless a ginner/cotton buyer has some particular ties with an input trader, why should he favor the latter to obtain bank loans for his commerce? Provided that cotton harvests serves as collateral for bank loans for inputs’ importation, normally only input traders and farmers should be bound by such credit arrangement, not ginners. Otherwise, direct contracts have to be drafted among trade partners separately: ‘input sellers to cotton buyers’ for seed cotton to be used as collateral, ‘input sellers to farmers’ for amount of inputs to be supplied on credit, and ‘cotton buyers to farmers’ for amount of seed cotton to be purchased at harvest (and therefore dedicated area cultivation).

Definitely, the inter-professional agreement was not clear on the advance payments obligations for ginners.

Table 1. Average fertilizer prices in the survey districts (communes) of Benin, 2003/04-2004/05.

| Districts / regions | Import price ^a (CIF, Fcfa/kg) | Applied farm gate price ^b (Fcfa/kg) | Official farm gate price ^c (Fcfa/kg) | Estimated farm gate price ^d |
|----------------------------------|---|---|--|---|
| Sinendé | 154.5 | 215.9 | 197.5 | 212.0 |
| Bembéréké | 154.5 | 205.9 | 197.5 | 206.6 |
| Gogounou | 154.5 | 203.6 | 197.5 | 210.7 |
| Kandi | 154.5 | 215.5 | 197.5 | 213.3 |
| Banikoara | 154.5 | 215.5 | 197.5 | 215.1 |
| Segbana | 154.5 | 215.0 | 197.5 | 223.6 |
| Borgou-Alibori (northern region) | 154.5 | 211.8 (6.5) | 197.5 | 213.5 (7.3) |
| Dassa-Zoumè | 154.5 | 203.6 | 197.5 | 177.1 |
| Djidja | 154.5 | 204.5 | 197.5 | 175.3 |
| Glazoué | 154.5 | 197.9 | 197.5 | 179.3 |
| Ouèssè | 154.5 | 208.6 | 197.5 | 187.1 |
| Ouinhi | 154.5 | 198.1 | 197.5 | 174.6 |
| Savalou | 154.5 | 201.2 | 197.5 | 182.9 |
| Za-Kpota | 154.5 | 208.6 | 197.5 | 172.4 |
| Zogbodomè | 154.5 | 208.6 | 197.5 | 170.6 |
| Zou-Collines (central region) | 154.5 | 203.8 (6.4) | 197.5 | 177.4 (6.5) |
| Both regions | 154.5 | 207.8 (7.6) | 197.5 | 193.7 (19.3) |

^a and ^b, ON; ^c, CAGIA, ^d, Estimated using the formulae: $P_{re} = 1.02 \cdot P_{caf} + 1.96 \cdot C_t + 2.22$, where: P_{re} is the estimated farm gate price, P_{caf} the CIF, import price and C_t the total transport cost from the port to the village. The numbers in parentheses are standard deviations.

In the reality, none of such direct business contracts existed in the institutional arrangement or were disclosed to farmers (SNV, 2005). The upshot was a sharp decline in fertilizer consumption as a result of organizational confusion and disorders, including non-payment of cotton revenues to farmers, unpaid previous input debts, and non-availability of further credit for input supply. The foregoing shows that the new governance structure implemented after liberalization by new cotton domestic market institutions was poor. The vacuum of the state monopoly's withdrawal remained unfilled, or artificially so.

The test on operations management from an institutional perspective

Price setting and distribution costs

Official input prices jointly set by AIC and the government are based on a theoretical cost price estimation using technical coefficients that are linked to the official seed-cotton purchase price. In spite of several revisions, namely through the WADDELL formulae (MAEP, 2004), official prices bear two drawbacks: (a) temporal and spatial variations of cotton yield and world market price fluctuations were ignored; (b) it is not clear how all private importers, supplying inputs to different zones and operating at different real costs, could sell inputs at a same pan-territorial farm gate price.

