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WAAPP Follow-on program

Rice Value Chain: Lessons from Asia for West Africa

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Agriculture Practice
Trade & Competitiveness Practice

West Africa

Acknowledgements

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Contents

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List of charts and figures

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List of Tables

Chapter 1: Executive Summary

Background

Rising dependence on imported rice in West Africa is a concern for ECOWAS nations. Even with healthy production growth, the gap between the quality and quantity of production and demand continues to widen. Recognizing that addressing the issue of import dependency will require taking action beyond the farm as part of a cross-value chain approach, a study was undertaken to identify and diagnose challenges that span the value chain. The study centered around an assessment of the evolution of the rice value chain in select Asian nations – some of which turned around from a situation of import dependency to export dominance – to extract relevant guiding principles for selected[1] West African nations to adapt for the achievement of a similar trajectory. The primary purpose of this study is to identify interventions to be incorporated in the design for the proposed WAAPP follow-on project – the West Africa Agriculture Transformation Project (WAATP). The report also lays out more general and overarching guiding principles for the West African region as a whole to derive lessons from the successful development of rice value chains in select Asian countries[2].

Context

Rice is a major staple food across the world. However, production is highly concentrated in Asia and several countries across the globe are net importers. Most West African countries are increasingly vulnerable to global rice supply conditions as their consumption is rising, and export is dominated by few players even as the rice import bill is skyrocketing – with the import bill for rice in some countries going beyond a few percentage points of GDP.

Countries in West Africa have done very well in terms of raising their total rice output. However, it is evident that the growth achieved, even while being higher than world average growth over the last 50 years, has been slower than what would be required to keep their populations fed and their foreign exchange position comfortable. The gap between demand and local supply is not only in terms of quantity but also in terms of the alignment of rice produced locally with consumer preferences around quality[3], flavor/taste and price.

Since factors that give rise to the gap across all dimensions – price, quality, taste/flavour – pervade through the entire value chain as against production alone, only an approach that streamlines the value chain and enables competitive businesses in each segment of the chain can drive self-sufficiency.

[1] Selected nations include Nigeria, Cote d'Ivoire, Ghana, Senegal and Mali

[2] The guiding principles are derived from experiences of Asian countries and are meant to provide overall direction. While this report covers specific recommendations for the WAATP project, it does not attempt to provide specific recommendations for the transformation of each regional nations' rice value chain. The latter would require a more detailed assessment of each (West African) nations' specific context to enable adaptation of guiding principles and detailing these into specific country-level recommendations.

[3] Quality of product itself (eg. level of impurities, share of broken kernels etc.) and quality of the overall offering around the product for the consumer (eg. attractive / convenient packaging and the convenience, reliability and consistency of availability etc.)

To keep the study focused and enable a deep assessment, a framework was used to shortlist the most relevant Asian countries to study for extraction of learnings. Parameters were defined around the scale of rice industry, speed of turnaround, current level of competitiveness and context comparability to narrow down to India, Thailand and Cambodia for the study.

Guiding principles from the Asian experience

A study of three Asian nations that have transformed their rice value chain – India, Thailand and Cambodia – points to the following broad guiding principles

- A public policy approach towards the development of the entire value chain works better than undertaking isolated independent improvements in each segment of the value chain.
- A deliberate and consistent strategy extending over several years and involving the private sector is needed to achieve transformation.
- Sustained public financing and policy support is imperative to capacitate smallholders – albeit in tight lock-step with policies and incentives to draw in private investments in post-harvest chain.
- Scale efficiencies can be achieved organically even while leveraging the experience and strengths of existing value chain stakeholders (small mills, aggregators, distributors)
- Regional linkages matter and, if leveraged well, can be synergistic.

Directional recommendations West Africa

Unlike most other emerging markets with smallholder dominant agriculture, West African nations face market failures at both ends of the chain. A large part of the domestic rice demand is captured by importers while domestic supply remains largely limited to subsistence or local informal markets. Thus, even while catering to global demand for key cash crops, the region's nations are unable to access their captive demand for rice commercially. Though some national governments in the region have demonstrated a commitment towards resolving the challenge, a coherent and conscious strategy to resolve the problem has not been developed. To the extent strategic action has been taken, it has been supply driven and limited to isolated on-farm improvements not linked to or "pulled" by demand. It is ironic therefore that when some local players have taken initiative to develop the local rice supply chain, one of their biggest challenges has been in sourcing paddy supply.

To the extent available, local paddy supply is misaligned with the price, quality, taste/flavour requirements populations (especially urban) have come to expect. With no overt support for local industry or investors in the local rice chain to match the challenge of imports it is not surprising that very few private investors have come forth to invest in the local rice chain. Thus, demand remains invisible and unavailable to farmers, providing them little incentive to increase either the quantity or quality of production, even when capacity may be provided by donor / government programs sporadically.

With consumer taste preferences now strongly aligned to characteristics of Asian varieties and quality of rice, it is imperative for the local value chain to align with these. At the same time,

local value chains have to be able to deliver such rice at an affordable / comparable in price with that of imported rice.

In a situation where market forces are not working to deliver local and regional demand to the region's growers, and challenges around land tenure security limit the potential for large scale commercial farming, the need for public intervention spanning across the value chain is clear. However, the intervention required is as much – or more – in the nature of facilitation of private sector stakeholders than in the nature of direct involvement or investment in segments of the value chain.

In most emerging markets with smallholder dominated agriculture, governments inevitably support the farming community with financial and technical capacity while the private sector plays a greater role in the post-harvest chain. In the West African region however, both public and private sector action has been limited. Not enough is spent on upgrading the capacity of farmers at one end[4] and, even to the extent such expenditure is undertaken, it does not follow a deliberate, defined or consistent strategy.

Private investors shy away from investing in the rice value chain in the region because they are not assured of sustained volumes of paddy or rice of the quality that they require to meet the requirements of their customers, especially when the same is easily available from imports.

Public sector action must therefore be directed towards creation of incentives and developing the confidence of private sector players operating in the import value chain towards investing in the domestic rice value chain. With their impeccable understanding of the finest segments of consumer demand and their specific preferences, close control on the distribution chain for rice to discerning consumers and capacity to invest by virtue of their financial strength, rice importers are some of the best placed stakeholders to be encouraged for investing in the domestic rice chain. However, in the absence of importers' ability to manage cultivation and, more importantly, for the government to ensure the welfare and livelihoods of smallholder farmers, the government must tightly align and link smallholder support with these investments.

Aligning this overarching philosophy and with the guiding principles extracted from a study Asian rice majors gives rise to the following directional recommendations for West African nations as a whole to reduce import dependency.

- Develop a rice sector strategy and implementation plan for the region that switches focus from development of productive capacity to achievement of competitiveness at the value chain level[5].
- Establish a regional rice platform to (a) organize regular regional public-private (including importers) consultations (b) identify synergies for collaboration and facilitate consensus on the same (including those identified below and tariff actions) (c) carry out research to inform

[4] Share of spend on agriculture is under 10% for the region compared to between 1-10% on rice imports; as against this the world's current largest exporter – India – spends close to 6% on subsidizing domestic agriculture alone.
[5] To align with and enhance envisaged activities under the ECOWAS "Regional Rice Offensive"; http://www.inter-reseaux.org/IMG/pdf/Offensive_Riz_EN.pdf

decision making for region-level policy making (d) provide implementation support for regional (ECOWAS) policy decisions.

- Draw out agreements between the government, interested private sector investors and farmer groups growing rice and interested in commercialization outlining specifically the investments to be carried out by the government – potentially through WAATP – to capacitate farmers / farmer groups to meet the quality and quantity requirements of investors in milling and distribution of local rice.
- Create and develop the capacity of farmer groups for large scale commercial mechanized farming of rice and support these groups with infrastructure for near-farm processing / preparation, inputs, training for cultivation, harvesting, business and finance skills for transactions and finance for both for inputs and working capital to hold on to stocks leveraging mechanisms like Warehouse receipt financing amongst others
- Incentivize existing and new small scale millers to invest or upgrade in improved milling capacity.
- Develop public sector (research and extension) capacity to boost rice seed value chain
- Provide catalytic credit enhancement
- Build trading infrastructure and storage in the medium term
- Undertake study tours defined around specific topics considered useful by domestic rice stakeholders.

Specific recommendations for WAATP

In line with one of the core findings of this study, it will be imperative for WAATP to undertake activities along the entire value chain. Specific recommendations for the project that cut across value chain segments are outlined below and summarized in Figure 1:

Research: Focus on adaptation of a limited number of selected varieties - that align with consumer tastes - for each area / ecology as against a scattergun approach to varietal development. In addition, provide for enhancement of the capacity to deliver quality foundation seeds.

Extension: Expand network to deliver location specific technologies and insights while driving adoption through on-farm demonstrations and ensuring uniform adoption of select varieties to prevent mixing

Inputs: Leverage regional synergies for sourcing and innovation platforms for driving rapid adoption/dissemination and realizing scale economies. Ease finance to encourage village entrepreneurs for agro-dealerships. Consider time-bound direct subsidy for key inputs for smallholders.

Production: Bridge the yield gap by deploying short maturity varieties in rainfed areas and prioritizing cutting-edge practices like System of Rice Intensification (SRI) in existing irrigated areas as against an all-out investment in irrigation. Leverage innovation platforms for scale and collectivization benefits - paddy aggregation, credit access, reduced waste and transaction costs

Post-harvest management: Invest in "Farmer Service Centers" for shared infrastructure (drying, cleaning etc) and equipment (harvesters, tractors etc) and / or partner with / incentivize private players for investments in the same. Expand access to finance through leasing, Warehouse Receipt Finance, guarantees to provide credit enhancement for private investors in post-harvest infrastructure etc.

Milling: Incentivize investment by importers and other investors in large scale and efficient milling by building confidence in paddy supply through above actions and promoting linkages between small and medium sized millers and large processors. Adopt / transfer technologies for parboiling, sorting, grading etc. from Asian countries.

Distribution and Marketing: Encourage importers to extend their distribution network for local rice. Potentially, in conjunction with above actions, impose mandates for local sourcing on importers and government institutions. Develop a framework of standards for milled rice and enforce compliance while providing training on the same.

