The "Future Farm": a Novel PPP in the Yamoussoukro District

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The Ivorian context: evolution of rice production, consumption and trade[1]

For years after independence in the 1960s, the Republic of Côte d'Ivoire (RCI) produced enough rice to feed its population. By the mid-1970s, RCI achieved complete self-sufficiency and even exports as a result of strong government interventionist policies in rice production. However, it suffered growth deficits during a transition from state led agriculture growth to privatization in the 1980s which affected production and resulted massive imports to satisfy increasing demand.

Rice production in RCI increased from 420 000 MT of paddy to about 700 000 MT between 1980 and 2011, with a compound growth rate of 1.8% per year. The overall growth in production over the past 30 years was primarily the result of increases in yield, with average growth rate of 1.6% per year over 1980-2011, while the growth in area harvested was more moderate (0.8%). Although notable increases in yields have been achieved under irrigation (about 5MT/ha), average yields remain low (about 2MT/ha) as these gains have not been sufficiently important in aggregate to offset the relative stagnation of yields under rain fed conditions. In fact, nearly 90% of the total production of rice is from upland, hydromorphic and lowland ecosystems. While significant increases in area planted to rice have been achieved during the period 1980-1999 (i.e., from 350 000 ha to 450 000 ha), it decreased back to early 1980s levels throughout the 2000s, as several irrigated rice production schemes were abandoned.

Today, rice is among the fastest growing food commodity in consumption in RCI. Although, apparent per capita rice consumption actually fell from the early 1980s to the mid-2000s, total consumption has been steadily rising from 600 000 MT to 1 600 000 MT over the period 1980-2010. Population growth (at about 3.3% p.a), rapid urbanization, increasing incomes and urban consumers' preferences in terms of cost and ease of cooking are the main drivers of this increase.

Despite increases in rice production, the demand for rice has been outstripping production gains over the past three decades. RCI is the second largest rice importer in the region, accounting for about 16% of WA imports or 3% of global imports in 2011. RCI procures over half of its rice needs through imports, with Asia, particularly from Thailand (60%), Vietnam (17%), and Pakistan (10%). Rice imports have been growing at 8.8% during the period 1996-2010 compared to 1.8% in the previous decade.

The 2008 rice crisis and the rejuvenation of rice production in RCI

While the Government's direct interventionist policies in production led to self sufficiency and export of rice in the 1970s, few investments were undertaken over the past ten year to rejuvenate the rice subsector in RCI despite evidence of strong competitive advantage in production for domestic consumption and even for exports in neighboring countries. Moreover, the abundance of rice production lands (valleys and flat plains); a tropical climate capable of supporting two

[1] The statistics used in this section have been calculated from data obtained from the FAOSTAT.

crops per year;, and an appreciable level of know-how in rice production, are important factors that could help improve that competitive edge. Various subsequent attempts at privatization of the rice sector during the structural adjustment period failed and resulted in the abandonment of major irrigation schemes and furthering gaps in production and deficits.

The 2008 price hikes resulted in severe food shortages and provided impetus to expanded rice production in RCI in order to increase rice self-sufficiency rather than relying on international trade. This renewed momentum led to the development of a Revised National Strategy for the Development of Rice Production for the period 2012-2020 (NSDR) and the establishment of the Office of the National Rice Development Project (ODNR). The aim of the NSDR is to promote profitable production of quality rice by local farmers, leading to low and stable prices to consumers while generating job creation through added value in seed production, transportation and marketing, and machinery repairs. One of the main strategies to achieve this goal lies in the creation of Rice Production Pools (or Centres) around major agricultural dams and irrigation sites, which will operate commercial nucleus demonstration farms and act as learning centers for outgrowers.

The "Future Farm": a novel PPP in the Yamoussoukro District

Several irrigation projects have been developed over the years to provide water all year round for farmers in the Lakes Region, including the district of Yamoussoukro, which is located at about 245 km northeast of Abidjan. This region accounts for about 7% of total national rice production.