While little attention was paid to problem (a), on the other hand pan-territorial pricing policy involved a discrete

subsidy administration through a mechanism of internal costs' transfers from cotton farmers in remote regions to those in regions relatively near the port. Some gaps exist between the estimated farm gate price (Table 1) and the price on the basis of which traders were actually paid by the licensing authority (Table 1). Differential transport costs and related operational capital costs (interests on bank loans) should have been enough to explain the gaps. But they also include rents and subsidies. The gaps between applied and estimated fertilizer farm gate prices amounted in average to 14.1 CFA/kg during the '2003 to 2005' period. They were larger in the central region (26.1 CFA/kg) than in the northern region where traders would rather experience losses. "Fortunately" for the approved traders' alliance, the licensing system compensates them for these losses through high prices of pesticides and the attribution of distribution zones mostly in the central region. Therefore, they get perverse incentives when they are discretely and inequitably "helped" by the licensing system to target such zones. In the practice, through a complex pricing system whereby differential grades are applied on seed-cotton purchased from farmers, subsidy is discretely administered by the government and is converted to occult profits via selected traders' networks.

Obviously, the intertwining cotton/input pricing mechanism is an obstacle to transparency (cf. MAEP, 2004) and an instrument for distributing rents. It supports the subsidy-and-credit scheme, but also a rent-seeking practice. Between 2005 and 2011, following complaints of collusion between the fertilizer market regulation authority

Table 2. Evaluation of fertilizer quality-related marketing services.

| Elementary quality-related variable | Borgou-Alibori (N=258) | | Zou-Collines (N=319) | |
|---|------------------------|---------|----------------------|---------|
| | n | Yes (%) | n | Yes (%) |
| Positive impact of liberalization on fertilizer quality | 258 | 28.3 | 319 | 17.2 |
| Demand for new cotton fertilizer types | 258 | 12.0 | 317 | 32.2 |
| Demand for appropriate fertilizers for other crops | 258 | 69.0 | 317 | 84.5 |
| Reception of adulterated fertilizers ^a | 10 | 90.0 | 98 | 20.4 |
| Reception of unfilled bags ^a | 10 | 60.0 | 98 | 58.2 |
| Poor storage conditions ^a | 10 | 0.0 | 98 | 20.4 |

^a For these sensitive questions, the numbers of valid observations were very low (compared to sample sizes) because most farmers did not to reply in order to secure their access to cotton input credit controlled by the licensing system.

Table 3. Evaluation of fertilizer availability-related marketing services.

| Elementary availability-related variable | Borgou-Alibori (N=258) | | Zou-Collines (N=319) | |
|---|------------------------|---------|----------------------|---------|
| | n | Yes (%) | n | Yes (%) |
| Positive impact of liberalization on availability | 258 | 41.5 | 316 | 42.7 |
| Physical conditions of warehouses* | 86 | 86.8 | 77 | 80.4 |
| Non-removal of delivered products | 221 | 13.6 | 316 | 21.5 |
| Procurement through informal traders | 219 | 18.3 | 319 | 12.9 |
| Existence of other farmers' groups willing to do retailing | 258 | 30.6 | 319 | 8.5 |
| Convenience of privately-owned stores for fertilizer retailing in the village | 258 | 5.0 | 289 | 23.9 |

* Total number village warehouses assessed and proportion of warehouses with concrete walls and zing roofs.

and main importers, the CAGIA was dissolved and its services were brought under AIC's direct control at its headquarters. Sinzogan et al. (2007) have already felt this need through a "perspective of breakaway network" in the functioning of cotton institutional linkages.

The foregoing discussion indicates that hypothesis 1 is rejected. But it was made clearer with the quantitative analysis following, which shows the most specific value-added this paper brings to other studies (Minot and Daniels, 2002; Sinzogan et al., 2007; Kpadé, 2011; Hougni, 2009) on the analysis of cotton sub-sector's institutional settings in Benin.