Overall: Develop a rice sector strategy and implementation plan for the region that switches focus from development of productive capacity to achievement of competitiveness at the value chain level and create a regional institution / setup to mobilize sustained analytical and execution capacity for the same. This setup would also continuously identify and plan for implementation of synergies between regional nations and organize a regular public private consultation at the regional level. Facilitate agreements between innovation platforms / cooperatives and millers (including but not limited to outgrower arrangements) for sustained supply of paddy to the latter in exchange for offtake guarantees from them.

Figure 1: Schematic with recommendations for WAATP

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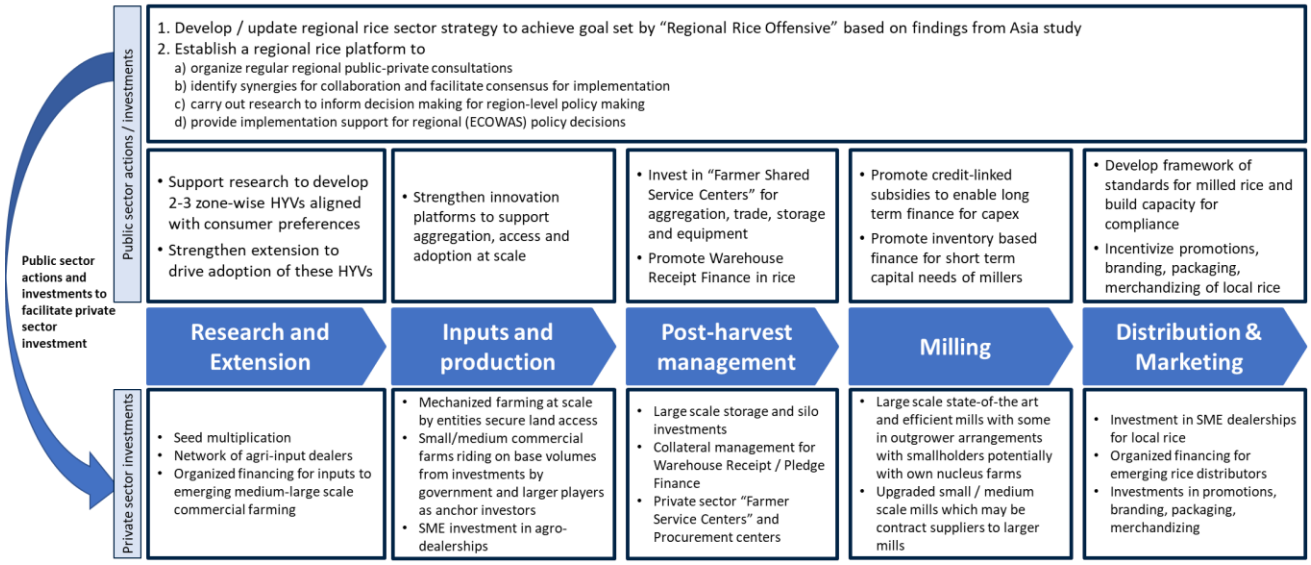
Illustrative schematic with snapshot of recommendations for WAATP



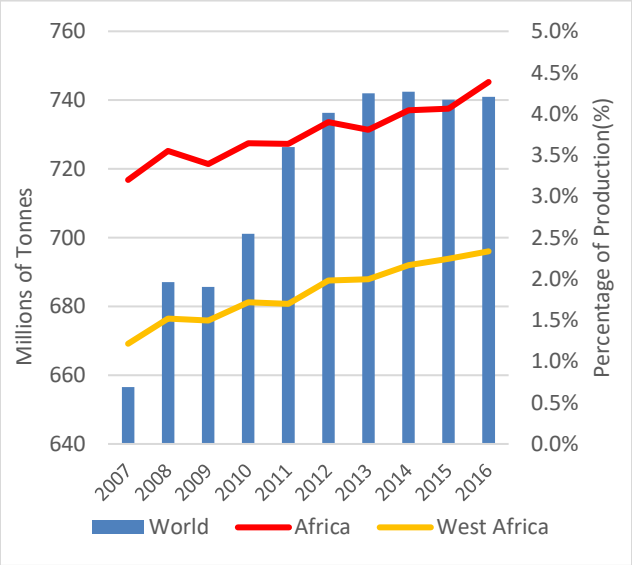
Chapter 2: Background and Introduction

Background

Rice – a major global staple food

Rice is a major staple food across the world. However, production is highly concentrated and several countries are net consumers. According to the FAO, rice is the world's most popular food. Being the staple food for over half the World's population,[6] it provides 27% of dietary energy supply and 20% of dietary protein intake in the developing world. Rice is cultivated in over 113 countries and global paddy production has been on the rise, from 656.6 million metric tonnes in 2007 to 741 million tonnes in 2016 (Figure 2). While consumption is widespread, production is relatively concentrated – 90% of global paddy production is undertaken in Asia, and four countries – China, India, Vietnam, and Thailand produce the bulk of this output. Africa accounts for less than 5%, even though paddy production has been on the rise in recent times – from 3.2% in 2007 to 4.4% by 2016. West Africa accounts for only 2.3% of global production. Many regions are net consumers of rice (Figure 7), but sub-Sahara Africa has the largest deficit – the region requires at least 13.9 million tonnes of milled rice to close its rice deficit according to latest data.

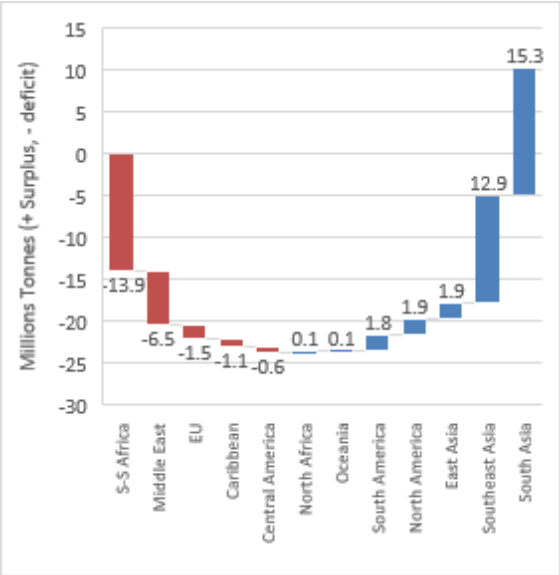
Figure 2: Global Rice Paddy Production (2007 – 2016)



Source: FAOSTAT

Figure 4: Net consumption of milled rice – select regions 2016/17

[6] http://www.fao.org/Newsroom/en/focus/2004/36887/index.html



Source: USDA

In the context of food security, most West African countries are increasingly vulnerable to global rice supply conditions as their net consumption is rising, and export is dominated by few players. Table 1 shows that nearly all West African countries consume far more rice than they produce, and moreover this rice "deficit" is rising fast in many countries. Meanwhile rice exports are dominated by a few players but there are several importers. Only three exporters – India, Thailand, and Vietnam – account for 63% of the volume of global milled rice exports, while exports are only about 10% of global milled rice production for 2017 (Figure 3). Whereas, rice importation is far less concentrated, with the top three importers of rice – China, Nigeria, and the EU – accounting for just 25% of global imports. Across the developing world, governments prefer to retain significant control over the production, marketing and trade of rice (e.g. Thailand and India - the two largest exporters – have both had a history of controlling and influencing production and trade). This is because rice is a food security crop and its domestic availability for consumption is critical for even the largest exporters. This makes the value chain subject to factors that are not limited to commercial rationale – rice availability has directly or indirectly influenced politics and stability in several countries. A rising dependency on rice imports by African countries, and the limited supply options puts them in a precarious position. Yet, agro-climatic conditions for rice cultivation in the region are very suitable. Attaining self-sufficiency in rice production is an imperative for food security in many African states.

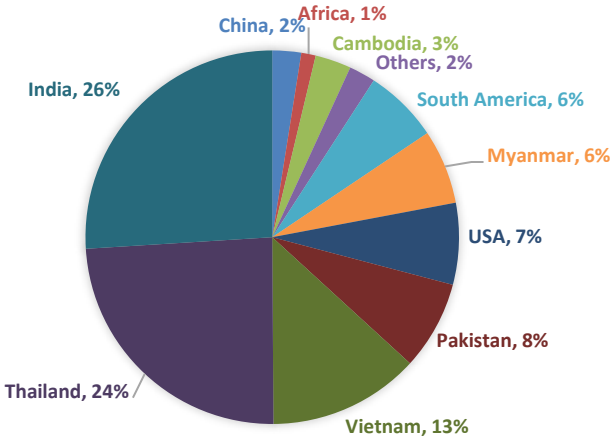
Table 1: Milled Rice Production and Consumption in West Africa (in '000 Tonnes)

Country		2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Cote d'Ivoire	Production	784	567	1015	1257	1335	1399	1335
	Domestic Consumption	1450	1600	1900	2200	2400	2600	2800
	Net Surplus/Deficit	*-666*	*-1033*	*-885*	*-943*	*-1065*	*-1201*	*-1465*
Gambia, The	Production	66	33	35	46	31	34	38
	Domestic Consumption	171	180	188	190	185	190	216
	Net Surplus/Deficit	*-105*	*-147*	*-153*	*-144*	*-154*	*-156*	*-178*
Ghana	Production	295	278	289	342	362	385	413