In 2013, the district of Yamoussoukro and NOVEL, a major rice importing firm, in collaboration with the Synegenta Foundation for Sustainable Agriculture (SFSA), and AGCO, a leading manufacturer and distributor of agro-industrial equipment, created a dedicated joint venture, YAANOVEL SA. The aim of this PPP is to develop and test an agricultural hub and services model called "YAANOVEL Future Farm" in the district of Yamoussoukro, which will link small farmers to NOVEL's rice value chain and increase product quality, yields and the incomes. The project is expected to reach 5 000 smallholder farmers, with an average farm size of 1 ha. An additional 10 000 ha will be developed as an industrial plantation. The project is expected to produce 100 000 tonnes of rice intended primarily for the local market. It will be developed in phases over a period of 5 years, including: (i) the creation of a model farm for the promotion of appropriate mechanization, and incorporating modern seed center; (ii) the rehabilitation of existing rice schemes; (iii) the development of additional arable irrigated land; (iv) the creation of a complete rice processing unit; (v) the creation of storage capacity.

Developing comprehensive needs-based technical packages for rice seeds and paddy producers

SFSA's efforts will mainly contribute toward the first phase with the aim of helping farmers develop the right skills, access the right inputs to increase productivity, and improve the quality of rice being produced. More specifically SFSA committed to:

- leading the development of a functional commercial rice seed system;
- providing on-farm support activities; and

- contributing its mobile platform *Farmforce* to link smallholder farmers more effectively to the value chain.

Except for some delays regarding the implementation of *Farmforce*, most of the activities scheduled for 2013 have been realized, including:

- conducting a needs assessment for farmers;
- strengthening the capacity of farmers by providing various training modules on production, harvest and post-harvest methods;
- developing comprehensive needs-based technical packages for production of certified seeds and paddy; and
- establishing demonstration plots to test and validate the seed and paddy production strategies.

In order to develop comprehensive needs-based technical packages, a pilot project for the commercial production of certified seed and paddy, using AfricaRice's variety WITA 9, was conducted in several irrigated schemes in Yamoussoukro (see Figure 1).

Figure 1. Pilot project in the Subiakro irrigated scheme, Yamoussoukro

Certified seed production perimeter

Paddy production perimeter

The first phase of the pilot (March - July 2013) focused solely on the certified seed production component and was conducted on 5 ha with 3 seed producers. YAANOVEL, in collaboration with SFSA and ONDR provided all inputs, certification services, seed treatment, and laboratory tests. They pre-financed all production operations, with expected reimbursement at the end of the production cycle, and provided all technical support and extension services with a 95% subsidy. They committed to purchase the entire production at a fixed price of 300 FCFA/kg (i.e., 20% above market price) and sold the certified seeds for 600 FCFA/kg (i.e., current market price). The technical package was established in collaboration with all producers.

***Goal*:** The aim of this phase was to test several parameters, including: (i) overall performance of production, (ii) farmers' know-how and experience in rice farming, (iii) farmers' reimbursement capacity, (iv) effectiveness of semi-mechanized[2] production currently adopted by farmers, and (v) farmers' responsiveness to innovations.

[2] Land preparation and threshing activities are typically mechanized and carried out by a service provider.

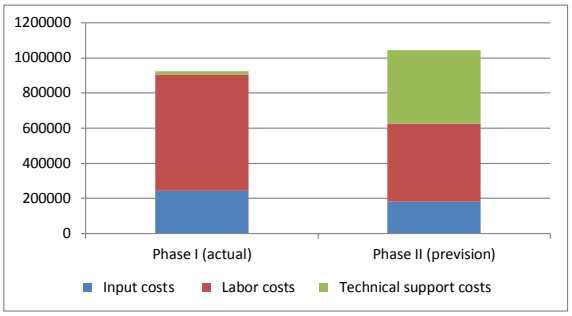
Results: Overall results were satisfactory, with an average yield of 6.5 MT/ha and more than 50% gross margins for producers (Table 1). There was a 100% reimbursement rate. Farmers adopted the recommended technical package, and they demonstrated a very good knowledge and experience in rice farming. However, the semi-mechanized production practices currently adopted by farmers, especially for land preparation and post-harvesting, exhibited important limitations, mainly due outdated and low capacity of tillers and harvester currently available and resulted in important delays and losses (about 10%). YAANOVEL also obtained positive returns, with 25% gross margins, excluding cost of capital.

The second phase of the pilot (Oct. 2013 - Jan 2014), included both seed and paddy production components, involving 2 seed producers (3 ha) and 77 paddy producers (83.5 ha). YAANOVEL pre-financed all production operations and committed to purchase the entire production at a fixed price of 300 FCFA/kg for seeds and 175 FCFA/kg of paddy (i.e., 20% above market price). They sold the value-added certified seeds for 600 FCFA/kg and milled white rice for 400 FCFA/kg (i.e., current market price).