The test on operations management from a quantitative perspective

Previously an assessment of the supply chain performance from an institutional perspective was given. Here, a marketing perspective is used to test hypothesis 1 which states that "there is a positive correlation between the service quality index and profitability". In order to understand the calculation of the service quality index, the results of the marketing survey are presented first.

Farmers' evaluation of marketing services

Fertilizer marketing services pertain to fertilizer quality,

availability and accessibility. Tables 2 to 4 summarize the most relevant results of that survey and indicate that farmers' needs for many critical marketing services were not met. Future improvements in service delivery should address poor quality of, and accessibility to fertilizers.

The service quality index

The service quality index was computed using original binary response scores (0/1) for some selected elementary marketing services. This selection was based on the uniqueness of expression or relative independence among the variables in each group of services, and taking into account the number of responses per variable, which should be representative enough, that is, higher than half of total sample size. This means that some variables in Tables 2 and 4, not obeying to this double condition, were dropped. Then the responses were converted to the corresponding values on a positive gradient, in order to calculate the partial indexes: index of quality (IQ), index of availability (ID), and index of accessibility (IA), and a composite 'service quality index' (ISV) (Table 5). The main result is that the quality of marketing services offered by all "competing" private traders was found to be just average or quite poor. On a '0 to 1' scale, the mean value of the service quality index was only 0.518. The lowest index values were observed in Ouessè, a food crop-dominated district

Table 4. Evaluation of accessibility-related marketing services.

| Elementary accessibility-related variable | Borgou-Alibori (N=258) | | Zou-Collines (N=319) | |
|--|------------------------|---------|----------------------|---------|
| | n | Yes (%) | n | Yes (%) |
| Positive Impact of liberalization on fertilizer prices (reduction) | 258 | 1.6 | 319 | 6.3 |
| Demand for other methods of input credit reimbursement | 258 | 3.5 | 316 | 6.0 |
| Demand for technical advises | 258 | 57.4 | 316 | 65.5 |
| Demand for small-size bags | 258 | 1.2 | 316 | 3.5 |
| Demand for improved seed varieties | 258 | 62.8 | 316 | 69.3 |
| Demand for new pesticides and spraying equipment | 258 | 52.3 | 317 | 74.8 |
| Demand for oxen-driven equipment | 258 | 39.2 | 317 | 50.8 |

Table 5. Method for calculating fertilizer marketing service quality index at village level.

| Elementary service quality variables | Values / scores (farmer's satisfaction on a positive scale, 0 - 1) | |
|--|--|-------|
| Positive impact of liberalization on fertilizer quality | No=0 | Yes=1 |
| Demand for new cotton fertilizer types ^a | Yes=0 | No=1 |
| Demand for appropriate fertilizers for other crops ^a | Yes=0 | No=1 |
| Index « Quality of fertilizers » (IQ) | (Sub-total)/3 | |
| Positive impact of liberalization on availability | No=0 | Yes=1 |
| Physical conditions of warehouses | Zing-roof & concrete wall=1 Otherwise=0 | |
| Non-removal of delivered products | Yes=0 | No=1 |
| Index « Availability » (ID) | (Sub-total)/3 | |
| Positive Impact of liberalization on fertilizer prices (reduction) | No=0 | Yes=1 |
| Demand for other methods of input credit reimbursement | Yes=0 | No=1 |
| Demand for technical advises | Yes=0 | No=1 |
| Index « Accessibility » (IA) | (Sub-total)/3 | |
| Service quality index at village level ^d (ISV) | ISV = (IQ + ID + IA)/3 | |

^aThese demands concern the quality of fertilizers, in terms of appropriate nutrient contents. ^bThe composite and partial indexes are calculated as the village-level averages of values at individual farmer level.

in the central region (Table 6).

