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Comparative Advantage in Demand and the Development of Rice Value Chains in West Africa

MATTY DEMONT^a, ROSE FIAMOHE^b and A. THIERRY KINKPÉ^{c,*}^a *International Rice Research Institute (IRRI), Metro Manila, Philippines*^b *Africa Rice Center (AfricaRice), Cotonou, Benin*^c *Laboratory of Analysis and Research on the Economic and Social Dynamics (LARESD), University of Parakou, Parakou, Benin*

Summary. — National rice development strategies in Africa are often supply-focused and implicitly assume that consumers will readily substitute imported for domestic rice. However, due to increasing import dependency, urban consumer preferences for rice have become biased toward Asian export quality standards, against which African rice has difficulties to compete. Anecdotal evidence suggests that this import bias is higher in cities close to the port and remote from the geographical centers of cultural heritage where African rice was domesticated more than 3,000 years ago. We purposely select a sample of five West African urban markets which are supplied by both foreign and domestic rice value chains and which are located at varying distances from the nearest ports and centers of cultural heritage, and conduct framed field experiments based on auctions to analyze the drivers of urban demand for domestic rice with upgraded quality characteristics. We find that West African rice has increasing difficulties competing against imported rice on urban markets the more consumers appreciate characteristics of imported Asian rice, the closer to the port, and the further the geographical and genealogical distance from rice cultural heritage. These challenges provide crucial insights into value chain upgrading in policy makers' struggle to achieve rice self-sufficiency in West Africa. Our findings suggest that the optimal portfolio of investment in value chain upgrading is a function of the targeted end-market and its distance from the port and rice cultural heritage. The closer the end-market is located toward the port, the more investment is needed in lifting demand of domestic rice through quality upgrading, branding, and promotion to enable it to compete against imported rice. Proximity to centers of cultural heritage, on the other hand, endows rice value chains with a “comparative advantage in demand,” requiring less investment in demand-lifting and leaving more room for supply-shifting investments.

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Key words — demand analysis, value chain upgrading, experimental auctions, competitiveness, cultural heritage, West Africa

1. INTRODUCTION

West Africa is currently witnessing rapid growth in rice consumption due to population growth, urbanization, and rising purchasing power (Fofana, Goundan, & Domgho, 2014). Rice is the largest source of food calories and has become a highly strategic commodity in the region (Seck, Tollens, Wopereis, Diagne, & Bamba, 2010; Seck, Touré, Coulibaly, Diagne, & Wopereis, 2013). Although local rice production increased rapidly after the 2007–08 food crisis, it has never caught up with demand; import dependency is still around 50% (Saito, Dieng, Touré, Somado, & Wopereis, 2015; Seck *et al.*, 2013). Countries endowed with a port typically find it cheaper to rely on foreign imports of rice to feed their cities, rather than to invest in their domestic agricultural sector (Aker, Block, Ramachandran, & Timmer, 2011; Bezemer & Headey, 2008; Lipton, 1977; Moseley, Carney, & Becker, 2010). Such heavy reliance on imports can severely affect food security and political stability, as demonstrated during the 2007–08 food crisis (Berazneva & Lee, 2013). Laroche Dupraz and Postolle (2013) argue that long-term food security cannot depend on imports and must be built on the development of domestic production, with enough barrier protection against world price fluctuations.

In the next sub-sections, we will take a closer look at (a) rice import dependency in four West African countries (Nigeria, Niger, Côte d'Ivoire, and Benin); (b) Africa's struggle to reduce rice import dependency; and we will conclude this introduction by showing some evidence for the existence of (c) a “comparative advantage in demand” in the West African rice sector.

(a) Rice import dependency in four West African countries

During the last 20 years (1996–2015), rice consumption in Nigeria and Niger has annually increased by 5–13%, while production has increased by only 1–3%, leading to an annual increase in import dependency (percentage of consumption covered by imports) by 5–10% (Table 1 and Figure 2). Côte d'Ivoire has managed to keep import dependency more or less steady thanks to an average production growth of 4.7%, which is close to the 5.1% growth recorded in consumption. Despite facing double-digit growth rates in consumption averaging 11%, Benin has managed to reduce import dependency by almost 1% annually, thanks to high growth rates in production averaging 14%.

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Table 1. Rice import dependency in four West African countries, 1996–2015

	Period	Benin	Côte d'Ivoire	Nigeria	Niger
Consumption, average growth rate (%)	1996–2015	11	5.1	5.2	13
Consumption, average growth rate (%)	2008–15	17	9.3	5.5	7.3
Production, average growth rate (%)	1996–2015	14	4.7	2.6	1.0
Production, average growth rate (%)	2008–15	18	19	3.5	1.0
Import dependency, average growth rate (%)	1996–2015	−0.9	0.0	4.7	9.8
Import dependency, average growth rate (%)	2008–15	−0.2	−4.3	3.8	1.3
Import dependency, average (%)	1996–2015	75	59	41	59
Import dependency, standard deviation (%)	1996–2015	5.6	8.2	13	29
Import dependency, coefficient of variation (%)	1996–2015	7.4	14	31	48
ANOVA F of Fisher			14.05***		
Import dependency (%)	2015	70	56	53	81
Import dependency, total for the four countries (%)	2015		56		

Source: Author's calculations based on USDA (United States Department of Agriculture) (2016).