	Domestic Consumption	790	875	950	965	965	980	1050
	Net Surplus/Deficit	*-495*	*-597*	*-661*	*-623*	*-603*	*-595*	*-637*
Guinea	Production	990	1102	1267	1355	1301	1351	1435
	Domestic Consumption	1255	1377	1512	1700	1750	1900	2000
	Net Surplus/Deficit	*-265*	*-275*	*-245*	*-345*	*-449*	*-549*	*-565*
Guinea-Bissau	Production	125	105	119	126	80	102	112
	Domestic Consumption	235	235	245	240	225	230	250
	Net Surplus/Deficit	*-110*	*-130*	*-126*	*-114*	*-145*	*-128*	*-138*
Liberia	*Production*	*187*	*184*	*183*	*170*	*149*	*180*	*195*
	Domestic Consumption	*402*	*384*	*455*	*460*	*440*	*430*	*480*
	Net Surplus/Deficit	*-215*	*-200*	*-272*	*-290*	*-291*	*-250*	*-285*
Mali	Production	842	1130	1250	1438	1409	1515	1808
	Domestic Consumption	1000	1200	1350	1500	1650	1750	1950
	Net Surplus/Deficit	*-158*	*-70*	*-100*	*-62*	*-241*	*-235*	*-142*
Nigeria	Production	2818	2906	3423	3038	3782	3941	3780
	Domestic Consumption	4800	5600	5700	5800	6100	6400	6550
	Net Surplus/Deficit	*-1982*	*-2694*	*-2277*	*-2762*	*-2318*	*-2459*	*-2770*
Senegal	Production	411	276	320	296	380	616	612
	Domestic Consumption	1131	1300	1309	1391	1505	1650	1700
	Net Surplus/Deficit	*-720*	*-1024*	*-989*	*-1095*	*-1125*	*-1034*	*-1088*
Sierra Leone	Production	648	711	719	791	459	549	731
	Domestic Consumption	768	981	1039	1121	819	839	1101
	Net Surplus/Deficit	*-120*	*-270*	*-320*	*-330*	*-360*	*-290*	*-370*
Togo	Production	72	73	105	104	95	92	89
	Domestic Consumption	172	168	215	204	185	242	344
	Net Surplus/Deficit	*-100*	*-95*	*-110*	*-100*	*-90*	*-150*	*-255*

Source: USDA Net surplus/deficit is the difference between rice production and consumption. Minus (-) indicates rice deficit, whereas positive (+) indicates rice surplus

Figure 3: Concentrated market of rice exporters (Percentage of global exports by origin) in 2017



Source: Data from FAO Rice Market Monitor, April 2018

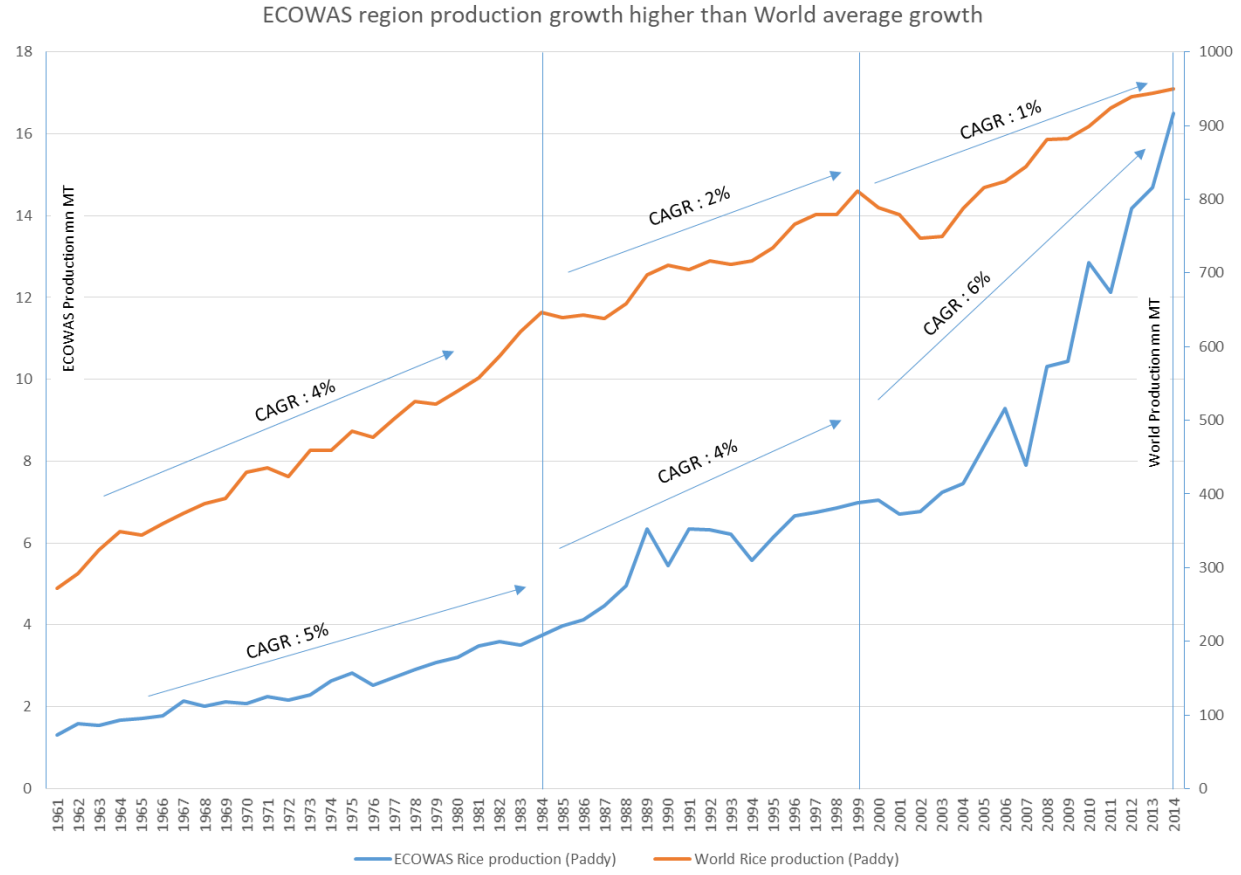
Rice production also has valuable by-products that can contribute to business and economic development. While rice is important for consumption, its by-product – the rice husk has various

important uses, especially if produced in large quantities. Some of these include: (i) for soil aeration and fertilization especially in horticulture, since the husk is rich in potassium and silicon. This is widely used in Japan; (ii) rice husk ash (RHA) is very rich in amorphous silica, which is excellent for reinforcing rubber tyres, and can be used for strengthening building materials, especially cement.[7] In the USA, Goodyear – one of the largest tyre manufacturers – uses rice husk silica in tyre production[8]; (iii) source of renewable fuel – the husk is increasingly used as a biomass that fuels power plants completely, especially in Asia, and for generating steam for parboiling in rice mills. In Myanmar, rice husk biomass supports rural electrification projects[9]; (iv) a top-class insulation material – because the husk is difficult to burn or absorb moisture.

Dependence on imports of rice – a key staple in West Africa – continues to rise

Countries in West Africa have done fairly well in terms of raising their total rice output. (See Figure 4)

Figure 4: ECOWAS region production growth vs World average growth



[7] RHA is used in the production of Portland cement. When burnt completely, the ash can have a Blaine number of as much as 3,600 compared to the Blaine number of cement (between 2,800 and 3,000), meaning it is finer than cement. The fineness of the ash also makes it a very good candidate for sealing fine cracks in civil structures, where it can penetrate deeper than the conventional cement sand mixture.

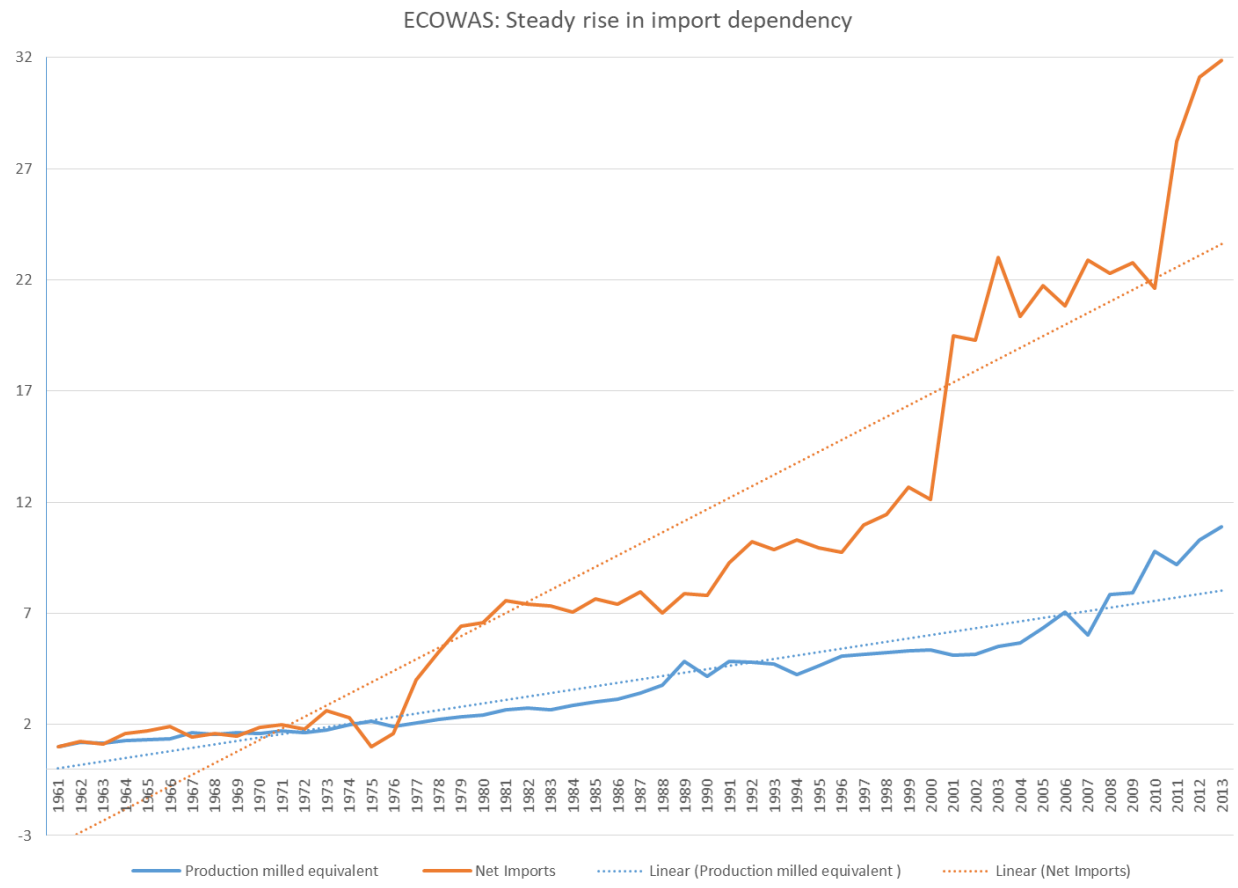
[8] https://www.environmentalleader.com/2014/09/goodyear-converts-rice-husk-waste-to-fuel-efficient-tire-treads/

[9] See in http://www.myanmarinsider.com/rice-husk-a-useful-by-product-for-rice-growing-countries/.