In each region, the differences between districts for the partial and composite service quality indexes respectively are very low (coefficient of variation of 0.10 to 0.20) because the licensing system prescribes standard services. However, the difference between the two regions is significant at a 1% level. Although total service delivery obeys to the same AIC-prescribed pan-territorial standards, farmers in a region, compared those of the other region, perceived differently the fertilizer quality-related service delivery on the ground of criteria such as priority crops (cotton vs. food crops) and diversity of fertilizers types needed. Some of these criteria were not necessarily disclosed.

The 'service quality index – costs – profitability' relationships

Farm gate prices paid by farmers (fertilizer consumers) or actual costs should be congruent with the service quality farmers receive from the supply-chain. Table 7 shows the

gaps in profitability between the oligopoly alliance (favored by the licensing system) and non-alliance competitors, and Figure 3 displays the relationships between service quality, costs (applied versus estimated) and profitability.

The 'service quality index: applied cost' relationship is backward (zero correlation in the left-side graph at the top), compared to the 'service quality index: estimated cost' relationship (positive correlation in the right-side graph at the top). The left-side graph illustrates an abnormal relationship, where farmers perceive large variations in service quality, whereas they actually bear an average fixed high cost through applied prices paid to traders by the licensing authority. This confirms the perverse incentives for oligopolies (protected market clusters). The right-side graph at the top illustrates what the normal relationship should be, that is, service quality is congruent with estimated costs, indicating good prospects for cost-effective optimal service when the previously described standard prescriptions will disappear. The third graph at the bottom finally shows the observed negative correlation between service quality index and

Table 6. The service quality index of fertilizer supply-chains in the surveyed cotton zones of Benin.

| Districts / regions | Fertilizer quality index | Availability index | Accessibility index | Service quality index |
|-------------------------|--------------------------|--------------------|---------------------|-----------------------|
| <i>Sinendé</i> | 0.380 | 0.704 | 0.537 | 0.540 |
| <i>Bembéréké</i> | 0.652 | 0.748 | 0.600 | 0.667 |
| <i>Gogounou</i> | 0.452 | 0.770 | 0.484 | 0.569 |
| <i>Kandi</i> | 0.430 | 0.685 | 0.459 | 0.525 |
| <i>Banikoara</i> | 0.472 | 0.611 | 0.333 | 0.472 |
| <i>Ségbana</i> | 0.540 | 0.703 | 0.420 | 0.554 |
| Borgou-Alibori (N = 86) | 0.491 (0.204) | 0.702 (0.159) | 0.469 (0.145) | 0.554 (0.110) |
| <i>Dassa-Zoumè</i> | 0.226 | 0.676 | 0.357 | 0.420 |
| <i>Djidja</i> | 0.341 | 0.534 | 0.422 | 0.432 |
| <i>Glazoué</i> | 0.382 | 0.806 | 0.458 | 0.549 |
| <i>Ouessè</i> | 0.242 | 0.586 | 0.373 | 0.400 |
| <i>Ouinhi</i> | 0.457 | 0.729 | 0.420 | 0.535 |
| <i>Savalou</i> | 0.420 | 0.662 | 0.516 | 0.533 |
| <i>Za-Kpota</i> | 0.324 | 0.722 | 0.472 | 0.506 |
| <i>Zogbodomè</i> | 0.317 | 0.619 | 0.532 | 0.490 |
| <i>Zou-Collines</i> | 0.337 | 0.666 | 0.446 | 0.483 |
| (N = 105) | (0.178) | (0.210) | (0.146) | (0.128) |
| T of Student | 5.494** | 1.347 | 1.087 | 4.122** |

N = number of villages. Figures in parentheses are standard deviations. The T of Student refers to the statistical test of difference between means of the two regions: ** difference significant at 1% level.

