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# Towards an analytical framework linking institutions and quality: Evidence from the Beninese pineapple sector

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**Improving non-traditional agricultural product quality is challenging for smallholder farmers in developing countries since they often lack the resources and an adequate enabling institutional environment. Based on an extensive literature review, this paper develops an analytical framework identifying factors influencing the improvement of quality and the underlying institutions influencing these factors in order to have a global view on institutions influencing product quality. The framework is then applied to the pineapple sector in Benin. Our interviews and survey of pineapple producers bring further important elements to our understanding of institutional constraints affecting quality enhancement. The frame work developed constitutes analytical tool to locate possible farmer institutional constraints.**

**Key words:** Quality, institutions, value chains, pineapple, Benin, Sub-Saharan Africa.

## INTRODUCTION

Quality is becoming an increasingly important issue in the marketing of food products (Reardon and Farina, 2002; Henson and Reardon, 2005). There is however an important concern that smallholders from developing countries are facing important barriers to improve quality. Indeed, they usually have limited access to good quality planting materials; have poor storage and processing facilities, lack human and investment capital, and face high transaction costs. As a result, the quality of their products is heterogeneous and often below domestic and international market requirements (Trienekens and Zuurbier, 2008; Dolan and Humphrey, 2000). Many scholars and practioners observe that the improvement of product quality in developing countries does not only require technical innovations. Adequate institutions that can support and make technical improvements effective are also crucial (Dorward et al., 2005). As the rules of the

game, institutions create a stable structure for human interaction and decrease uncertainty surrounding commercial exchanges, hence reducing transaction costs and allowing more efficient production and coordination activities (North, 1990). Although a growing body of literature is emphasizing the importance of institutions in helping smallholders to improve non-traditional agricultural product quality, most studies focus on the enhancing role of institutional arrangements (modes of coordination) such as contract farming, producer organization and partnerships. While definitely insightful, these studies are not meant to provide with a general representation of the institutional components that may constrain or enhance quality.

The main objective of this paper is to better address the challenge of enhancing non-traditional agricultural product quality by improving our understanding of the effect of institutions on quality improvement. This objective is delineated in two sub-objectives. The first one is to provide a systematic guideline tool for identifying institutional constraints affecting quality enhancement. We do so by developing an analytical framework that

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identifies the various factors affecting quality at the producer level and the underlying institutions that may influence them. We believe this specific point in the value chain - the producer level- is of high importance in terms of quality compliance since quality can hardly be corrected at later stages of the chain. By focusing on this point, we also adopt a value chain perspective<sup>1</sup>, taking into account producer's transactions with downstream and upstream partners in the chain. Value chain analysis rarely takes into account the effect of institutions on quality, probably because of our limited knowledge on the type of institutions that matters. The second objective is to confront our framework to reality and possibly extend our knowledge by locating other institutional constraints related to product quality. We do so by applying our framework to the pineapple sector in Benin using data from a survey of 14 pineapple producers and interviews with 16 organizations.

The Beninese example constitutes an interesting empirical case. The country's economy is essentially based on agriculture. For many years, cotton has been the most important crop for export, representing 90% of the agricultural export value. However, due to recent national and international difficulties in cotton supply chains, the Beninese government decided to encourage the diversification of agricultural products for exportation. In 2007, pineapple was selected as one of the crops to be promoted along with cashew nuts, shrimps and shea butter. Over the past decade, pineapple production has been growing rapidly in Benin thanks to a strong increase of local and regional demands, as well as a relative success of a few agricultural and trade entrepreneurs in serving niche markets in Europe (Mongbo and Floquet, 2006). However, achieving high pineapple quality remains problematic for most smallholders that wish to reap the benefits of lucrative export prices. Moreover, quality problems seem to be mostly due to the lack of an enabling institutional environment. Being aware of the situation, the Beninese government has recently committed to help the pineapple industry improve quality through various programs aimed at overcoming institutional failures.

We believe the outcomes of this research are of interest for all public or private organizations that seek to improve non-traditional agricultural produce quality in developing countries. By disentangling the relationships between quality and institutions and by adopting a chain perspective, our analytical framework identifies the key institutional components influencing quality.

Governments, agency officials and practitioners can use it as a guiding analytical tool to locate farmers' institutional constraints and eventually support them to improve

product quality.

## LITERATURE REVIEW

### Institutions and food quality improvement

In this paper, we make the distinction between the institutional environment and institutional arrangements (Davis and North, 1971). The institutional environment refers to the institutions that frame the economic activity by setting social mutual expectations. These institutions can be either formal (laws, public norms, property rights) or informal (social norms of conduct, customs, community unwritten rules). Institutional arrangements refer to the modes of organizing transactions (modes of coordination) that must comply with the rules. The analysis of the effect of institutions on the improvement of agrifood products is receiving more and more attention in the literature, especially concerning the role of various institutional arrangements that help farmers comply with high quality requirements (Key and Runsten, 1999; Kirsten and Sartorius, 2002; Okello et al., 2007).

However, we are not aware of any study that has taken a broad approach on institutions and quality, the approach we intend to use in this paper. Most researches focus on the effect of one institutional constraint on quality such as enforcement institutions (Fafchamps, 1996), physical infrastructures (Fafchamps and Hill, 2005; BIRTHAL et al., 2005) and the legal framework (BIRTHAL et al., 2005).

The relationship between product quality and the choice of an institutional arrangement to frame exchanges in food chains has been particularly examined in the context of developed countries (Vetter and Karantininis, 2002; Ménard and Valceschini, 2005; Raynaud et al., 2005). The main idea conveyed by these studies is that higher product quality requires diverse investments that may generate the risk of hold-up situations. As a result, partners in such exchanges will seek transaction cost minimization and will frame their transactions within tighter governance structures. Also, partners might wish to control the supply chains more tightly to satisfy consumer demands for quality and safety (Ménard and Valceschini, 2005). In developing countries, tighter arrangements represent an institutional response to market failures. Contract farming, producer organizations and partnerships with public or private organizations, to name the most prevalent, often provide smallholders with agricultural inputs (Dorward et al., 1998; Dorward et al., 2004), credit (Reardon et al., 2004; Key and Runsten, 1999; Kaganzi et al., 2009; Bitzer et al., 2011), market information (Key and Runsten, 1999; Holloway et al., 2000; Narrod et al., 2009), risk minimization (Shiferaw et al., 2006), certification services (Okello et al., 2007; Narrod et al., 2009), increased bargaining power (Kherallah et al., 2002; Devaux et al.,

<sup>1</sup>Throughout the paper, we make a distinction between value and supply chain. A value chain is a combination of activities adding value to a product in a chain, whereas a supply chain integrates these activities much more closely and introduces specific coordination mechanisms and management practices to comply with customers' requests.

2009) and technical assistance (Glover and Kusterer, 1990; Markelova et al., 2009; Boselie et al., 2003). Institutional arrangements, in turn, often need a legislative framework to be fully effective including contract, competition and producer organization laws (Poulton et al., 2006).