Source: FAOSTAT; UNCOMTRADE

However, it is evident that the growth achieved, even while being higher than world average growth over the last 50 years, has been far too slow than required to keep their populations fed, leading to a widening gap between consumption and production. (See Figure 5)

Figure 5: ECOWAS import dependency (Indexed, volumes)

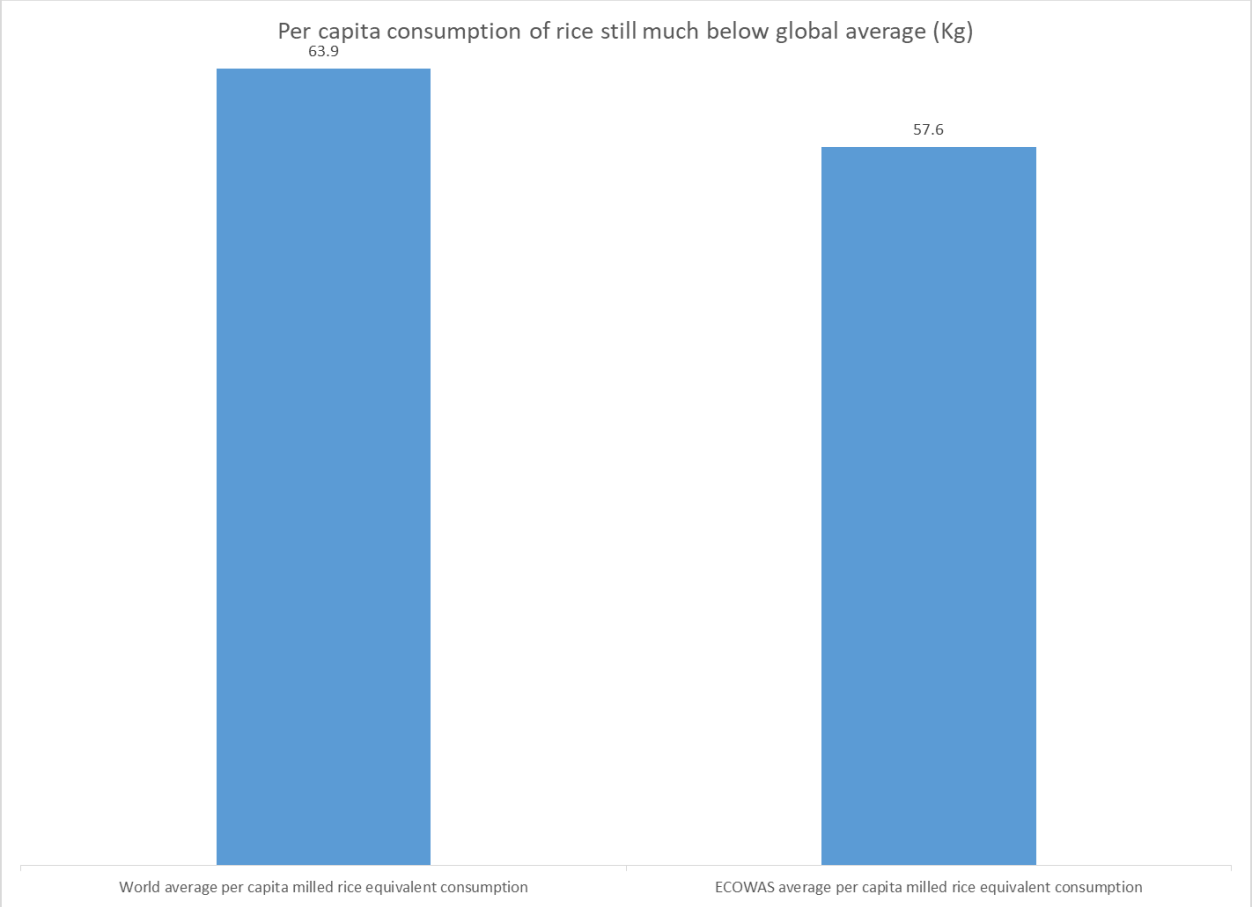


Source: FAOSTAT; UNCOMTRADE

Consumption growth appears to be primarily driven by rise in per capita consumption[10] which, being still low (at a regional level) compared to the global average (See Figure 6), is likely to continue to rise as an increasing share of the population emerges from poverty.

Figure 6: Per capita rice consumption: ECOWAS vs Global Average

[10] Per capita consumption is derived from dividing total consumption by the total population. Increase in "per capita consumption" therefore includes not only increased consumption at an individual level but also the increase in overall consumption across individuals on account of a greater number of people starting to consume rice.



Note: Per capita consumption varies significantly between countries within the region, from 36kg/year/person in Ghana to 110kg/year/person in Senegal
Source: USDA, FAOSTAT (2017/18)

As can be seen from Table 2, even while growth in production is greater than the growth in population in most ECOWAS countries (except Niger, Liberia and Gambia), net imports are rising even faster than production growth in almost all these countries (except Mali) indicating that per capita consumption is rising rapidly and that import dependence will continue to rise in the region unless production growth is boosted significantly.

Table 2: Comparison of growth rates of population, rice production and net imports in West Africa

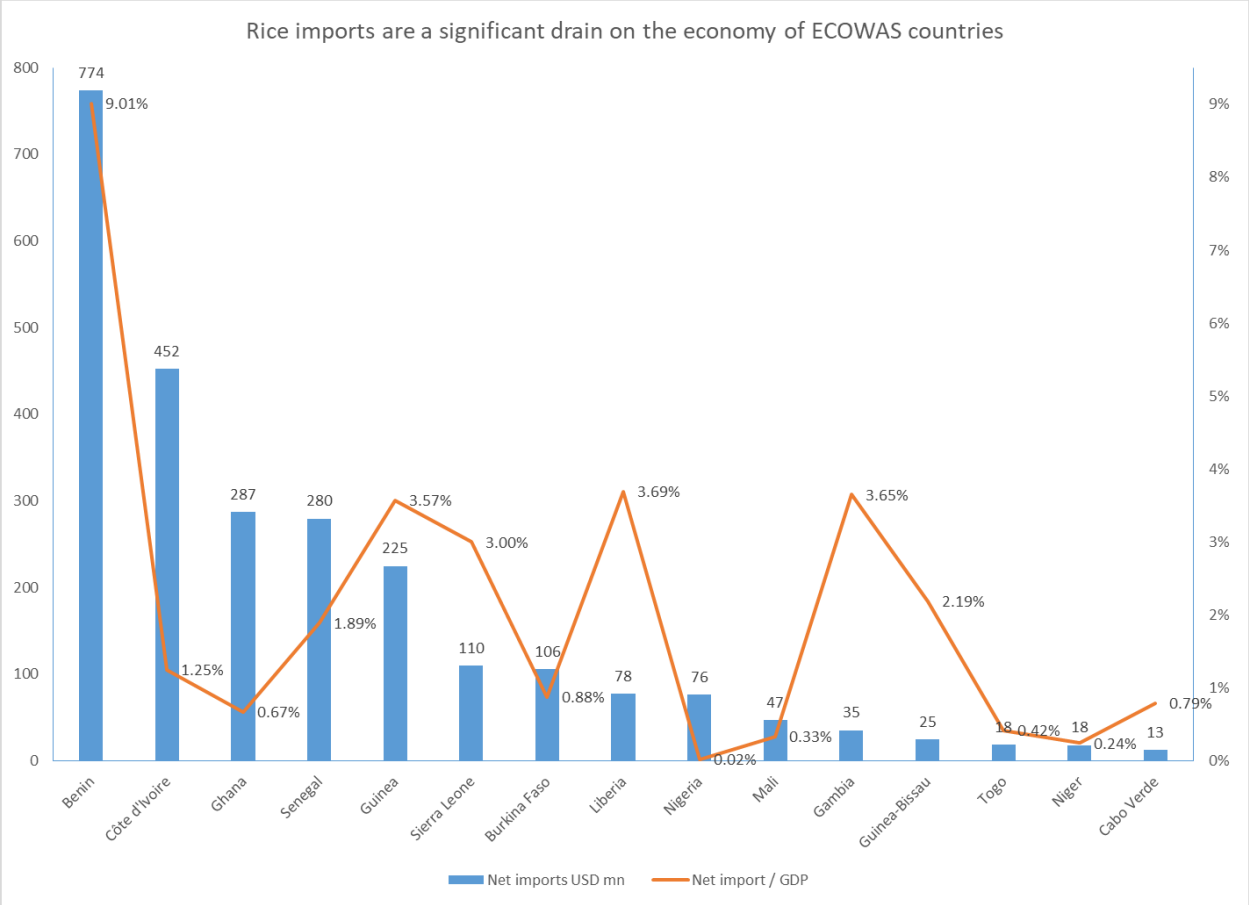
	Population CAGR	Production CAGR	Net imports CAGR
Nigeria	2.6%	7.1%	15.9%
Niger	**3.3%**	**0.8%**	12.0%
Benin	2.7%	9.9%	11.4%
Burkina Faso	2.4%	4.6%	9.6%
Sierra Leone	2.1%	3.0%	8.5%
Togo	2.9%	3.1%	7.7%
ECOWAS	2.6%	4.7%	6.9%
CÃ´te d'Ivoire	3.5%	5.0%	6.2%
Ghana	2.6%	5.8%	5.9%
Guniea-Bissau	1.9%	2.8%	5.8%

	Population CAGR	Production CAGR	Net imports CAGR
Cabo Verde	1.8%	NA	5.7%
Guinea	2.2%	4.5%	5.7%
Liberia	**2.6%**	**1.6%**	4.8%
Senegal	2.8%	3.3%	4.4%
Gambia	**3.1%**	**1.6%**	4.0%
Mali	2.2%	**4.9%**	**3.8%**

Note: CAGR between 1961 and 2013; except for Senegal where it is between 1969-2013
Source: FAOSTAT; UNCOMTRADE

For an already food insecure region, rising import dependence of a staple crop can be disastrous, exposing countries in the region to both supply and price risk, besides draining precious foreign exchange (See Figure 7). One of the top exporters of rice to ECOWAS countries – China – and the current top exporter – India – both have a history of controlling exports rather unexpectedly driven from the needs of their domestic markets. It might only take only a few poor rice growing seasons in India to give rise to concerns around export of rice which could lead to curbs on the same. While the basket of rice exporters is wide and therefore options are always likely to be available, the disruption this causes in addition to the volatility of global rice prices are important risk factors ECOWAS countries would rather avoid. Clearly, a transformational, not merely an incremental change in status quo is needed.