Table 7. Profitability ratios (% of applied farm gate price)^a in fertilizer trade for different groups of traders in Benin.

| Variable | Traders' distinction using market shares | | | Traders' distinction using presumed alliance | | All traders |
|-----------------------|--|-----------------------------------|-------------------|--|--------------------------|-------------|
| | Leaders | 3 rd place competitors | Irregular traders | Oligopoly alliance | Non alliance Competitors | |
| Borgou-Alibori | | | | | | |
| Minimum | -8.5 | -5.0 | -7.5 | -8.5 | -7.5 | -8.5 |
| Maximum | 12.1 | 1.3 | -1.1 | 12.1 | -1.1 | 12.1 |
| Mean (SD) | 2.0 (3.8) | -1.9 (1.7) | -4.5 (1.8) | 1.3 (3.8) | -4.5 (1.8) | 0.8 (4.1) |
| Zou-Collines | | | | | | |
| Minimum | 13.4 | 7.1 | 4.8 | 9.8 | 4.8 | 4.8 |
| Maximum | 29.8 | 22.0 | 17.0 | 29.8 | 22.0 | 29.8 |
| Mean(SD) | 25.0 (4.8) | 16.5 (4.1) | 12.0 (3.3) | 21.0 (6.1) | 13.3 (4.5) | 16.8 (6.5) |
| Both Regions | | | | | | |
| Minimum | -8.5 | -5.0 | -7.5 | -8.5 | -7.5 | -8.5 |
| Maximum | 29.8 | 22.0 | 17.0 | 29.8 | 22.0 | 29.8 |
| Mean (SD) | 8.6 (11.2) | 11.8 (8.8) | 8.6 (7.5) | 8.8 (10.7) | 11.2 (7.3) | 9.6(9.7) |

a. Profitability ratio = $100 \times \text{Profit} / (\text{CIF price} + \text{estimated direct local costs})$; Profit = Applied farm gate price – (CIF price + estimated direct local costs); Applied farm gate price = Cost price, as the minimum selling price which forms the basis for paying traders (joint ONS/CSPR estimations). Estimated direct costs = Sum of intermediary costs from the port to farm gate, according to normal rates and cost calculation (field survey). From the formulae below table 2, intermediary costs are: $f = 1,927 \times (C_t + \epsilon)$, where C_t stands for transport cost and ϵ , for handling and storage costs. Therefore: Profitability ratio (%) = $100 \times [\text{Applied farm gate price} / (\text{CIF price} + 1,927 \times (\text{transport cost} + 1,1352)) - 1]$.

actual profitability ratio, illustrating once more the perverse incentives for traders, especially for the oligopoly alliance that gets huge profits whereas farmers rate

low the quality of their service.

These findings indicate that the expected positive relationship between service quality (resulting from