The institutional environment may have a direct or an indirect impact on quality improvement. Institutions such as inspection and extension service, and enforcement of quality compliance may affect directly the quality of products. The majority of institutions have however an indirect impact on food quality since they are not tailored to this specific role. Educational institutions that provide for skilled labour are not always specific to product quality but have an important influence on agents' capacity to adopt techniques that improve quality for instance. Also, by enabling the creation and development of organizations and governance structures, institutions affect the incidence of transaction costs and indirectly the level of quality that can be attained. The presence of micro-credit organizations for smallholders to invest in quality enhancing techniques and reliable contract enforcement mechanisms that reduce transaction costs when marketing higher quality products are a few examples.

### **An analytical framework linking quality and institutions**

The improvement of non-traditional produce quality is conditional to several factors. As Jaffee and Henson (2004) state, compliance with quality standards relies on the "legal and industry structures and the availability of technical, scientific, administrative and financial resources". According to our literature review, quality improvement at the producer level depends mostly on (1) the technical itinerary followed by farmers, (2) the quality and amount of inputs used, (3) the availability of market information, (4) the magnitude of transaction costs faced by producers, (5) the infrastructures and (6) the certification services availability. Let us have a closer look at these factors and link them to their framing institutions.

The technical itinerary is the sequence of agronomic techniques by which the environment of the crop is controlled so as to get optimal yield and quality. The optimal technical itinerary is achieved through knowledge either with experience or specific training and education. Specific training provided by extension services or other organizations, and underlying institutions such as research and development institutions, are all directly involved in quality improvement. To be effective and well adapted to producers, these institutions need to adapt the scientific knowledge to practices and their personnel must understand quality requirements throughout the whole supply channel (Soler, 1997).

Another important factor is an adequate access to good quality inputs. In developing countries, sufficient financial

resources can be a major limiting factor to acquire inputs. Low farm-gate prices may lead farmers to reduce their use of inputs. Fresh produce and pineapple in particular, are highly capital-intensive productions. To finance the "purchase of production inputs, farmers must either dip into their savings or obtain credit" (Nyemeck et al., 2007). Resorting to low-cost and reliable formal credit (banks, microfinance) or informal credit (relatives, traders) is thus critical.

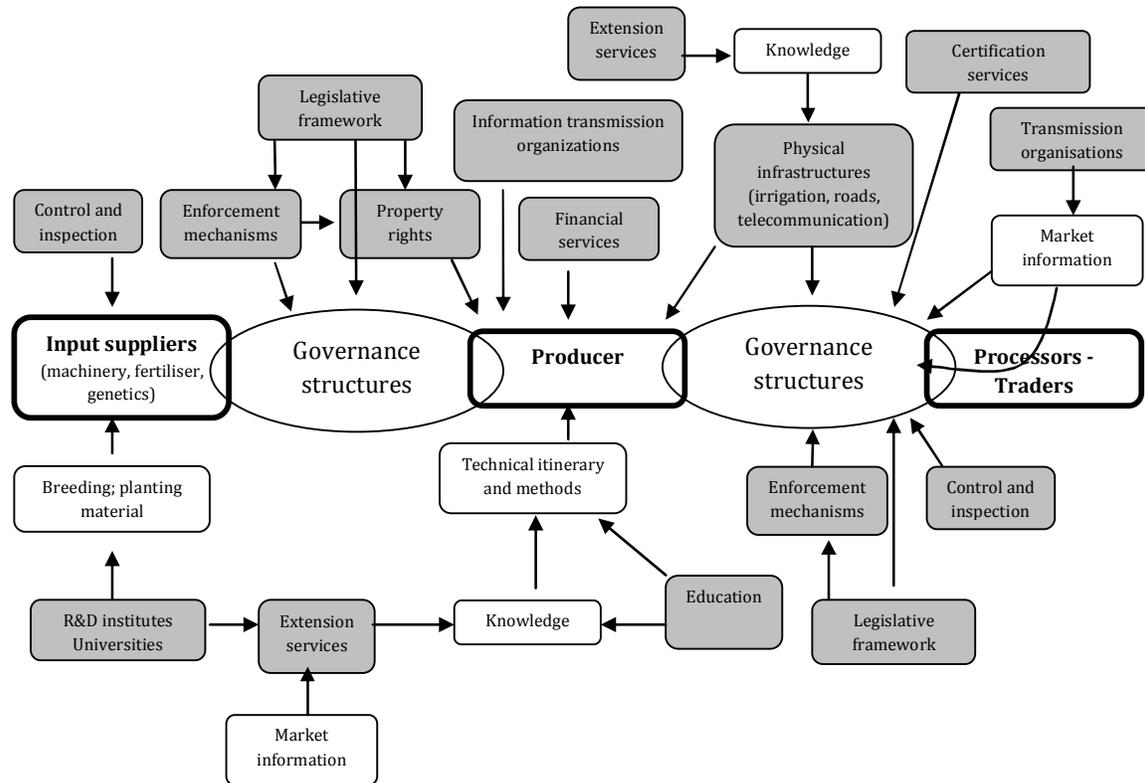
Market information is often cited as an important limiting factor for producing high quality products (Tilburg et al., 2007; Trienekens and Zuurbier, 2008). Complying with standards and norms set by customers' first means being aware of them. Information on norms and standards can either be communicated by extension services, public agencies or chain partners through governance structures (Lyon, 2000) or associations (Lyon, 2003). Note that Shepherd (1997) questions the efficiency of governmental intervention at this level. He affirms that government involvement in market information dissemination is usually not conclusive since it is costly to operate information systems, prices fluctuate very rapidly, which leads to inadequate information, and farmers may not understand the information communicated.

Quality improvement also involves transaction costs. Transaction costs are considered as the costs of performing an economic exchange. They consist of ex ante and ex post costs. Ex ante costs are basically search, bargaining and contract writing costs. Ex post costs are enforcement, monitoring, maladaptation and contract breach costs. The level of transaction costs depends on many factors including the characteristics of transactions (asset specificity, uncertainty), the governance structure chosen to frame exchanges, presence of laws and policies related to contractual practices, collective action, cost of getting information, and costs of enforcement. The latter factor is critical for smallholders in developing countries. If quality agreements are frequently not respected, partners will not trust each other and efforts to improve quality will not be rewarded.

The existence of low-cost and reliable contract enforcement institutions are thus indirectly related to quality improvement at the producer level. Many studies emphasise the role of collective mechanisms (Okello et al., 2007; Jaffee and Masakure, 2005), contract farming (Key and Runsten, 1999; Minten et al., 2005) and public and/or private partnerships (Henson et al., 2005; Boselie et al., 2003) as efficient governance structures to help smallholders reduce transaction costs in quality improvement practices.

Furthermore, in order to increase incentives on investments that will improve quality, well-defined and enforceable property rights on land are imperative (Besley, 1995).

Many infrastructures may affect product quality. Physical infrastructures such as standards of sanitation and access to potable water are needed to comply with



**Figure 1.** Factors affecting agricultural produce quality at the producer level and institutions that may impact them. White rectangles correspond to factors and shaded ones, to the institutions.

most export food safety standards (Jaffee and Henson, 2004). Appropriate roads, proper irrigation, storage facilities and a reliable telecommunication network also influence the capacity of farmers to achieve targeted quality and lower transaction costs.