Figure 7: Rice imports as % of GDP



Source: FAOSTAT; UNCOMTRADE

Note: As discussed later in the report, the strikingly high imports in Benin comprise a high share of imports that are informally re-routed to neighboring countries, especially Nigeria. Irrespective, the amount spent on imports at an overall level compared to the region's economy, is sizeable.

While these numbers highlight the gap in the quantum of consumption unmet by domestic production, there exists an equally concerning gap in the quality[11] **of rice** delivered to domestic, particularly urban, consumers vis-à-vis the quality of imported rice available[12]. The extent of gap between imported rice and that which is available locally varies significantly on the dimensions of quality, flavor/taste and price between consumer segments within each country of the region. For premium consumers (those with high disposable incomes and relatively high levels of discretionary spending, quality of local rice often fails to match that of imported rice even while local rice may be cheaper and could even align better with flavor/taste preference. For urban poor consumers on the other hand, local rice may not be available at a price competitive to imported rice even if the latter may be of a relatively low quality and less

[11] Quality of product itself (eg. level of impurities, share of broken kernels etc.) and quality of the overall offering around the product for the consumer (eg. attractive / convenient packaging and the convenience, reliability and consistency of availability etc.)

[12] For example in Ghana, "most of the rice is cultivated from low-quality seed with mixed varieties, which brings about uneven maturity at harvest and wide variations in the size and shape of rice grains. Generally, this results in a gap between the quality of local and imported rice. Also, milling techniques applied to locally produced rice vary considerably. Most of the processing is done manually especially by small rice producers, which in turn results in end products of different quality" Source: FAO, "Analysis of incentives and disincentives for rice in Ghana", 2013

preferred in terms of taste since many urban centers are either on the coast and / or are better connected with ports from where delivered cost of imported rice of comparable / better quality may beat that of local rice from rural areas. For rural consumers, the sheer lack of availability of local rice a few months after harvest when their own subsistence production (and stocks of commercially available local rice) is exhausted drives up the purchase of imported rice even when it may not be preferred in terms of flavor/taste. Taste/flavor preferences drive some consumers to buy imported rice of a specific variety that local varieties may not be able to match even when they may be more expensive. Some examples where this is the case include Thai Hom mali and Indian/Pakistani basmati rice in particular and most fragrant rice varieties in general. Preferences that increase the gap between local rice and imported rice also vary from country to country. For example, Ghanaian imports are dominated by fragrant long grain rice (attributes which are found to a lesser degree in local rice) indicating that some part of the gap can be attributed to taste and quality differences between local and imported tice. At the other end, Senegalese imports are dominated by 100% broken rice (with a very low marginal cost for exporting countries, it being a by-product of milling) indicating that a large part of the gap can be attributed to price competitiveness of imported versus local rice.

This points to the necessity of bringing about changes in the end to end supply chain between farm and consumer such as to align production and processing quality to the preferences of consumers. No amount of increase in production can replace imports unless the production can be aligned with consumers' requirements – a function that is delivered by the supply chain after production at farm.

A disproportionate segmental focus, particularly only on the production segment risks creating a situation that is eventually counterproductive for self-sufficiency. By boosting supply at the farm gate such an approach can increase availability but without an efficient supply chain to clean, grade, mill, package, distribute and even more importantly, without a fair and transparent mechanism of transactions near the farm and / or visible to the farmer, this excess supply only leads to a localized glut depressing prices and discouraging farmers from producing more even as the concentrated demand of rice in urban centres at the other end of the supply chain are starved of local supplies and resort to imports. Several productivity enhancement pilots / projects that have not placed a concomitant focus on the post-harvest chain have earned a bad name for this reason. Such focus at the macro level prioritizing on-farm productivity without a tight and real-time linkage with the other segments often leads to situations where there are acute short-term demand and supply mismatches. In a situation where both demand and supply of rice are unpredictable[13] this can lead to serious disruptions in the food security situation with occasionally disastrous socio-economic implications[14]. Though many of the National Rice

[13] Unpredictability of supply of rice comes about from the fundamental uncertainties of farm-based production – most importantly the vagaries of weather – while unpredictability in the demand (that is available for local supply to fulfil) comes about from the uncertain supply and price of rice available for import from global trade. Uncertainty of supply and price of rice from the global trade comes about due to the sheet concentration of the rice exporters market and the vulnerabilities their own economies to the supply of rice domestically.

[14] The dangers of Africa's reliance on rice imports was made clear when skyrocketing world food prices in 2008 led to riots in capital cities across the continent; West Africa was worst hit with occasionally deadly riots in Burkina Faso, Cameroon, Ivory Coast and Senegal. Memory of 1979 when rice riots arguably contributed to political instability that preceded years of civil war which did not end until 2003; Source: https://www.pri.org/stories/2011-11-28/rice-20-africa-rice-complicated

Development Strategies (NRDS) developed by various African nations – supported by the Coalition for African Rice Development (CARD) - in the wake of the world food price crisis in 2008 were clear in their intent to kick start the process of holistic value chain development, implementation over the last few years has often not followed an end to end approach towards development of the value chain[15].

Unlike several other agriculture crops in the region (eg. cocoa, rubber, oil palm), rice has a large commercial market within the region and therefore does not have to be exposed to the vagaries and uncertainties of global trade and the complexity of dealing with the long lead times and working capital cycles typically required for exports; nor does it have to be subject to the requirements of alien customers outside the region. Besides, the crop has no gestation period for development and instead can have 2-3 harvests in a year creating a lesser strain on the limited credit infrastructure in the region. It is high time therefore that the attention and resources devoted to the development of "cash crops" be concomitantly deployed for developing rice as a commercial crop.

Dependence is concentrated on a few Asian countries

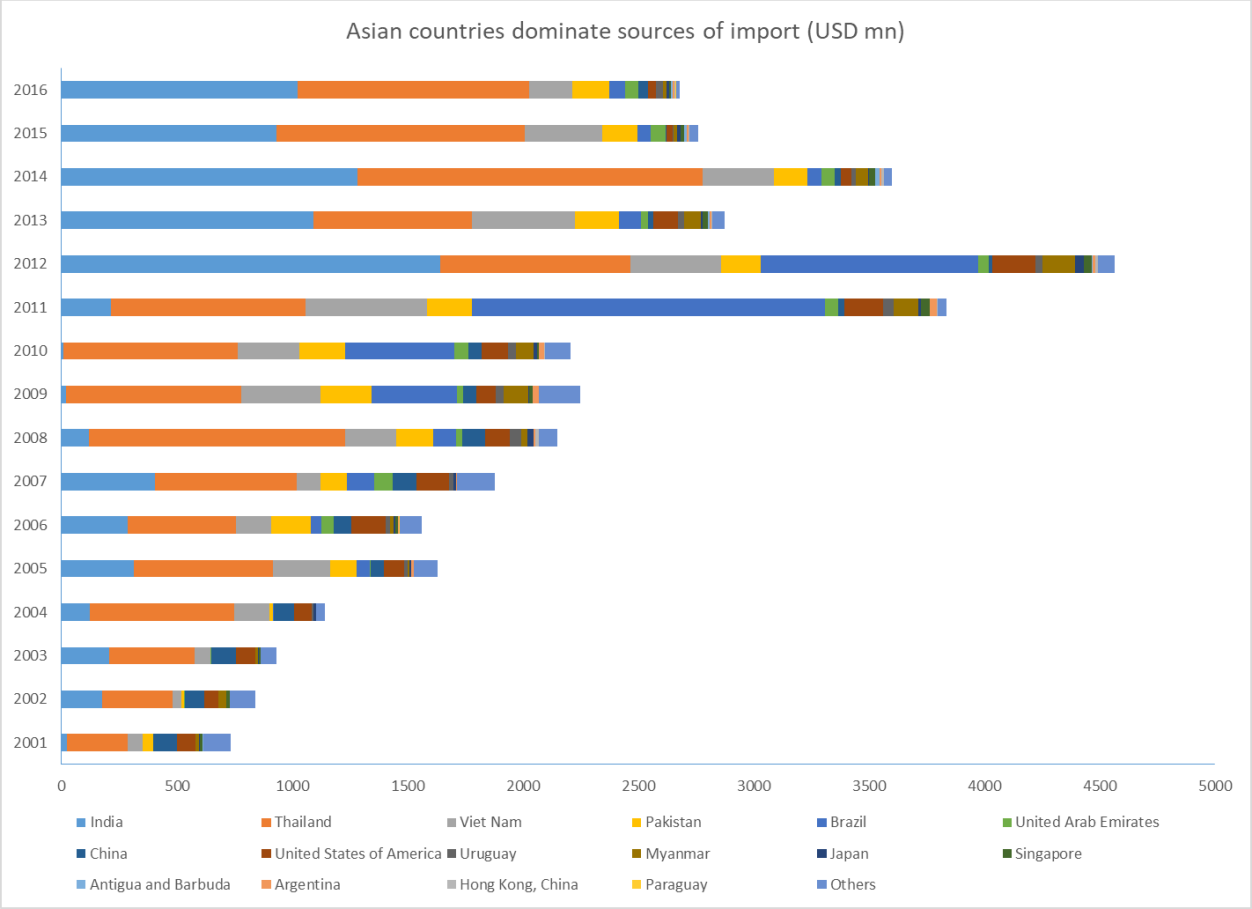
While indigenous varieties of rice are believed to have been grown in West Africa as far back as 3,000 years ago, the influence and prevalence of Asian varieties, which now dominate consumption[16], have a relatively short history in the region[17] (See Figure 8).