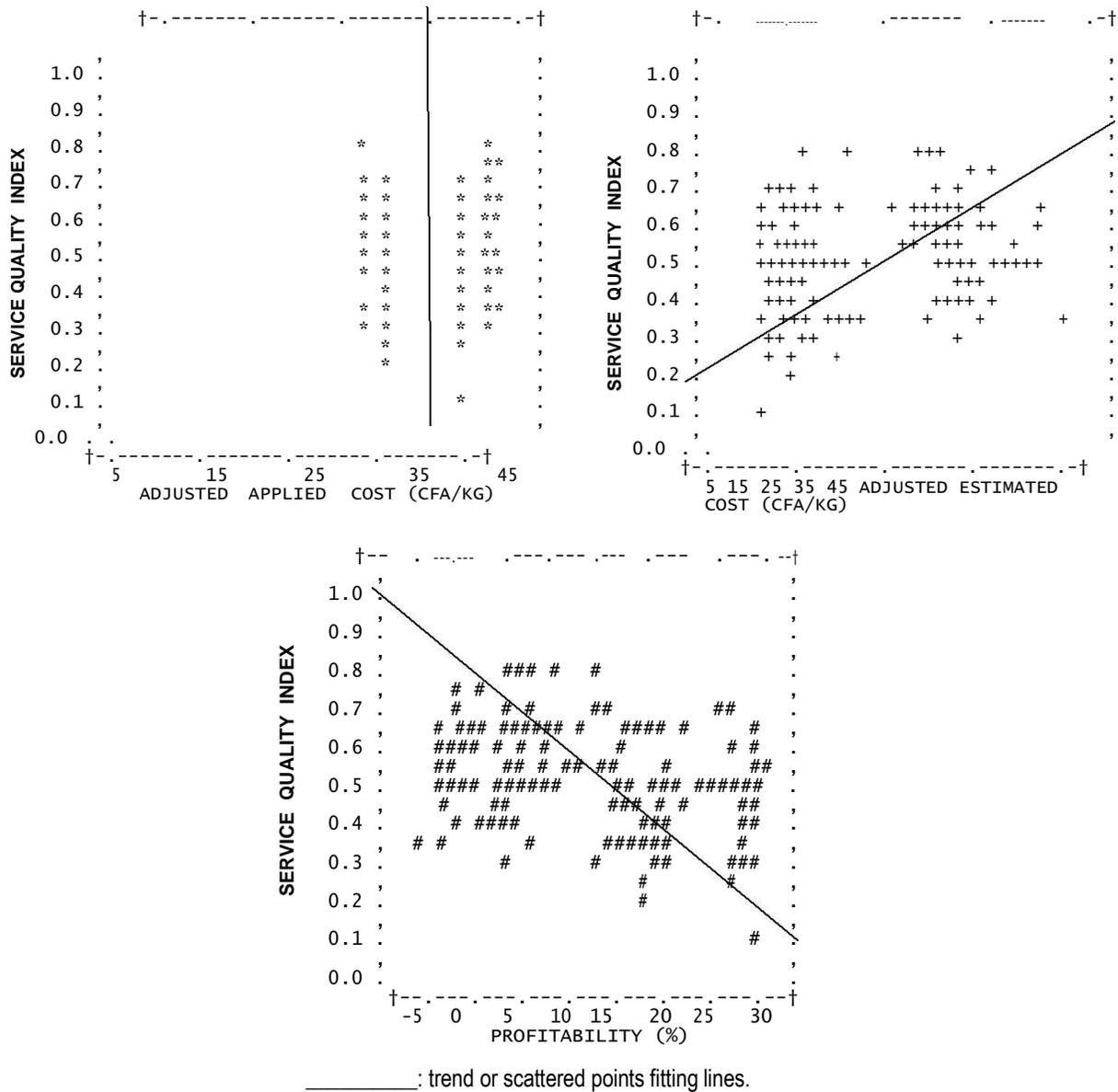


Figure 3. 'Service quality index – costs – profitability' relationships in the fertilizer market in Benin, 2003-2004. In the top two graphs, transport costs were deducted from total costs to avoid the regional bias.

operations management in the private supply-chains) and profitability is not observed. The rejection of hypothesis 1 is therefore confirmed by means of quantitative assessment.

The tests on competition and entrepreneurship

Although the concerns for equitable credit supply and delivery of good quality of fertilizers and marketing services by private traders may call for a market control/regulation system, the latter should avoid rules that hamper competition and entrepreneurship. The licensing system in Benin does not encourage competition

because the rules therein are not meant to legitimize the issuing of import licenses to traders on a transparent basis. Formal rules of the game are designed to protect private business clusters rather than promoting market transparency and competition. The system indirectly confers a strong market power to private oligopolies. Its legitimacy is contested, as non-alliance competitors (many small and medium – size input / output trade businesses) suspected the former state monopoly (with seed cotton market share of 53%) to having introduced the new rule of “40% deposit” to indirectly eliminate the competitors of the private oligopoly. Indeed, only the ginneries who have special ties with that input oligopoly were prompt to comply with the 40% rule in order to

eliminate other input traders from the competition. For example, purchase intentions (probationary input orders) approved by farmers' leaders are vital for input traders to get the license because banks request those documents before delivering credit letters, and both documents are required to support import bid files. Yet, obtaining the purchase intentions does not always result from normal direct business negotiations between traders and farmers. They rather involve corruption of farmers' leaders and discrete negotiations with the leading importers.