The lack of certification services is another limiting factor for smallholders to access high quality markets (Tilburg et al., 2007; Okello et al., 2007). These services may either not be available or too expensive for small producers.

Based on these elements drawn from the literature, we developed a simple analytical framework of institutional components affecting quality improvement (Figure 1). The framework summarises the main factors influencing agricultural product quality at the producer level (in white rectangles) and the relations between these factors and the underlying institutional components (in grey rectangles).

Smallholders from developing countries face major institutional constraints that hamper their product quality improvement. Beninese pineapple producers are no exception. The next sections aim at applying our analytical framework to the pineapple sector in Benin. Why pineapple and why Benin? Although pineapple has been produced in Benin for decades, has been considered recently as having a great potential as an export crop. The Beninese government, like other sub-Saharan

governments, is trying to diversify its exporting agricultural products spectrum in order to increase revenues from international markets and alleviate domestic poverty. Moreover, the rapid development of high-value domestic markets can create a lucrative outlet for smallholders. Pineapple sold on these markets must meet strict standards of quality. The production and marketing of pineapple in Benin is however lacking an enabling institutional environment, which seems to hamper the development of high-quality products.

## METHODOLOGY

Benin is a country in West Africa with a small southern coastline where most of its population, approximately 9 million people, live. The annual percent change of the gross domestic product (GDP) has been increasing since 2005 passing from 3 to 5% in 2008 (IMF, 2009).

The economical activities of Benin are mostly based on subsistence agriculture, cotton production and regional trade. From 2000 until 2008, about 47.3% of the population live below the international poverty line of 1.25 \$US per day (Human development report, 2010). Agricultural households represent some 60 percent of the population and contain a disproportionate number of the poor (World Bank, 2007). The country has good infrastructures: an international airport, a seaport and a relatively good road network in the southern part. The data collection for this research took place in the Atlantic department, which is located in the southern part of

**Table 1.** Organizations interviewed in Benin.

S/No.	Organisations interviewed
1	Pineapple processor
2	Table filière (value chain organization)
3	CSI (input distributor)
4	Fruitex (input distributor)
5	PADFA (Agricultural value chain support program)
6	Cebenor (normalisation and quality management centre)
7	DANA (food norm inspection services)
8	Helvetas (NGO)
9	ADEX (national association for the development of exports)
10	CerPA (Extension services)
11	DPFSA from PADFA (operational branch of the PADFA)
12	REPAB (Producer organization in Allada region)
13	ARPA (Producer organisation Allada region)
14	Producer and agronomist Allada region
15	Researcher (University Abomey-Calavi)
16	Processor of pharmaceutical product from pineapple

Benin. Although Beninese populations living in rural areas are generally poorer than those living in cities, we can consider the Atlantic department as a rather well-off region. It shows a lower poverty level than the Northern part.

There were approximately 10,000 pineapple growers in Benin in 2009 (Dohou, 2008). The major pineapple producing zone is the southern part of the country in the Atlantic department with 98% of the country's production (Daniel and Martin, 2008). From 1996 to 2007, pineapple production has undergone a slow but stable increase passing from 89,410 to 135,912 tons (FAOSTAT, 2009). Benin worldwide rank in terms of pineapple production value is also constantly rising. According to FAO statistics, Benin ranked 38<sup>th</sup> in 1990, 29<sup>th</sup> in 2000 and 24<sup>th</sup> in 2007 (FAOSTAT, 2009).

The data collection has been conducted in a two-step sequence during the fall of 2009. Questionnaires were constructed based on elements of our analytical framework and many open questions were included to allow for additional information from respondents. The first round of data collection consisted of 16 semi-structured interviews with 19 knowledgeable informants, such as directors or project coordinators, from different organizations involved in the pineapple supply chain (Table 1).

Each interview lasted at least an hour and a half. The objective of this first sequence of interviews was to obtain information about the institutional role of organizations involved in the pineapple sector in terms of quality improvement and their links with other organizations/institutions. The sample of organizations was chosen based on their knowledge on the pineapple sector and their involvement in pineapple production, trade or quality improvement. Informants were first asked to describe their organization (objective, function, employees) and then questioned on their activities with pineapple producers, their view on the strengths and weaknesses of the pineapple industry, and their links with other organizations.

The second round of data collection consisted of interviewing 14 pineapple producers in the Sekou region in the Atlantic department on the perceived effectiveness of various institutions that may be involved in quality improvement. Since it was not possible to have an official list of pineapple growers, producers were randomly selected while traveling across the country side. The first part of the questionnaire consisted of questions on factual information about respondents (age, education level) and their pineapple activities (experience in pineapple production, cultivated area, production

and marketing channels). In the second part of the questionnaire, respondents were asked 35 questions related to pineapple quality and quality preservation along the chain as well as questions on their access and use of diverse types of institutions and organizations, namely financial institutions, extension services, quality norms, education, enforcement mechanisms, governmental intervention and institutional arrangements. These questionnaires were useful for crosschecking the information previously provided by the organizations and also for gaining deeper insight into the issues covered by the first-round questionnaire. Moreover, all relevant respondents' comments were noted in the enquiry.

The composition of the sample was quite heterogeneous except for the gender since they were all male respondents. Table 2 summarises a few socio-economic characteristics of our sample. We observe that all respondents were aged between 31 and 52 years old with a mean of 39, and that most of them have a good experience in pineapple cropping with an average of 13.5 years of experience. The average total agricultural area cultivated by farmers interviewed was 4 hectares and the area specific to pineapple, 1.8 hectare. Moreover, the educational levels of respondents range from illiterate to second level of the secondary school<sup>2</sup>. Finally, half of interviewed farmers were members of producer organizations.

The data collected in the interviews and through the survey was used as input for comparing the Benin practice with what was learned from the literature. Thereby we could verify whether the statements we obtained from the theoretical and practical literature also hold in the Benin context. The survey answers were assessed to look for commonalities and differences. For several questions we used Likert scales, which allowed us to derive mean scores and standard deviations. Overall, the data was used to provide a thorough description of the quality constraints in the Benin pineapple industry, as well as to validate our analytical framework.

### Portraying the pineapple chains in Benin

Our intention in this section is not to perform a formal value chain analysis of the pineapple sector in Benin but to provide a broad

<sup>2</sup>The illiteracy rate in Benin in 2007 was 54.7% (OECD and BAfD 2008).

**Table 2.** Descriptive statistics of the producers sample, n=14.

Parameter	Mean	Standard deviation	(Min; Max)
Age (years)	39	6.9	[31; 52]
Experience in pineapple cropping (years)	13.6	6.7	[5; 31]
Area cultivated (Ha)*	4.0	2.3	[1.5;6.8]
Pineapple area in 2009 (Ha)**	1.8	1.2	[0.5; 3.5]

\* To ensure normality, we removed an outlier data (28.3 Ha) from our sample; \*\* Again, we removed an outlier data (8.75 Ha) from our sample to ensure normality.

picture of the environmental, institutional and economical settings in which producers are operating in order to better understand the challenges they are facing.