Notes: All figures are calculated on an annual basis. Import dependency is calculated as the percentage of consumption covered by imports. Statistical significance denoted at *** $p < 0.01$.

After the rice crisis in 2007–08, several authors started recording increases in rice yields across Africa (Saito *et al.*, 2015; Seck *et al.*, 2013). The concomitant effect on production growth rates is reflected in all four countries, except in Niger (Table 1 and Figure 2). In the post-crisis period, import dependency decreased annually by 4.3% in Côte d'Ivoire, while it is stagnant in Benin and still increasing by 1–4% in Nigeria and Niger. In the period 1996–2015, rice import dependency in Côte d'Ivoire and Benin averaged around 59–75% and slowly declined to attain 56–70% in 2015. The opposite happened in Nigeria and Niger, where import dependency slowly increased from an average of 41–59% during 1996–2015 to 53–81% in 2015.

Average import dependency levels in the period 1996–2015 were significantly different between countries; Benin being historically the most and Nigeria the least dependent one (Table 1). Import dependency was also found to be more variable in a landlocked country like Niger (coefficient of variation of 48%), than in coastal countries like Benin, Côte d'Ivoire, and Nigeria (coefficient of variation of 7–31%). In 2015, Niger was the most rice import-dependent country (81%), while Nigeria and Côte d'Ivoire were the least dependent ones (53–56%). The promising progress in Nigeria and Côte d'Ivoire can perhaps be attributed to the well-balanced investment portfolios featured in their national rice development strategies, which apart from supply-shifting investments in area expansion, intensification, and mechanization also include investments in processing, and value chain upgrading (Demont, 2013). However, despite this improvement, aggregate import dependency for the four countries combined is still high (56%).

(b) Africa's struggle to reduce rice import dependency

African governments are currently attempting to reduce rice import dependency by developing ambitious national rice development strategies. However, with a few exceptions, many programs are supply focused and lack a holistic value chain vision (Demont, 2013). It is often assumed that self-sufficiency can be achieved through area expansion and productivity enhancement (e.g., Fofana *et al.*, 2014; Pradhan, Fischer, van Velthuis, Reusser, & Kropp, 2015; van Oort *et al.*, 2015). However, this focus on the supply side of the equation implicitly assumes that consumers will readily substitute imported for domestically produced rice. Price policies are based on a similar implicit assumption, and have been proven

to be unsuccessful in reviving domestic rice sectors and redirecting African consumers toward local rice, as evidenced by a large body of literature from the 1990s (reviewed by Demont, Rutsaert, Ndour, & Verbeke, 2013) and recent policy studies (e.g., Coulibaly, Nakelse, & Diagne, 2015; Gyimah-Brempong, Johnson, & Takeshima, 2016; Moseley *et al.*, 2010). The latter suggests that policy makers should focus on “non-price” attributes in the development of their domestic rice sectors. Nasrin *et al.*, 2015 found that commercialization is one of the key drivers explaining the recent increase in rice production in five Sub-Saharan African countries, and concluded that policies should focus on improving the performance of rice markets in Africa and facilitating market access and participation. Moseley *et al.* (2010) earlier questioned why Mali has become less dependent on imported rice than, for example, The Gambia and Côte d'Ivoire, even though it underwent similar policy reforms. They attributed Mali's success to a mix of price and non-price attributes. First, its landlocked status reduced price competitiveness of imported rice relative to domestic rice and generated more financial space for the growth of the national rice sector. Secondly, its improved internal network increased price competitiveness of local rice. Finally, local rice had little difficulties competing against imported rice quality-wise thanks to urban consumers' strong attachment to domestic rice, exemplified by the price premiums are high paid for the local variety *Gambiana* (N'krumah, Elbehri, & Legret, 2013).

Recent research has advanced the hypothesis that increasing self-sufficiency in rice in Africa will crucially hinge on upgrading rice value chains to address the demand side of the equation, particularly in large, urban consumption zones (Demont, 2013; Gyimah-Brempong *et al.*, 2016; Wailes, Durand-Morat, & Diagne, 2015). Due to a long history of increasing imports, urban preferences for rice have become biased toward Asian export quality standards, against which African rice has difficulties to compete (Coulibaly *et al.*, 2015; Demont & Ndour, 2015; Fiamohe, Nakelse, Diagne, & Seck, 2015; Naseem, Mhlana, Diagne, Adegbola, & Midingoyi, 2013; Tomlins, Manful, Larwer, & Hammond, 2005). In Asia, it is similarly found that consumer preferences are a function of the balance of trade of a country as net importers tend to “import” preferences from first-mover or leading exporters, such as Thailand (Custodio, Demont, Laborte, & Ynion, 2016). Rice value chains will consequently need to upgrade the quality of domestic rice to these “imported” preference standards to help domestic farmers com-

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