Figure 8: Sources of rice import for West African countries

[15] "The NRDS proposed by Cameroon, Côte d'Ivoire and particularly Senegal are highly biased towards supply-shifting investments. The most comprehensive NRDS is proposed by Nigeria"; Source: "Reversing urban bias in African rice markets: A review of 19 National Rice Development Strategies", Demont, 2013

[16] Both in the form of direct imports of rice produced in Asia and through the increasing share of rice grown with seed from or bred with Asian varieties

[17] https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/4146.pdf



Source: FAOSTAT; UNCOMTRADE

The penetration of rice from Asian countries - in particular India, Thailand, Vietnam and Pakistan to name a few – several of which had themselves been import dependent in the 1960s, demonstrates the turnaround these countries have been able to achieve not only in feeding their own populations but also emerging as globally competitive exporters. With prolonged imports from these countries over the years, taste preferences of consumers in the ECOWAS countries, particularly of those living in urban areas where the availability of imported rice is higher, have aligned with the Asian varieties.

Introduction

With a view to address the critical goal of rice self-sufficiency, or more appropriately rice competitiveness, the WAAPP follow up program seeks to develop and implement specific interventions towards the same. Given the dominance and relevance of rice from Asian countries, this report was commissioned to study the evolution and drivers of competitiveness of rice value chains of key Asian exporters to the ECOWAS countries so that lessons and best practices from those countries which emerged from contexts not vastly different from that in the ECOWAS countries can be drawn and customized to guide activities in the WAAPP follow up program. Specifically, this study seeks to draw implementable learnings from selected Asian countries around the elements of their institutional framework, policy environment and overall agricultural value chain systems that contributed to their success.

In order to make the study focused and efficient three Asian countries for deeper assessment were selected on the basis of a framework (outlined in the next chapter). While the study focuses on developing broad guiding principles for adaptation to the entire West African region, the top five economies in ECOWAS viz. Nigeria, Ghana, Cote d'Ivoire, Senegal and Mali, were accorded relatively greater attention in the research with two (Ghana and Cote d'Ivoire) also being visited.

Chapter 3 provides a conceptual framework for the selection and evaluation of Asian rice majors in the context of drawing learnings for select West African countries. Chapter 4, 5 and 6 provide a description of the rice sector in India, Thailand and Cambodia respectively and, using the framework outlined in Chapter 3, derives key takeaways ("guiding principles") that led to the transformation of this sector in these countries. Chapter 7 synthesizes findings across these countries and puts them in the context of West Africa to outline key common themes that underlie the turnaround in these countries with a view to derive specific agenda / action items for the WAAPP follow up programs drawing upon these themes. Finally Chapter 8 closes with conclusions and recommendations. Annexure 1A and 1B provide more detailed information on the historical evolution of the rice sector in India and lay out the key considerations to be accounted for in adapting lessons from India in the region respectively. Annexure 2 lays out the list of people with whom discussions were carried out in Ghana and Cote d'Ivoire.

Chapter 3: Conceptual framework and results of country selection

The basket of exporters of rice to ECOWAS countries is diverse. While there is relative concentration in the total volume of rice exports amongst a few countries, when it comes to drawing learnings from the experiences of successful rice growing and exporting countries, it is also important to consider other variables beyond volumes that influence the relevance and applicability of the policy, institutional and technical best practices that made them successful.

Given the transformative approach required in the target region, an emphasis on speed of transformation in addition to the continuity and consistency of volumes of export to the ECOWAS region would be prudent when arriving at source countries to draw learnings from. Context comparability is key not only in terms of the business environment and challenges associated with emerging markets but also in terms of the impact the source countries have had on their impoverished (smallholder) populations in becoming the major rice exporters.

Finally, while learning from the large exporters makes sense given that their being exporters demonstrates their global competitiveness, it is also important to consider the depth of the domestic market of the source countries. This is because eventually, the primary objective of ECOWAS countries is to become able to service their own domestic market's needs and success achieved by source countries in servicing their domestic markets, particularly their urban centers and linking these to the rural producers (in effect success achieved in developing the in-country supply chain) would be well worth picking lessons from.

Selection and prioritization criteria

To make the exercise efficient and focused and the derived lessons implementable in the absence of unlimited resources, a tight framework was followed for prioritizing source countries which, while including countries that contribute a lion's share to ECOWAS' imports, also does not neglect any that may offer lessons without being a dominant exporter. Not only did this help in planning and allocating time to countries appropriately, it enabled deeper assessment of the chosen countries. It is with this background that the following approach was followed

1. Obtain the following information on all rice exporters
   a) Annual production
   b) Annual exports
2. Filter out countries that
   a) Are neither a top-15 exporter nor a top-15 producer[18]
   b) Have negative total net exports of rice[19]
   c) Not from Asia[20]
3. Shortlist 3-4 relevant countries using the following parameters (See Table 3)

[18] This ensures we are accounting for the most successful and competitive rice players
[19] Negative net exports indicate under-developed or sub-scale domestic markets which reduces relevance for the purpose of this study
[20] For context and relevance; as evidenced in Figure 8, Asian countries have established a dominant share in the total import of rice by ECOWAS countries that has sustained for several decades.

a) Scale of production[21]
b) Speed of rampup in production and net exports, particularly to ECOWAS countries[22]
c) Competitiveness[23]
d) Overall relevance and context comparability
   i. Share of exports to ECOWAS countries
   ii. Share of smallholders[24] in total grower numbers
   iii. Share of production exported
   iv. National income category[25]

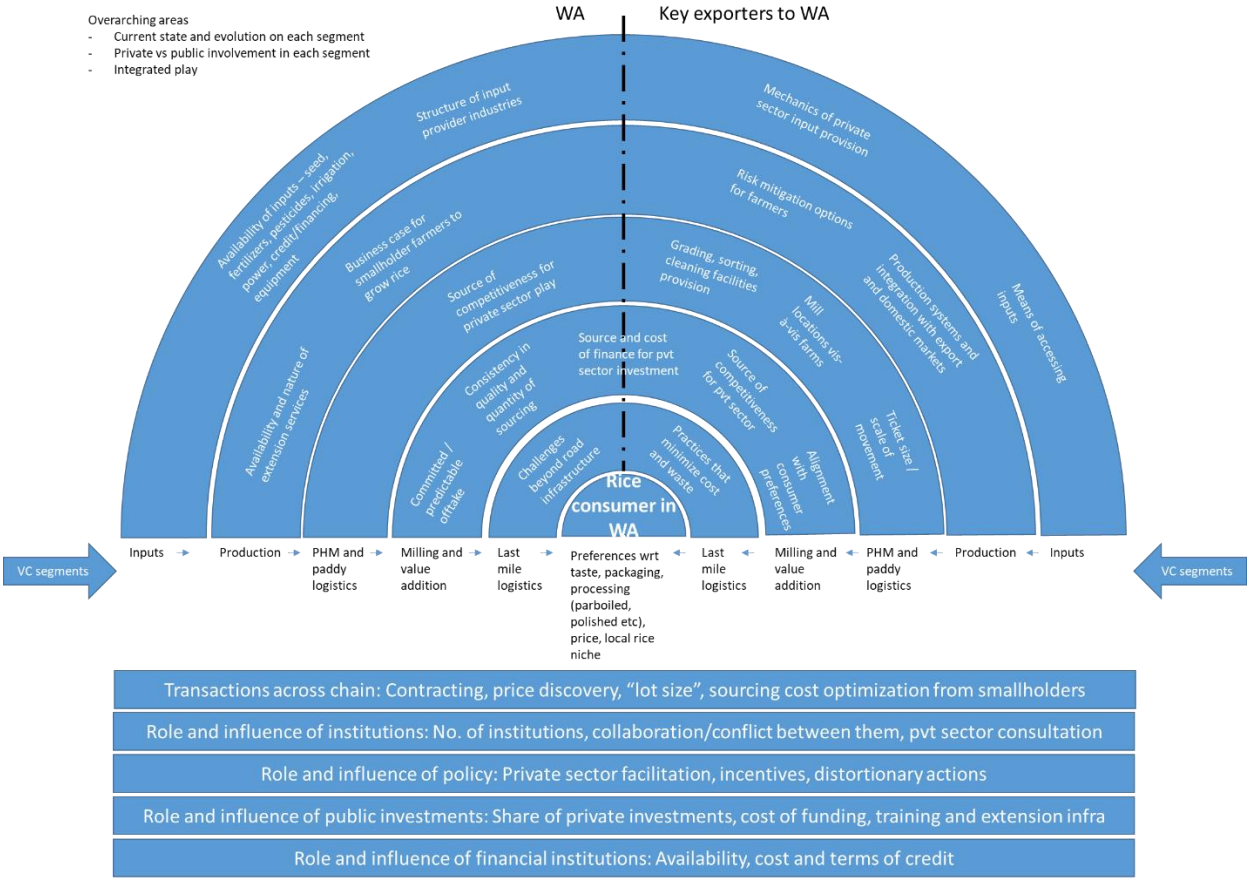
4. Apply the following parameters as a "tie-breaker" in case of a "close finish" in ranking of countries using above parameters
   a) Scale: Total exports
   b) Speed: Average growth of exports
   c) Relevance and context comparability
      i. Qualitative view on level of government influence/intervention in rice value chain[26]
      ii. Year of WTO accession[27]
      iii. Landlocked country[28]
5. Use the broad framework outlined in Figure 9: Broad framework for assessment of Asian countries in the context of drawing learnings for West African nations to assess each selected country's existing value chain and the institutional, policy, investment aspects that influence the evolution and current state of the same

Table 3: Country selection framework

Indicator	Filters	Core parameters	"Tie-breakers"
Scale	Drop if - Neither a top-15 producer nor a top-15 net exporter - Negative net exports - Non-Asian	Production (2014)	Exports
Speed		Avg growth of production (1962-2014) Avg growth of net exports (1988-2014) Growth in export to ECOWAS (2005-2014)	Avg growth of exports (1988-2014)
Competitiveness		Net exports (2014)	
Context comparability		Share of export to ECOWAS (2009-2014 avg) Share of smallholders in all growers (<1ha) Share of production exported National income level	Year of WTO accession Level of government intervention / control Landlocked

[21] As of 2014
[22] As measured by %age growth in these parameters
[23] As measured by quantum of net exports
[24] Growers with less than 1ha of landholding; share is measured across crops since data on share of rice smallholders amongst all growers is not available consistently
[25] Highest relevance of countries that are at low income or lower middle income level
[26] Higher government interference would result in a lower score
[27] Earlier accession would mean more competitive market
[28] A landlocked country in this set could provide valuable lessons for the same in the ECOWAS region

Figure 9: Broad framework for assessment of Asian countries in the context of drawing learnings for West African nations



Country selection results

For the filtered countries identified as defined in Step 1 of the selection methodology, data collected on parameters identified was collated from various sources and is represented in Table 4.