Beninese pineapples are mainly sold on three markets: national, sub-regional and European. Export of fresh and processed pineapple to Europe is however still marginal and is increasing very slowly mainly because of high air-freight costs and difficulties to obtain sufficient and homogeneous quality. The national market seems to be an important outlet for Benin pineapple although the proportion of pineapple sold on that market is not well-known, varying from 26 to 60% depending on the documentary sources consulted (Dohou, 2008; Helvetas-Benin, 2007). The main products sold on the national market are fresh pineapples and juice. The preferences of local consumers for fresh pineapple are basically sweet and large fruits at low prices. The local market is not very demanding in terms of quality. In fact, there are no official quality norms to comply with and no control on locally marketed fresh pineapples. The supply of fresh pineapple onto the local market is not formally organised and institutional arrangements used to convey transactions are either spot market or relational contracting (informal agreements sustained by the expectations of future relationships).

The value chains seem to be controlled by the wholesalers who link producers to retailers located in the production zones or in the two biggest marketplace of the southern region, Tokpa and Ganhi. Wholesalers are usually women that negotiate and buy pineapples from known producers or from collecting agents that randomly seek ripe pineapples in the fields. The central role of women in the food trade in West Africa is widely recognised in the academic literature (Levin et al., 1999). As for the juice market, processors obtain their fruits from wholesalers or directly from producers. The quality requirements for processed pineapples are a big size, high sugar content and no skin damages.

Exports to neighbouring countries like Nigeria, Burkina Faso and Niger consist essentially of fresh pineapples. Since trade to neighbouring countries is informal, no official statistics are available to quantify the flow of pineapple exported in the sub-region. In 2007, agents from various segments of the pineapple supply chain estimated that 86,400 tons of pineapples were exported to these three countries which represent 64% of the total Beninese production (Dohou, 2008). Another source mentions that 40% of pineapples are exported to the sub-region (Helvetas-Benin 2007). These markets constitute an interesting outlet for Benin producers since they pay high prices during specific periods of the year like the Ramadan period and the quality requirements are much less strict than European standards. However, the Nigerian government heavily taxes pineapple imports which raises the price of Beninese pineapple substantially in that country. Moreover, future evolution of sub-regional markets is hard to predict since it might be influenced by arbitrary protectionist political decisions. The value chains for the sub-regional market are characterized by low coordination and their structure is similar to the value chains for the local market with the wholesalers as central coordinating actors.

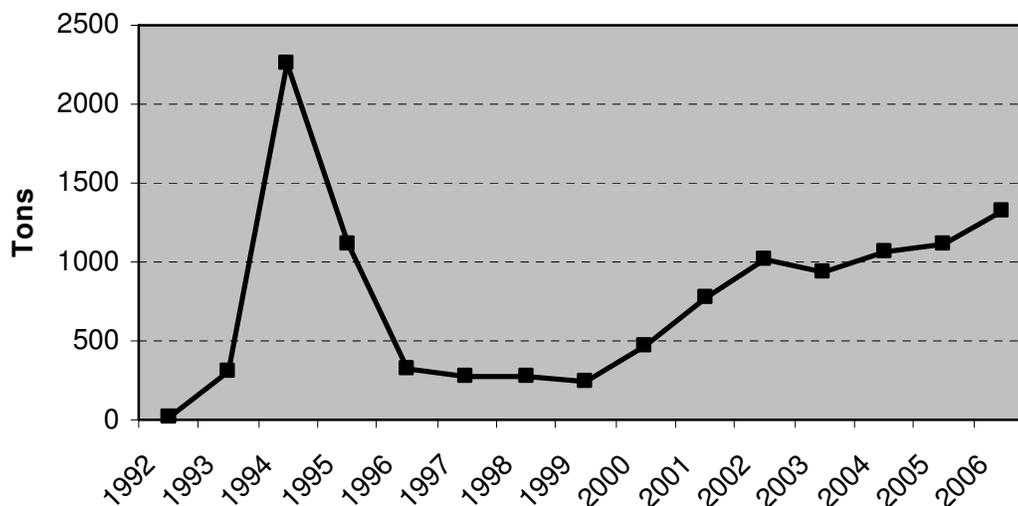
Europe imports annually approximately 500,000 tons of fresh

with 1,326 tons in 2006 (INSAE, 2009). It must compete with other sub-regional countries such as Côte d'Ivoire, Cameroun and Ghana on European market. Figure 2 shows the evolution of fresh Beninese pineapple exports to Europe from 1992 to 2006.

Exports to Europe started in the early nineties and experienced a two-year extremely rapid progression in 1993-1994 followed by an especially sudden drop in 1995-1996. Since then, pineapple exports are slowly increasing but have not been able to reach the 1994 peak. Reasons indicated in the literature and verified by our interviews for that slow progression are very high air-freight<sup>3</sup> costs and low fruit quality. According to organizations interviewed, air-freight costs have increased since 2001. However, as the evolution of Beninese pineapple exports to Europe shows, the drop in 1994 and slow recovery of exports since then does not seem to be only due to air-freight costs. The 2001 cost increase following September 11 is barely perceivable on the graph. The incapacity of Beninese pineapples to meet European quality standards might thus play an important role in this slow progression.

The European export chain is more coordinated than the local and sub-regional markets and it can be considered as a supply chain. Contractual agreements between farmers or producer organizations and exporters can be either written or oral. At the moment of our investigation, there remained only two exporters of pineapple in Benin and both of them are large producers that buy pineapples from neighbouring producers to complete their export quantities. They usually use a mix of written and oral contracts with their suppliers. Quality norms for fresh pineapple are very strict and can include the *codex alimentarius*, safety norms on maximum residue levels (MRLs), heavy metals maximum levels, GlobalGAP regulations and traceability norms (Daniel and Martin 2008). Phytosanitary controls can be performed at the airport of Cotonou at the expenses of the exporter and are performed again in the importing country. ADEx, a national association for the development of exports, is in charge of disseminating information on the evolution of European regulations to chain actors but its efforts are often limited to exporters. Since European consumers have a preference for a yellowish skin colour corresponding to a high degree of maturity, producers make use of plant growth regulators (which residues are subjects to norms) to foster simultaneous maturity of the fruits in the field. Exporting to Europe requires a high level of agronomic expertise compared to the local and regional markets, but also more inputs and therefore involves a greater need of financial resources for producers. These conditions explain why most exporters have been large producers or producer organizations having sufficient agronomic and financial capacities.

<sup>3</sup>Boat-freight was used in the past but problems of coordination and trust have undermined this transportation alternative. Our interviews revealed that boat shipments necessitate large quantities of pineapples, which implied that pineapples had to come from various farms. If some pineapples shipped were not of sufficient quality, they would spoil and contaminate the whole shipment. Because tracing back low-quality pineapples and the faulty farmer was almost an impossible task, exporters and farmers lost trust in each other and today no pineapples are exported through this transportation means anymore.



**Figure 2.** Evolution of Benin fresh pineapple international exports from 1992 to 2006 in Tons. Source: INSAE 2009.

Exports of processed pineapple consist mainly of dried pineapples that are grown by producers closely supervised by non-governmental organizations (NGOs).