Goal: The aim of this phase was mainly to assess the overall performance of the prevailing semi-mechanized paddy production system and test seed producers' responsiveness to innovations, especially regarding: (i) the technical package, which was adapted from ONDR's official recommendations and entailed a 30% reduction in input and labor costs, and (ii) removal of the subsidy on technical support and extension services, which resulted in 95% increase in supervision costs (see Figure 2).

Results: The trials are still on-going, and the effects of these changes on the overall performance are yet to be assessed; however, they are expected to result in a 20% decrease in gross margins for seed producers (see Table 1). Gross margins are estimated at 20% for paddy producers and 30% for YAANOVEL, excluding cost of capital.

Figure2. Distribution of production costs for seed production (FCFA/ha)



Source: by author using data obtained from project

Table1. Crop budget for seed production

	Phase I (actual)	Phase II (forecast)
Total revenue (FCFA/Ha)	1,966,050	1,800,000
Yield (kg/ha)	6,554	6,000
Paddy price (FCFA/kg)	300	300
Total costs (FCFA/Ha)	905,450	1,045,450
Input costs	226,483	182,450
Labor costs and machinery contract rates	658,467	443,000
Technical support costs	20,500	420,000
Gross revenue (FCFA/Ha)	1,060,600	754,550
Gross margin (%)	54%	42%

Source: by author using data obtained from project

The third phase of the pilot (expected March - July 2014) will include both seed and paddy production components and will reach up to 1000 producers, with of the aim of furthering assessing farmers' responsiveness to innovations, especially regarding full mechanization of land preparation, harvesting and post-harvesting activities.

Next steps and recommendations

While the above analysis notes that positive results have been achieved thus far, the calculation of gross margins only includes the variable costs associated with the particular enterprise. Thus, the overall profitability and sustainability of the enterprise will strongly depend on the costs associated with financing activities, including depreciation, overhead or fixed business costs, and interest payments. Nonetheless, several constraints remain, especially with respect to poorly functioning farmers' organizations, poor maintenance of irrigation infrastructure, shortage in labor[3] during land preparation and harvesting activities, shortage in quality machinery, poor harvesting techniques and lack of storage facility. Thus, in order to scale this project pilot, there is a need to:

Revitalize farmers' organizations and strengthen their capacity. The main services of these organizations to their members included: (i) providing quality inputs at a discounted cost, (ii) pre-financing input supplies, and (iii) cleaning irrigation and drainage canals. Until now, YAANOVEL has been directly distributing quality inputs given the small number of participating farmers in the pilot project. As more farmers joint the initiative, there will be a need to find a structure to ensure the distribution of these inputs. This will also allow improving the maintenance of the irrigation and drainage canals, which will result in increasing both the quantity and quality of production.

Improving mechanization will allow reducing input costs[4] and decreasing shattering losses and post-harvest loses from 10% to 1%. Increased mechanization will reduce the number of jobs in farm labor. However, the introduction of adapted mechanization can address labor bottlenecks, improve productivity and create jobs in machinery operation and repairs, which is more attractive to the unemployed youth. AGCO's leadership and commitment to offer solutions tailored to the needs of the project will be essential to the success of this component.

Improving post-harvest management and building appropriate storage facilities. Currently, there are no storage facilities. Priority should be given to building storage facility in order to improve milling efficiency and increase the quality of local rice.

Improving risk mitigation in order to ensure reimbursement of input financing and protect farmers' revenue loss in case of crop failure related to natural disasters (e.g., drought, floods). SFSA could contribute its knowledge on crop insurance.

Improve farmers' integration in the value chain. SFSA could contribute its advanced mobile platform *Farmforce* to this task. Adapting this application to local needs will provide increased traceability, compliance of standards, facilitation of agricultural extension, and input-output management.

[3] While land preparation and threshing activities are currently mechanized, transplanting and harvesting are still done manually and are very labor-intensive activities. Although there are many school dropouts and landless foreigners in the region, there is still a shortage of agricultural labor during transplanting and harvesting periods due mainly to (i) YAANOVEL's pledge to fighting child labor, (ii) low daily agricultural wage (1800 FCFA/day), and (iii) the drudgery of the activities that make this work unattractive for the youth.

[4] Poor land preparation often leads to unleveled fields, which result in higher water requirement, poor fertilizer-use efficiency, and higher weed pressure.

Rehabilitating irrigation sites and building road infrastructures. The government has committed to conduct these works; however, uncertainty regarding their completion remains. Thus, a clear timeline should be developed.