Available data on imports figures indicate that there has been a decreasing competition since 1999. The Herfindahl-Hirschman Index (HHI), which is a market concentration index, was 0.1808 over the 1995 to 1999 period, indicating a monopolistic competition (Besanko et al., 2000:235-237). HHI was 0.2008 over the 2000 to 2004 period, which indicates a higher monopolistic competition. Corresponding values of the C4 index (market share of the first four importers) were respectively 73 and 77%. The situation has worsened since then, as a private monopoly has completely arraigned market regulation institutions. As a result farm-gate service has become poor. In a liberalized market, competition among traders should be allowed to create relevant utilities for consumers using transparent pricing and innovative contracting strategies.

The licensing system impedes competition and entrepreneurship. It gives private oligopolies abnormal advantages, which constitutes perverse incentives at the expense of farmers. Indeed, oligopolies get huge profits and are officially warranted stable business relationships with clients (farmers) in the central region, while not making any difference in the quality of prescribed marketing services. The system discourages dynamic efficiency as it involves higher transaction costs and discourages innovation to harness profitable business opportunities for optimal service delivery (Figure 1). Cheating or abuse of farmers through a non-transparent pricing policy is also demonstrated. Hypothesis 2 on competition is therefore rejected, that is, there is very little competition on service quality and prices, due to the lack of transparency in the institutions. The same also applies for hypothesis 3 on entrepreneurship, as the system limits fertilizer traders' innovative propensity.

These findings are supported by Sinzogan et al. (2007) who pointed out that "the stakeholders in the cotton inter-profession have become partners in a game that was previously run by a monopoly. It was assumed that farmers' organizations and the private sector were capable of assuring the coordination and the execution of the required activities, motivated by potential for increasing their profits. But the assumption that competitive pressures would lead to more efficient input markets also has not been confirmed; rather, there is evidence that collusion among institutional stakeholders has thwarted competition". With empirical data, our paper

confirms this. The impact of arraignment of institutions by a private oligopoly on the quality and costs of distribution service has been demonstrated.

On a final note, it is worth reporting that in April to May 2012, a nationwide crisis exploded about input subsidy mismanagement by AIC and was officially presented to the public as wrong cotton statistics estimation, the debate being about who (between AIC and the government/MAEP) should take the lead in disclosing such statistics. Actually the underlying issue is "who captures input subsidies destined to farmers and why?" Statistics were an alibi to finally discard a private oligopoly which has become a public malaise since 2000 and a political fear as from 2005, considering the relationship between votes of rural populations and their satisfaction about agricultural input supply. As the crisis

was getting bitter, the government declared the dissolution of AIC and decided to put in place an ad hoc committee to examine the conditions for implementing reforms which would bring back the state monopoly to control the market. Obviously, as our research revealed, this is not the right solution. It is disappointing that politics in Africa does not tap from research findings for wise policy decision-making, and the same mistakes are repeated over several years.

CONCLUSION AND POLICY RECOMMENDATIONS

The paper provides an empirical evidence of the relationships between the theory of institutions and transaction costs, and its application in supply chain management where operations management and entrepreneurship are constrained by the nature of competition set by the institutions. The licensing system in Benin is a case that illustrates distorted rules of the game and market authorities' arraignment by traders in the play of the game. Notwithstanding the cotton world market crisis, several institutional drifts have characterized the partially liberalized input market in Benin, where the state still controls market entry under a hidden agenda managed by some hybrid organizations. The test on operations management showed that present private traders confined themselves to the cotton sub-sector and pursued the perverse incentives created by the licensing system rather than improving market service delivery. There, compulsory alliances generate high transaction costs and low quality of marketing services to farmers. The negative relationship between service quality and distribution costs has been dedicatedly illustrated and hypothesis 1 was rejected. Market failure occurred because the new institutional arrangements (mainly the licensing system) were built on unwanted residuals of the failed state monopoly. The lack of motivations of the new institutions to foster competition and entrepreneurship (innovative propensity) among traders was also evidenced on empirical grounds, leading

to rejection of hypotheses 2 and 3 in the context of Benin's liberalized fertilizer market.