The three main marketing channels for pineapples in Benin are illustrated in Figure 3. The approximate percentage of pineapples going through each channel is presented in the arrowed boxes.

## RESULTS

### Institutional constraints of Beninese pineapple growers

This section of the paper depicts institutional constraints related to quality improvement of Beninese pineapple producers based on the analytical framework developed previously. We structured our analysis around the quality improvement factors (market information; inputs, technical itinerary; infrastructures; certification services; and transaction costs) identified in our framework and discuss the institutional constraints faced by Beninese pineapple growers for each of these factors. We are aware that a survey of 14 respondents cannot provide meaningful statistical conclusions. However, because our survey allowed us to collect producers' comments and detailed explanations, it carries a non-negligible set of genuine data.

### Market information

Most pineapples grown in Benin end up on the local or sub-regional markets and farmers selling to these markets have no specific quality objectives to meet. Our survey revealed that three of the farmers did not even understand the concept of quality at all. Producers exporting to Europe have more stringent quality

requirements to comply with. However, when asked about the quality requirements they had to comply with, very few of them mentioned spontaneously residue limits or Global GAP regulations. Only two farmers declared respecting residue norms, one on pesticides and the other on growth regulator. These results tend to indicate that compliance with European residue norms in general is not well-implemented in farmers' technical itinerary.

This situation is probably worsened by the fact that many farmers exporting to Europe do it on an irregular basis. They complete large producers' exports from time to time, depending on opportunities. This observation is in line with the outcomes of our interviews with organizations: Beninese producers can grow very tasty pineapples but there are still pesticides and growth regulator residues found on ready-to-sell pineapples. According to several respondents, the recent upgrade of European norms on chemical residues has enlarged the gap between Beninese growers and European consumers because of poor information on these norms and their application in the field.

This situation shows that farmers are either not trained to comply with these norms, not aware of them or do not have the financial resources to respect them, underlying institutional failures somewhere in the process of information access, training and credit access. The Beninese pineapple sector does not benefit from any public market information services, which is often the case for emerging crops. Governments do not have the resources, nor the competences, to provide rapidly changing market information on dozens of emerging crops to thousands of geographically scattered small holders. Information is rather communicated to very few growers via their institutional arrangements such as producer organizations, partnerships with NGOs and contracts with chain partners. Disseminating information

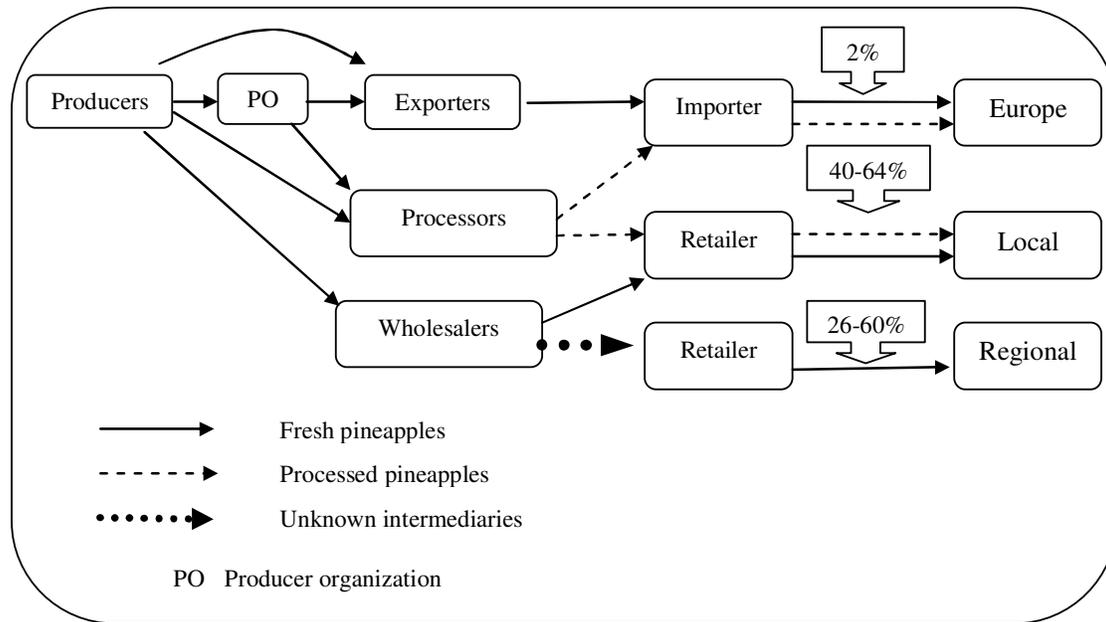


Figure 3. Mapping of the pineapple chains in Benin.

on quality requirements is crucial for emerging value chains. Individual farmers without any links with an organization or chain partner do not have access to market information and do not have incentives to improve quality.

### Inputs

Interviews with institutions revealed that quality of pineapples depends mostly on the amount of fertilisers applied. Fertilisers can be purchased on the private market at a high price that most farmers cannot afford. In order to facilitate smallholders' fertilisers' access, the Benin government offers, since 2006, subsidised fertilisers that are distributed by the public extension services structures. Eight producers of our sample had access to these subsidised fertilisers. However, almost all of them mentioned that their access was difficult or irregular because of fertilisers' shortage, lack of liquidity to buy them, distance between their farm and the distribution facilities, fertilisers were not always available on time and that they lacked the network to have easier access. Only one farmer had an easy access to subsidised fertilisers. He explained that this was due to his frequent contacts with extension service agents and his work at the town hall. His better access to subsidised fertilisers is thus apparently based on personal networking and his key professional position that provides him with some favouritism. Personal networking is not a negative factor *per se* but as Shirley (2008: 13) notes, in some countries, "*business success is determined more by who you know than by what you do*" and this

phenomenon might not favour the most efficient producers. Besides, our interviews revealed that subsidised fertilisers were sometimes bought by producers and sold on the black market at a higher price. The subsidised fertiliser policy is an appealing idea to help smallholder farmers improve their pineapple quality but in practice, personal networking, liquidity problems and the lack of monitoring over the distribution and use of fertilisers seems to be the true determinants of its effectiveness.

Although access to fertilisers depends on various factors, the main limiting factor is the financial capacity and one of the solutions that address the liquidity problem is credit. Producers interviewed and surveyed all had recourse to informal credit like self-financing activities and loans from relatives or from downstream chain trading partners. The choice for informal credit was explained in our survey by the fact that farmers either did not like formal credit, did not have the money to pay the annual fee to the bank, did not even know they could borrow from banks, mentioned that they needed personal contacts to have a loan or needed money to borrow money. One organization interviewed even pointed out that a formal credit "culture" does not really exist in Benin. People don't trust the banking system in general and prefer to use their informal networks to borrow money.

Five farmers indicated that they borrowed from banks and micro-credit institutions. Their appreciation of credit access varied a lot. On a seven-point Likert scale ranging from very difficult (1) to very easy (7), access to credit averaged 2.8, which indicates that respondents generally consider access to credit difficult. Producers indicated that loans were sometimes not given on time in the

production process and interest rates were often very high. Also, we learned from our interviews that formal credit in Benin is not tailored to pineapple cultivation.