Table 4: Results from country selection (data)

000 MT	Production (2014)	Avg growth of production (1962-2014)	Net exports (2014)	Avg growth of net exports (1988-2014)	Share of export to ECOWAS (2009-2014 avg)	Growth in export to ECOWAS (2005-2014)	Share of smallholders in all growers (<1ha)	Share of production exported	Income level
India	157200	2.7%	11160	-7.9%	168.1	>100%	62.5%	7.1%	Lower middle income
Thailand	32620	2.6%	10962	4.6%	193.7	13%	22.4%	33.6%	Upper middle income
Viet Nam	44974	3.3%	6274	0.8%	91.1	10%	81.8%	14.1%	Lower middle income
Pakistan	7003	3.4%	3746	8.7%	36.9	-3%	36.4%	54.0%	Lower middle income
Myanmar	26423	2.9%	716	-57.1%	85.2	-16%	34.3%	2.7%	Lower middle income
Cambodia	9324	7.3%	323	95.2%	0.7	99%	47.0%	3.7%	Lower middle income
Bangladesh	52326	2.7%	0	<-100%	0.0	-50%	52.0%	0.0%	Lower middle income

Sources: FAOSTAT, UNCOMTRADE, Various news reports, World Bank, FAO

Since the units of all data points do not align, making direct comparison and scoring unviable, a scaled score on each parameter has been given to each country. The scaled score is then

combined into a composite weighted score to prioritize countries for deeper assessment[29]. (Table 5 summarizes the scaled scores).

Table 5: Results from country selection (scores)

	Production	Avg growth of production	Net exports	Avg growth of net exports	Share of export to ECOWAS	Growth in export to ECOWAS	Share of smallholders	Share of exports	Income level	Weighted score
India	1.00	0.37	1.00	-0.08	0.87	1.00	0.76	0.87	1.00	0.70
Cambodia	0.06	1.00	0.03	1.00	0.00	0.03	0.57	0.93	1.00	0.46
Viet Nam	0.29	0.45	0.56	0.01	0.47	0.00	1.00	0.74	1.00	0.45
Thailand	0.21	0.36	0.98	0.05	1.00	0.00	0.27	0.38	0.00	0.45
Pakistan	0.04	0.46	0.34	0.09	0.19	0.00	0.44	0.00	1.00	0.24
Myanmar	0.17	0.39	0.06	-0.60	0.44	0.00	0.42	0.95	1.00	0.15
Bangladesh	0.33	0.37	0.00	-1.00	0.00	-0.01	0.64	1.00	1.00	0.05

As can be seen from Table 5, while India emerges as the most important country to be studied, Thailand, Cambodia and Vietnam are clustered together after India with Thailand and Vietnam tied on scores. All other countries, while undoubtedly important in terms of their position in the global rice value chain, emerge as relatively less relevant for the purposes of this study.

Between Thailand and Vietnam, application of the "tie-breaker" parameters identified in Step 4 above results in a clear choice of Thailand in the set of 3 countries for the deep-dive assessment from secondary research. (See Table 6).

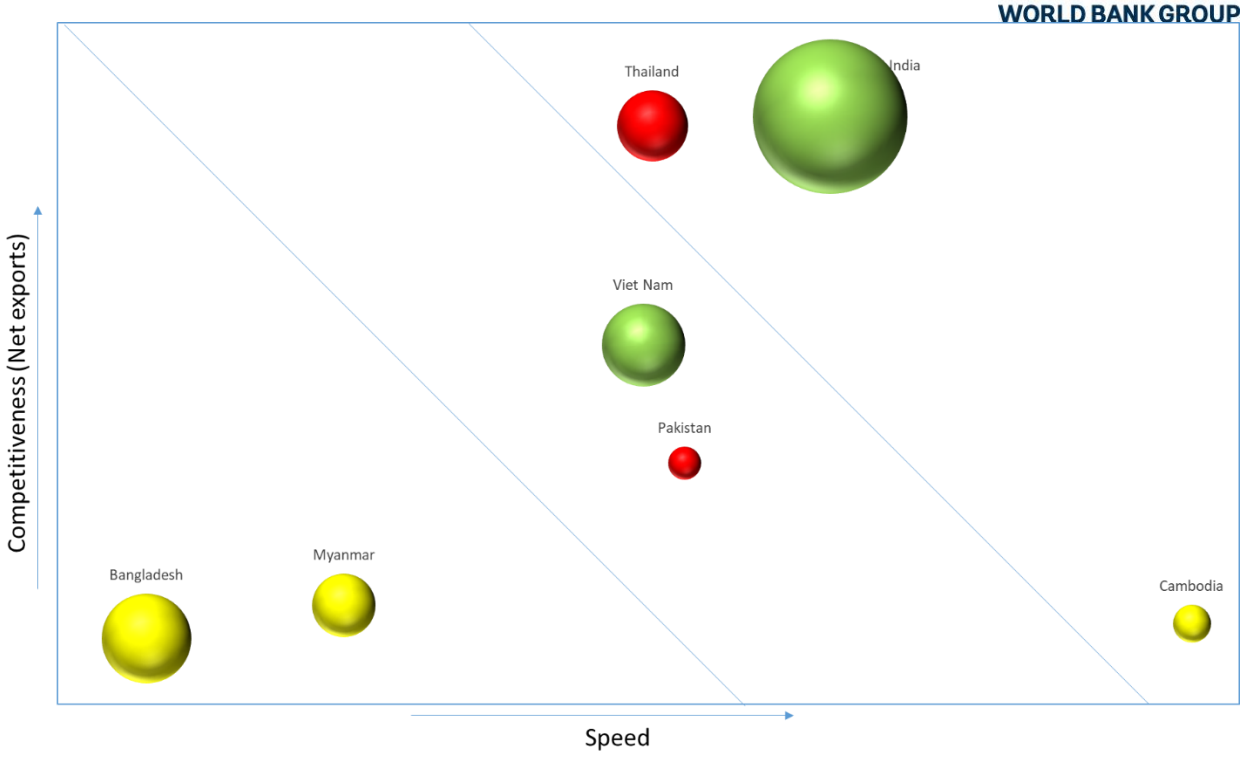
Table 6: Thailand vs Vietnam

	Weighted score	Total exports	Growth in exports	Year of WTO accession
Thailand	0.45	10969	5%	1995
Viet Nam	0.45	6335	1%	2007

The graphic in Figure 10 represents the relative importance of various countries when they are laid out along the four broad categories of parameters defined in the last section. The disaggregated picture allows us to see how changing priorities can change the results. If we accord a relatively greater importance to context comparability then Vietnam would replace Thailand in our selection. In terms of sheer volumes of net exports and production, however, Cambodia would lose out even while being far ahead in terms of the pace with which it has achieved a turnaround. Bangladesh and Myanmar while being more comparable to the target region, would only gain significance if total production were to be the dominant criteria for selection.

Figure 10: Options for country selection

[29] Weights used are 5% each for production and average growth in production, 25% for quantum of net exports, 20% for growth in net exports, 10% each for share of export to ECOWAS countries, growth of exports to ECOWAS countries, share of smallholders and share of production exported and 5% for income level of the respective country.



Notes: Color of bubble is indicative of context comparability (green indicates high comparability and red indicates low comparability) and size is representative of total production

To make the exercise representative and focused, five key economies of West Africa have been studied for the purpose of this report viz. Nigeria, Ghana, Cote d' Ivoire, Senegal and Mali. The term "West Africa" in this report refers to only these five countries report from this point onwards. While two of these countries were visited for the purpose of research for this report (Ghana and Cote d'Ivoire), the others were studied from secondary research. The selection of these five countries was driven from the fact that (1) they are the top five economies of the region in terms of GDP (Table 7) (2) they represent a diverse sample set of countries in terms of (a) consumer preferences for rice (Figure 29) and (b) mix of coastal and landlocked counties (c) varying strengths in production in terms of ecosystems (Table 13).

Table 7: Size of economies in the region

	GDP (2016) USD mn
Nigeria	404,649
Ghana	42,794
CÃ´te d'Ivoire	36,768
Senegal	14,605
Mali	14,002
Burkina Faso	11,695
Benin	8,894
Guinea	8,470
Niger	7,528
Mauritania	4,667
Togo	4,449
Sierra Leone	3,675
Liberia	2,757
Cabo Verde	1,639
Guinea-Bissau	1,125
Gambia	986

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Chapter 4: Lessons from India

A representation of the key controllable and uncontrollable similarities and differences between India (at around the time of the transformation of its rice value chain i.e. between 1960 and early 1990s) and West Africa (in present times) is provided in Table 8.

While the similarities establish the relevance of examining and learning from the Indian experience, the (controllable) differences provide an opportunity to gain from what India might have done that West African countries could replicate, even while keeping in mind that uncontrollable differences create limitations on the "transferability" of learnings.