Monopoly power is a permanent characteristic of fertilizer trade because of the huge capital required, especially at importation level. Yet, this paper provided evidence of the need for competition with a minimum regulatory framework to avoid some traders' delinquency and farmers' abuse. The government should relax entry restrictions to enable medium- and big-size importers to target different market segments according to crop zones, considering their own differential ability to flexibly handle credit dispensation to farmers and other client approach mechanisms. This means that such traders would build their own distribution networks and design appropriate service delivery to different client groups or sub-sectors. The government should also encourage competition at local distribution level where flexibility is particularly required in operations management. The private sector should work with a greater propensity for entrepreneurship, by tapping from business opportunities arising from new crop markets. Competition, which is a pre-requisite for quality management in supply-chains and entrepreneurial attitude among traders, needs to rely on a transparent market information system. A "fertilizer market observatory" where government would contribute to buffering the costs and hold the system accountable for all stakeholders' timely access will be key to an efficient fertilizer market in Benin and elsewhere in West Africa.

Finally, we formulate a few specific policy recommendations:

(a) Credit system liberalization: The issue of credit for traders and farmers remains a major concern. It needs to be addressed thoughtfully. Many formal banks are still reluctant to finance the agricultural sector because of high risks in rain-fed agriculture. The government should bring all stakeholders to re-organize the cotton sub-sector through transparent market institutions and a genuine participation of private businesses. In this regard, Benin may need to learn from some Asian countries how they succeeded in linking their financial markets to food crop sub-sectors, to make the latter profitable for farmers and local traders.

(b) Capacity-building: In order to harness the benefits of such a perspective, all partners of liberalized input markets in Benin should emphasize the diversification of supply-chains through the value-chain approach in order to enable innovations among actors. In particular, traders should avoid pursuing perverse incentives, if they would commit themselves to fostering agricultural intensification through viable markets. Their organizations should seek assistance from government and development partners, to enhance their capacities for efficient operations management and optimal service delivery to farmers.

(c) Agricultural trade and market development policy: All stakeholders should work towards improving the institutional setting of market conquest in the cotton sub-sector

so that better services could be offered to farmers without being hampered by a regulatory framework which overemphasizes environmental protection. For the sake of tax revenues that accrue from agricultural trade for public welfare, innovation is also required from public trade and fiscal authorities in the design of appropriate tax collection systems that would avoid physical or rent-seeking interventions of a central bureau in the fertilizer market.

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Abbreviations: **AIC**, Association Interprofessionnelle du Coton (Cotton Inter Professional Association); **AProCA**, Association des Producteurs de Coton en Afrique; **CAGIA**, Coopérative d'Achat et de Gestion des Intrants Agricoles (Cooperative for Input Purchase and Management); **CFA**, Communauté Financière Africaine (French-speaking Africa Monetary Community); **CIF**, Cost Insurance and Fret; **CNPC**, Conseil National des Producteurs de Coton (Cotton Producers' National Council); **CSPR**, Centrale de Sécurisation des Paiements et de Recouvrement (Cotton sub-sector's Central Bureau for Securing Payments et Debts Recovery); **FOs**, Farmers Organizations; **FUPRO**, Fédération des Unions de Producteurs (Federation of Producers' Unions); **MAEP**, Ministère de l'Agriculture, de l'Élevage et de la Pêche (Ministry of Agriculture, Animal Husbandry and Fisheries); **ONS**, Office National de Stabilisation (National Bureau for Agricultural Produce Price and Income Stabilization); **SONAPRA**, Société Nationale pour la Promotion Agricole (Cotton Input and Output Marketing Board); **SAPs**, Structural Adjustment Programs.

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