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**DOES MODERNIZATION OF THE RICE VALUE CHAINS IN SENEGAL
ILLUSTRATE A MOVE TOWARD THE ASIAN QUIET REVOLUTION?**

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1. Introduction:

The modernization of food chains in Africa, in terms of standards and contractual arrangements, was mainly documented for global value chains (Jaffee et Gordon, 1993 ; Maertens et Swinnen, 2009 ; Minten, Randrianarison et Swinnen, 2009). Research conducted in Asia by Reardon et al. (2012) reveals the modernization of domestic value chains, brought about by the midstream segment which invests in new technologies and integrates new functions. In Africa, scientific evidence on transformations of domestic value chains along the same path is limited (Soullier, 2013). But the rice value chain in Senegal seems to provide a good case reflecting what has been observed in Asia. The purpose of this paper is to analyze the dynamics of the rice value chain in Senegal, in order to assess if it follows the same trends as in Asia.

2. Conceptual framework

We call upon the Global Value Chain analysis framework (Gereffi, Humphrey, and Sturgeon, 2005) which highlights the influence that one actor in a steering position within the value chain has on the quality of product, and the distribution of tasks and skills among the various partners. The main concept is the governance, defined by Gereffi et Korzeniewicz (1994, p97) as “authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain”. This framework follows transaction costs economics (Williamson, 1994, 1983) and specifies three types of governance between market and hierarchy. This analysis framework is dynamic. Technical change, understood as the use of new technologies, may steer governance toward integration when it makes transactions more complex. Technical change may also turn governance toward a more relaxed form, when it strengthens the skills of suppliers (Gereffi, Humphrey, and Sturgeon, 2005). The modernization of the value chain is understood as an expansion and concentration of the midstream segment, which carries out some technical change and sets up new forms of coordination.

3. Methodology

Changes in the Senegal rice VC are analyzed from a historical point of view. In addition to literature review, we conducted in-depth interviews during three stays in Senegal between June 2014 and June 2015. We focused on interviews with actors in the upper part of the VCs located in Dagana Department, since technical and coordination changes mainly occur at their level. We met 47 producers, 38 small-scale and industrial rice millers, 23 traders (including wholesalers and importers), and 46 agents of public and private research and development organizations. Topics discussed were policies, actor behavior, quality management, and changes in coordination among actors.

We also used quantitative questionnaires to assess the distribution of net margins along the chain. Databases include 550 rice growers randomly selected after stratification according to their marketing strategies,² 49 processing units, and 60 traders, randomly selected. We rounded out the data on the traders by using results from François et al.

²This stratification was then corrected by using weight according to population.

(2014), who carried out a survey of 254 traders in order to assess net margins along the downstream segment of the same VC in 2014.

4. Results

Historically, two factors hindered and fostered the modernization of the rice value chain during three periods: public policies and links to global markets. (1) From 1964 to 1994, there was hierarchical governance driven by the state, since each level of the value chain was directly or indirectly managed by two State agencies. The first one highly taxed imports in order to subsidize paddy purchases from the second one. (2) This period was followed by liberalization and market/relational governance (1994-2007). Public intervention was reduced and the dependency from global markets increased. The traditional value chain expanded, contrary to the industrial one. (3) Since the first world food crisis, we observe patterns of vertical integration and modernization supported by public policies. Volumes produced doubled (Baris and Gergely, 2012 ; Ministère de l'Agriculture du Sénégal, 2009) and processors invested in technologies producing rice with low rates of impurity. They also set up new coordination modes to secure their supplies.

We identified five types of governance. The traditional value chain processes 87% of the production from the valley. The coordination is based on market price (market governance). Marketing contracts (modular governance) are nevertheless quickly increasing (they appeared in 2010 and concerned 5% of volumes in 2014), and link the price negotiated within the inter-professional association to specific criteria of quality. Farmers' networks (close to relational governance, 1% of volumes) use modern technologies, and negotiations are realized between producers and traders socially closed. Production contracts (captive governance, 5% of volumes) are set up by industrial millers which finance producers through in-kind inputs and are reimbursed in paddy. There are also industrial millers producing paddy (vertical integration, 1%).

We compared the share of benefits in the final price³ in 2014 with the results from surveys carried out during periods of hierarchical governance⁴ (FAO, 1994) and market governance (Liagre, 1997; UCAD/UNEP/ISE, 2003). Under state regulation, the value chain was in deficit. The value chain following the liberalization generated positive benefits, with little difference between traditional and industrial processing. Our survey shows that modernization increases benefits: the traditional value chain in 2014 generated 36% of benefit, the industrial processing of broken rice generated 38% and the industrial processing of whole grain rice generated 51%.

5. Discussion:

We compare the Asian and Senegalese modernizations. The Senegalese VC is more vulnerable to imports than PRC, India and Bangladesh since it produces around 20% of its consumption whereas the Asian countries are close to self-sufficiency. In Asia, the

³ We corrected prices for inflation with price index from the World Bank, base 100 in 2005. Net margin was calculated by removing all costs (including wages, capital depreciation and financial fees) to revenues (which includes bran, which is usually sold by millers).

⁴ We hypothesized the cost of traders based on the survey of Ndoye, Boughton, and Crawford (1991)

governments invested in infrastructure, land extension and sometimes subsidized agricultural inputs and investment in processing technologies. In Senegal, credit is a major tool used to develop the activity of producers and processors, although other supports exist.

Changes in the organization of VCs present similar patterns. The midstream segments underwent a technical change. Processors set up packaging and branding and there is a decrease in custom milling. Reardon, Timmer, and Minten (2012) reported the fast growth of modern retailing in Asia, but traditional retailing still dominates in Senegal. In Asia, the number of intermediaries decreases, with the collection function being taken on by midstream actors. In Senegal, due to shorter distances, collection was already being done by processors. Within the two VC, the midstream segment becomes the driver, by defining the quality criteria of paddy and rice.

Nevertheless, although the transformation is apparently similar, the sequences of the change are different in some aspects. In Asia, the benchmark situation concerns tied output-credit transactions between producers and village traders (Bell and Srinivasan, 1989; Lele, 1971). In Senegal, the State has used credit to support production since the independence (1964), through the distribution of inputs during the period of hierarchical governance and credit management by the national bank under the period of market governance.

The modernization of the VC in Senegal seems to be at the same level as in Bangladesh: the traditional value chain dominates but the modern one is growing quickly. In Senegal, the modern chain supplies 11% of national production. The quality of the final product seems to be better in Asia than in Senegal although it is improving in both areas. The distribution of margins along the VC is following the same trends: The increase of the total net margin along the chains benefits the midstream segment which obtains a higher share. Nevertheless; this increase also benefits producers in absolute values.

6. Conclusion

We therefore find that the rice VC is undergoing modernization as described by Reardon et al. (2012a). Nevertheless, the main differences between the Asian and African cases are that in Senegal: (1) the VC is more vulnerable to price shocks from global markets, (2) governance tends towards integration mainly because of credit policies, and (3) the modernization is more advanced in Asia.

We recommend policies to include small scale processors in the modernization of the value chain by supporting their access to compact unit rice millers (Cruz, 1999) and opening investment loans by CNCAS, with strong guarantees and insurance.

Key words: Value Chain; Modernization; Rice; Africa; Governance;

7. References

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