Reimbursement payments have to be done in a sequence that is not synchronized with the time needed by pineapple producers to obtain sufficient revenues since pineapple production cycle takes over 18 months. Besides, bankers are not very inclined to lend to pineapple producers since the informal nature of most trade arrangements does not allow them to have a hold on the revenues of the sales which makes pineapple growers highly risky borrowers. What emerges from our results was that credit in Benin is not tailored to the needs of smallholders growing high-value crops.

Access to high-quality planting material is also crucial for farmers to achieve high pineapple quality. If the pineapple propagules used show phytosanitary deficiencies, high quality fruit is less likely to be produced. In order to help farmers have easier access to good quality planting material, a governmental agency started distributing subsidised propagules in 2007. The agency buys propagules from farmers, undertakes their collection and transport, verifies their quality and distributes them to growers. Farmers who cannot afford to pay subsidised propagules can pay in kind by giving back two propagules for one received in the next production cycle. Although this initiative is a good start to palliate institutional failures, our interviews revealed that the limited means of the public agency affected the effectiveness of phytosanitary checks and distribution coordination.

### Technical itinerary

Respondents also mentioned that the quality of pineapple greatly depends on extension services and trainings. These are primarily provided by CerPA, the only public agricultural extension agency in Benin. NGOs, producer organizations and various private/public agencies also provide for these services to producers or producer organisation but on a more *ad hoc* or specific basis. A total of five producers in our survey used extension services. Four of them used technical assistance services from the CerPA or NGOs on a regular basis and one mentioned having occasional contact with CerPA agents for technical matters. Two producers used management services and only one received quality improvement assistance. The size of our sample does not allow performing statistical tests but our survey shows that all producers making use of extension services had at least a primary school level of education, which implies that there might be a link between the educational level of farmers and their access to extension services. This supposition would be in line with our interviews' outcomes. Indeed, one organization mentioned that public extension services cannot reach all producers because of limited resources and thus focus on farmers considered

as professionals and capable of learning new techniques. Five farmers of our survey were illiterate and four of them were not familiar with extension services, which imply that the achievement of high-quality fruits by a large portion of growers relies on adequate extension services but also indirectly on more educated farmers.

Our interviews with organizations highlighted two other issues that might affect extension service effectiveness. First, CerPA agents are young professional that have been recently trained to meet pineapple producer demands on technical advices. Some producers asserted that they did not learn much from this assistance, underlying the failure of the educational system to regularly provide for skilled technicians and agronomists. Second, there is no technical "package" tailored to pineapple cropping in Benin. All knowledge used by public extension services has been imported from Côte d'Ivoire and may not be optimal for Beninese agro-climatic conditions, underlying again a lack of resources or a possible coordination failure between research and development institutions and extension services. This failure is not unique to Benin; Soler (1997) made the same observation for West African countries in general. Respondents observed that the intervention of the private or public/private sectors is more relevant to improve pineapple quality since they usually teach the newest knowledge and techniques to Beninese growers.

In terms of training, six farmers of our sample mentioned they received at least one formation during the last 10 years. Training concerned management, optimal fertiliser and pesticide use, technical itinerary improvement, compost use and wilt control (loss of rigidity of the non-woody part of a plant). All producers that received formations mentioned that it helped to improve the quality of their pineapples. Although these formations seem to be useful, they remain quite sporadic. Insufficient training might be due to limited financial and human resources, but also to a lack of organization of extension services. Moreover, our survey indicates that producers benefiting from these formations all had in common a minimum level of education and were all members of a producer organization. Here again, our sample size does not allow us to conclude on an eventual link between access to formations, education level and producer organization membership but it could be investigated in a subsequent study.

### Infrastructures

Respondents mentioned that physical infrastructures may affect pineapple quality. Exporting producers explained that the absence of refrigerated storage facilities at the airport affected pineapple quality. Also, many producers noticed that if cars or trucks transporting pineapple from farms to markets are not well-loaded or overloaded, pineapples at the bottom are likely to be damaged and/or

have conservation problems. Losses are evaluated to be as high as 20%. Also, if the car or truck's previous load was chemicals or natural fertilisers, pineapples are more likely to lose quality. These problems are not directly linked to the quality of physical infrastructures but can be exacerbated by them. They also show that quality improvement is dependent upon the handling of products through the chain and the awareness of the importance of quality preservation by all agents throughout the chain.

### Certification

Access to particular quality markets can also be hampered by the lack or cost of third-party certification services. For instance, the costs of organic auditing and certification services are very high for smallholders in developing countries (Raynolds, 2004). In Benin, our interviews revealed that only one non-governmental organization (NGO) can oversee the organic certification process for products intended for international markets. As a consequence, although willing to grow organic pineapple, most growers do not have the resources to be certified and therefore cannot benefit from higher value niche markets that require certification.

### Transaction costs

Most pineapple transactions are of a 'cash and carry' type without coordinated institutional arrangements that minimise transaction costs and provides a better coordination of the produce along the chain. Contract breach is very costly for producers who have to spend many hours or days to solve their dispute in addition to the potential loss of their deliveries. Our survey revealed that although most producers are satisfied with their contractual arrangement, 10 producers out of 14 experienced serious disputes with their trading partners. Six disputes concerned prices, seven were related to the non-respect of the original arrangement and two were caused by the low quality of pineapple delivered. Disagreements were mainly solved without external intervention (6 cases); two disputes ended up in a formal tribunal; the police and the village chief (the social leader of the village) were each involved in one case; and finally, one case did not find any solution. If agreements cannot be enforced at low-cost, partners will not invest in costly assets that could improve quality. In that sense, contract enforcement becomes a limiting quality enhancement factor<sup>4</sup>.

<sup>4</sup>In order to avoid costly disputes, sub-regional and European exports arrangements are often enforced by an innovative mechanism binding partners more tightly. Collecting agents and wholesalers usually search the countryside and choose fields that will have pineapple ripened within a month. They then negotiate with the producer on prices and quantities. A few days before harvest, the trader puts growth regulator on pineapples to trigger ripeness and pay a price advance of 2/3 to the producer. This arrangement locks partners together in order to secure the transaction and avoid high *ex post* transaction costs.

More specific to the export market, many producers complained about their low bargaining power and high transaction costs with non-producer exporters in the past. Frequently, these exporters provided a loan without interest to the producer, so as to buy fertilisers, in exchange of his production. Problems arose when the exporter did not respect the terms of the contract on price for instance. The producer could not sanction the exporter and enforce the agreement since he was bonded by the loan. Producers complained that they always had to pay a penalty if they did not respect the export contract, whereas exporters, who should reimburse 50% of the fruits delivered as stipulated in the contract, did not pay any compensation. Since they could not enforce the contracts, producers had to sell their pineapples on the local market at lower prices. The origin of these contractual hazards may come from the nature of the contract between the exporter and the European importer. The European importers are reluctant to sign any contract because it formalises exchange and they consider that it is not suitable for frequent and highly uncertain transactions. The result of these informal contracts is that Beninese exporters face very high risks and transfer these risks on to producers. The nature of commercial arrangements and contract enforcement in the export chain does not create many incentives for producers to invest in higher quality produce. Unless all agents of the chain agree to bear some risks and to trust each other, easily enforceable arrangements should be developed to lower transaction costs and restore trust.

### DISCUSSION AND CONCLUSION

This paper had two objectives. The first one was to provide a guideline tool for identifying institutional constraints that affect non-traditional agricultural product quality improvement. We therefore developed an analytical framework based on available academic knowledge that identifies the various factors and institutions affecting quality at the producer level. The second objective was to confront this tool with reality and possibly improve our framework and therefore, our knowledge on the topic. The results obtained from our sample, although narrow, were quite insightful and indeed allowed to extend our knowledge on the institutional constraints faced by smallholders when they try to comply with high quality requirements. Table 3 presents the results of our survey. The first column presents the institutions identified in our framework, the second one indicates whether our research validates these institutions as crucial for quality improvement, and the third column summarizes the new information provided by our empirical observations.

All institutions identified in our framework have been validated by our research, that is, all respondents acknowledged the importance of these institutions in quality improvement. As for our survey results, many elements mentioned by respondents were not found in

**Table 3.** Validation of our framework and extensions from our empirical observations.

Institutional constraint	Validation of our framework	Extension/new information from observations in Benin
Market information	Yes	<ul style="list-style-type: none"> <li>Information on quality is generally communicated through institutional arrangements (producer organizations, NGOs, contracts)</li> </ul>
Inputs	Yes	<ul style="list-style-type: none"> <li>Financial resources are not the only limiting factor. Input shortage, distance between the farm and the distribution centre, and timely availability are also limiting factors.</li> <li>The effectiveness of subsidised inputs may be affected by the lack of monitoring over the distribution and the use of inputs.</li> <li>As for credit access, although financial institutions exist, formal credit is not tailored to pineapple cultivation.</li> </ul>
Technical itinerary	Yes	<ul style="list-style-type: none"> <li>The general educational level may affect the producers' capacity to learn or integrate new knowledge in the cropping cycle.</li> <li>A lack of resources may lead extension services to have an 'expertise gap' when experienced agronomists retire. Efficient services need to regularly train young professional to ensure a steady quality of services.</li> </ul>
Infrastructures	Yes	<ul style="list-style-type: none"> <li>The handling of products is as important as the quality of infrastructures.</li> <li>An awareness of the importance of quality preservation by all agents throughout the chain is also a crucial factor</li> </ul>
Certification	Yes	<ul style="list-style-type: none"> <li>Ex post transaction costs seem to be the most important type of costs.</li> <li>Most disputes concern price and quality.</li> </ul>
Transaction costs	Yes	<ul style="list-style-type: none"> <li>Local contract enforcement institutions seem to be effective and low-cost for cash-and-carry type of transactions.</li> <li>However, contracts for exports are not enforceable.</li> <li>The nature of contracts used in the downstream part of the chain may affect the occurrence of contractual hazards at the producer level.</li> </ul>

the literature. We highlight a few here. A first striking element concerns credit. Our survey reveals that credit is not tailored to the pineapple production cycle but also that the market coordination that characterized most of the pineapple transactions makes pineapple producers high-risk borrowers.

The result is that lenders and borrowers have few incentives to use the formal credit channel, a major constraint for high quality production. Another interesting element concerns the importance of appropriate product handling. Although most pineapple producers mentioned it was an important quality constraint, it has not been the focus of previous research. A third element is the issue of enforcement of export contracts, which deserves more attention. If local institutions cannot enforce these contracts, how can smallholders wishing to export rely on them?

A last institutional issue resulting from our study concerns market information. It seems that information on market trends and quality requirements is seldom disseminated by public organizations. In Benin, the use of those institutional arrangements promoting greater

coordination, notably producer organizations, NGOs and contracts, seemed to be the only reliable channel of accurate information. This observation leads to a more general remark on the capacity of smallholders from developing countries to improve quality. The lack of public resources to organize and finance the many institutions framing non-traditional agrifood chains (tailored credit, input quality monitoring, knowledgeable and available extension services, up-to-date market information) makes the use of privately coordinated institutional arrangements more suitable.

An important factor not tackled in our paper but strongly linked to the effectiveness of formal institutions is the effect of informal institutions. Throughout the analysis, we focused on formal institutions. But in developing countries, informal institutions have a strong influence, often much stronger than the formal ones. How do these informal institutions affect quality and how do they interact with the formal institutions? These two questions have hardly been answered in the literature although we believe they must be analysed to really understand how institutions can improve product quality, especially in

developing countries. During our investigation in Benin, we noticed some influence of social norms and cultural beliefs on trade, business strategies and formal institutions but their analysis would necessitate a wider sample and deeper examination. The next step in improving the framework is therefore to include the effect of informal institutions on quality compliance and their interrelations with the formal ones.

Although the empirical part of our paper focused on a non-traditional and high-value crop in a specific country, the pineapple production in Benin, we believe our analytical framework could be applied in a broader perspective (other countries and other crops) and that our results and conclusions may concern a larger audience interested in improving agricultural product quality in developing countries. Since our analytical framework was meant as a first step towards a better understanding of the effect of institutions on quality improvement, future research is needed to wholly grasp the complexity of reality.

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## REFERENCES

- Besley T (1995). Property Rights and Investment Incentives: Theory and Evidence from Ghana. *J. Polit. Econ.* 103(5):903-937.
- Birhal PS, Joshi PK, Gulati A (2005). Vertical Coordination in High-Value Food Commodities: Implications for Smallholders. IFPRI Discussion Paper no. 85.
- Bitzer V, Van Wijk J, Helmsing AHJ, Van der Linden V (2011). Partnering to facilitate smallholder inclusion in value chains. In: Value chains, social inclusion and economic development: contrasting theories and realities, edited by Helmsing AHJ and Sietze Vellema, London and New York: Routledge pp.221-246.
- Boselie D, Henson S, Weatherspoon D (2003). Supermarket procurement practices in developing countries: Redefining the roles of the public and private sectors. *Am. J. Agric. Econ.* 85(5):1155-1161.
- Daniel J, Martin T (2008). Impacts des normes obligatoires de la réglementation européenne, d'agriculture biologique et du commerce équitable sur les systèmes de production d'ananas au Bénin et au Togo. *Ingénieurs sans frontières*.
- Davis LE, North DC (1971). Institutional change and american economic growth. London, Cambridge: University Press.
- Devaux A, Horton D, Velasco C, Thiele G, López G, Bernet T, Reinoso I, Ordinola M (2009). Collective action for market chain innovation in the Andes. *Food Policy* 34:31-38.
- Dohou VB (2008). Programme national de développement de la filière ananas. Rapport final. ADEX.
- Dolan C, Humphrey J (2000). Governance and trade in fresh vegetables: The impact of UK Supermarkets on the African horticulture industry. *J. Dev. Stud.* 37:2.
- Dorward A, Fan S, Kydd J, Lofgren H, Morrison J, Poulton C, Rao N, Smith L, Tchale H, Thorat S, Urey I, Wobst P (2004). Institutions and policies for pro-poor agricultural growth. *Dev. Policy Rev.* 22(6):611-622.
- Dorward A, Kydd J, Morrison J, Poulton C (2005). Institutions, markets and economic co-ordination: Linking development policy to theory and praxis. *Dev. Change.* 36(1):1-25.
- Dorward A, Kydd J, Poulton C (1998). Smallholder cash crop production under market liberalisation: a new institutional economics perspective Wallingford: CAB International.
- Fafchamps M (1996). The enforcement of commercial contracts in Ghana. *World Dev.* 24(3):427-448.
- Fafchamps M, Hill R (2005). Selling at the farm-gate or travelling to market. *Am. J. Agric. Econ.* 87(3):717-734.
- FAOSTAT (2009) <http://faostat.fao.org/site/339/default.aspx>
- Glover DJ, Kusterer K (1990). Small farmers, big business: contract farming and rural development. Houndsmills/London: Macmillan.
- Helvetas-Bénin (2007). Appui à la filière ananas biologique et équitable: document du projet. Cotonou pp.6-9.
- Henson S, Masakure O, Boselie D (2005). Private food safety and quality standards for fresh produce exporters: The case of Hortico Agrisystems, Zimbabwe. *Food Policy* 30:371-384.
- Henson S, Reardon T (2005). Private agri-food standards: Implications for food policy and the agri-food system. *Food Policy* 30(3):241-253.
- Holloway G, Nicholson C, Delgado C, Staal S, Ehui S (2000). Agroindustrialization through institutional innovation. Transaction costs, cooperatives and milk-market development in the east-African highlands. *Agric. Econ.* 23:279-288.
- Human development report (2010). The real wealth of nations: Pathways to human development. Table 5: Multidimensional poverty index, p.162.
- INSAE (2009). Institut national de la statistique et de l'analyse économique. <http://www.insae-bj.org/>
- International Monetary Fund (2009). World economic outlook database. October 2009. [www.imf.org](http://www.imf.org)
- Jaffee S, Henson S (2004). Standards and agro-food exports from developing countries: Rebalancing the debate. World bank policy research working paper 3348.
- Jaffee S, Masakure O (2005). Strategic use of private standards to enhance international competitiveness: Vegetable exports from Kenya and elsewhere. *Food Policy* 30:316-333.
- Kaganzi E, Ferris S, Barham J, Abenakyo A, Sanginga P, Njuki J (2009). Sustaining linkages to high value markets through collective action in Uganda. *Food Policy* 34:23-30.
- Key N, Runsten D (1999). Contract farming, Smallholders, and rural development in Latin America: The organization of agroprocessing firms and the scale of outgrower Production. *World Dev.* 27(2):381-401.
- Kherallah M, Delgado C, Gabre-Madhin E, Minot N, Johnson M (2002). Reforming agricultural markets in Africa. Johns Hopkins University, Baltimore.
- Kirsten J, Sartorius K (2002). Linking agribusiness and small-scale farmers in developing countries: is there a new role for contract farming? *Dev. Southern Afr.* 19(4):503-529.
- Levin CG, Ruel MT, Morris S, Maxwell DG, Armar-Klimesu M, Ahiadeke C (1999). Working women in an urban setting: Traders, vendors and food security in Accra. *World Dev.* 27:1977-91.
- Lyon F (2000). Trust, networks and norms: The creation of social capital in agricultural economies in Ghana. *World Dev.* 28:663-682.
- Lyon F (2003). Trader associations and urban food systems in Ghana: Institutional approaches to understanding urban collective action. *Int. J. Urban Regional Res.* 27:11-23.
- Markelova H, Meinzen-Dick RS, Hellin J, Dohrn S (2009). Collective action for smallholder market access. *Food Policy* 34(1):1-7.
- Ménard C, Valceschini E (2005). New institutions for governing the agri-food industry. *Eur. Rev. Agric. Econ.* 32(3):421-440.
- Minten B, Randrianarison L, Swinnen JFM (2005). Supermarkets, international trade and farmers in developing countries: Evidence from Madagascar. Cornell Food and Nutrition Policy Program Working Paper No.191
- Mongbo R, Floquet A (2006). Pineapple against poverty? Market opportunities, technological development and social stratification in Southern Benin. Tropentag Conference, International Research on

- Food Security, Natural Resource Management and Rural Development, University of Bonn.
- Narrood C, Devesh R, Okello J, Avedaño B, Rich K, Thorat A (2009). Public-private partnerships and collective action in high value fruit and vegetable supply chains. *Food Policy* 34(1):8-15.
- North DC (1990). *Institutions, institutional change and economic performance*. Cambridge: Cambridge University Press.
- Nyameck JB, Gockowski J, Nkamleu GB (2007). The role of credit access in improving cocoa production in West African countries. *AAAE Conference Proceedings* pp.215-224.
- OECD, Banque Africaine de Développement (2008). *Perspectives économiques en Afrique 2007/2008*.
- Okello JJ, Narrod C, Roy D (2007). Institutional innovations for smallholder compliance with international food safety standards: Experiences from Kenya, Ethiopian and Zambian Green Bean Growers. *AAAE Conference Proceedings* pp.483-487.
- Poulton C, Kydd J, Dorward A (2006). Overcoming market constraints on pro-poor agricultural growth in Sub-Saharan Africa. *Dev. Policy Rev.* 24(3):243-277.
- Raynaud E, Sauvée L, Valceschini E (2005). Alignment between quality enforcement devices and governance structures in the agro-food vertical chains. *J. Manag. Gov.* 9:47-77.
- Raynolds LT (2004). The globalization of organic agro-food networks. *World Dev.* 32(5):725-743.
- Reardon T, Farina E (2002). The rise of private food quality and safety standards: illustrations from Brazil. *Int. Food Agribus. Manag. Rev.* 4:413-421.
- Reardon T, Timmer P, Berdegue J (2004). The rapid rise of supermarkets in developing countries: Induced organisational, institutional, and technological change in Agrifood systems. *Electronic J. Agric. Dev. Econ.* 1(2):168-183.
- Shepherd A (1997). market information systems. *AGS Bulletin*. Rome, Food and Agriculture Organization.
- Shiferaw B, Obare G, Muricho G (2006). Rural institutions and producer organizations in imperfect markets. IFPRI, <http://www.ifpri.org/publication/rural-institutions-and-producer-organizations-imperfect-markets>
- Shirley MM (2008). *Institutions and development*. Edward Elgar Publishing Inc.
- Soler A (1997). West African pineapple quality. *Second International Pineapple Symposium Proceedings* pp.525-530.
- Tilburg VA, Trienekens J, Ruben R, Boekel MV (2007). Governance for quality management in smallholder-based tropical food chains. Paper prepared for the 106<sup>th</sup> seminar of the EAAE.
- Trienekens J, Zuurbier P (2008). Quality and safety standards in the food industry, developments and challenges. *Int. J. Prod. Econ.* 113:107-122.
- Vetter H, Karantininis K (2002). Moral hazard, vertical integration and public monitoring in credence goods. *Eur. Rev. Agric. Econ.* 29(2):271-279.
- World Bank (2007). *Benin at a glance*. [http://devdata.worldbank.org/AAG/ben\\_aag](http://devdata.worldbank.org/AAG/ben_aag).