Table 8: Comparing Indian and West African rice value chain context

	Similarities	Differences
Controllable	• Aid / import dependency • Per capita consumption • Landholding size	• Expenditure on agriculture • Land ownership / access • Research and development infrastructure • Research and development practices • Irrigation infrastructure • Extension and inputs ecosystem • "Importer" dependency • Size of milling units • Market intermediation • Credit infrastructure
Partially controllable	• Consumption palate • Share of agriculture in GDP	• Level / extent of aid dependency • Consumption basket
Uncontrollable	• Level of economic development	• Size and depth of economy • Rural – urban population split • Distribution of production ecosystems

Similar consumption and production characteristics make India a useful case study

Despite being an early adopter of rice in the staple diet[30] and, according to some accounts, the place of origin of at least one of the current major varieties of rice grown globally[31], the nation – by extension the region of South Asia – at independence in the late 1950s inherited from its colonial occupiers a dilapidated agriculture ecosystem that was severely lacking in farm productivity and supply chain performance[32]. Thus while improving social infrastructure and well-being post-independence boosted population growth, even with steady production growth supported by agrarian reforms and the impetus on irrigation investments, output lagged behind consumption and dependency on imports rose in the years immediately following

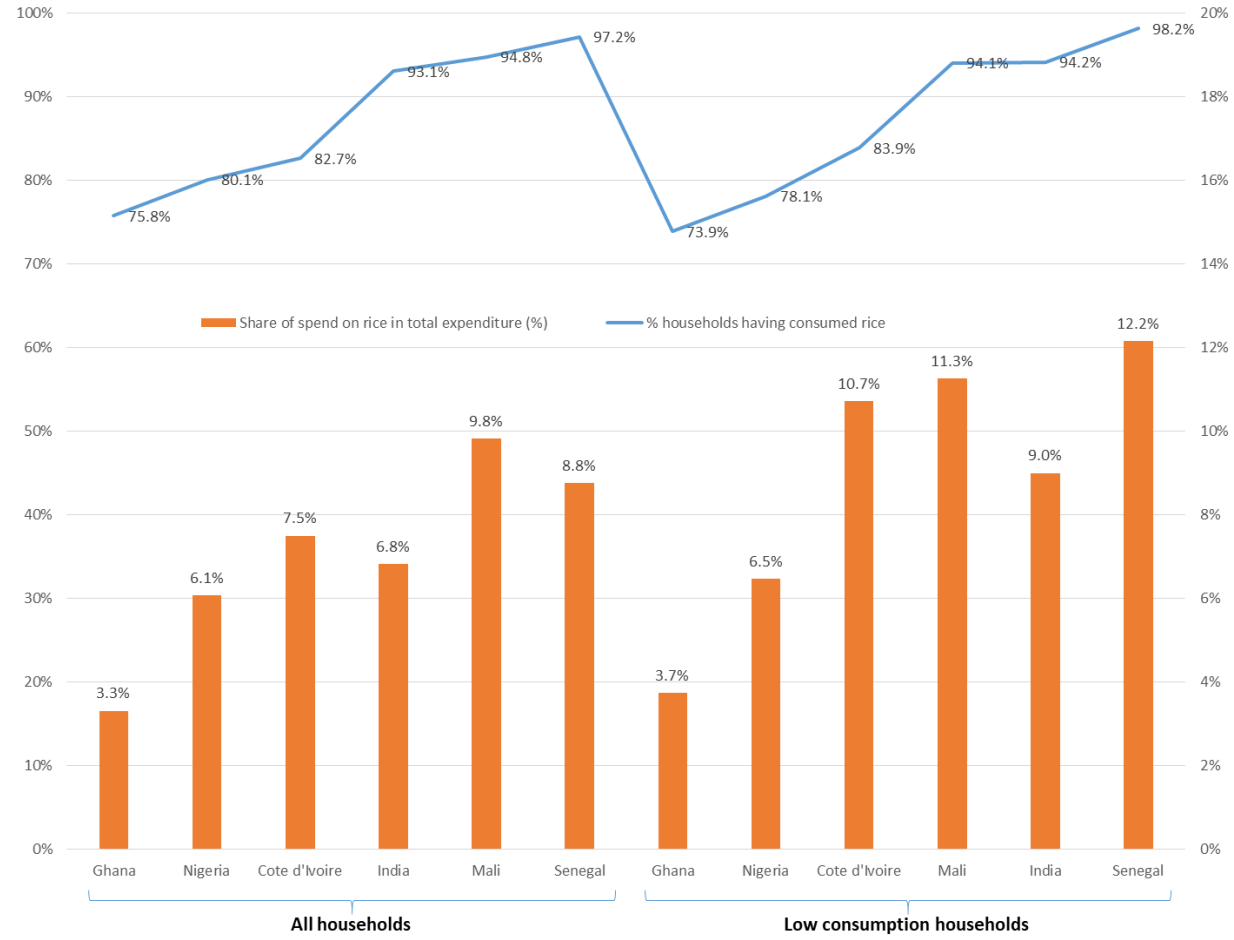
[30] The earliest remains of cultivated rice in the sub-continent have been found in the north and west and date from around 2000 BC

[31] The two major rice varieties grown worldwide today are Oryza sativa indica and Oryza sativa japonica. Historians believe that while the indica variety of rice was first domesticated in the area covering the foothills of the Eastern Himalayas. Source: http://www.velavanstores.com/Rice-in-India-Origin-and-History-of-Rice-in-India.asp

[32] Another factor that led to low availability of rice post-Independence was that India lost the most fertile rice growing region to East Pakistan (now Bangladesh) and a lot of the developed irrigation infrastructure also went to Pakistan while share of population staying in India was much greater

independence[33]. A situation (in)famously referred to as "ship to mouth" came about in the mid-1960s when arrival of food aid from the United States under the PL-480[34] scheme in ships on the Indian coast provided the assurance of requisite supply – a situation which could arguably be compared with the heavy dependence on Asian rice imports that several West African countries presently find themselves in[35].

Figure 11: Consumption and share of spend on rice by consumption segments (2010)

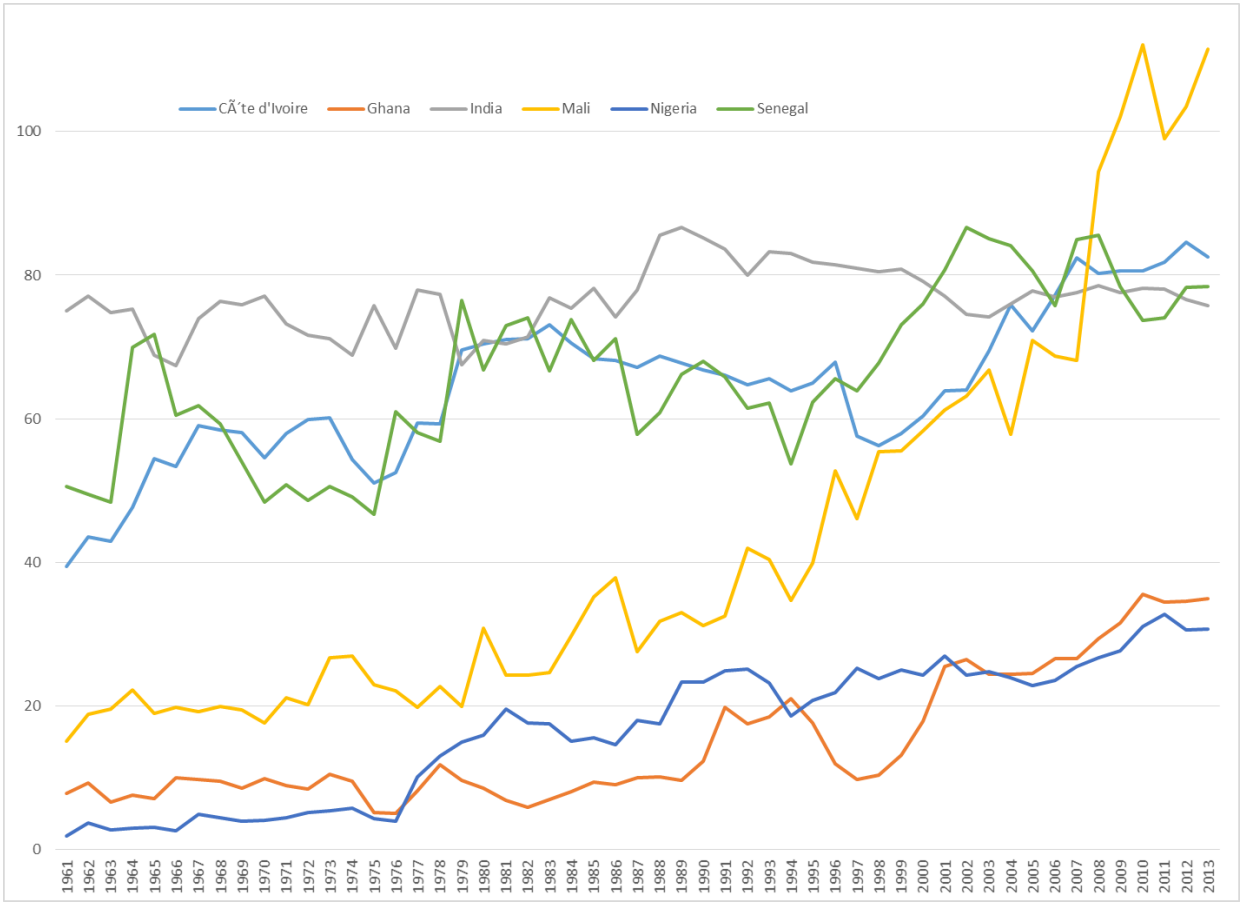


Source: World Bank

[33] Despite very good annual agricultural growth form 1956-65 of 3% per annum, India had been facing food shortages. Agricultural growth was not promising as demand was rising with population at 2.2% per annum from earlier 1%.
[34] Public Law (P.L.) 480 Agricultural Trade Development and Assistance Act was signed by US President Eisenhower in 1954. The law's original purpose was to expand international trade, promote economic stability of American agriculture, make maximum use of surplus agricultural commodities in the furtherance of foreign policy, and to stimulate the expansion of foreign trade in agricultural commodities produced in the United States
[35] The dangers of Africa's reliance on rice imports was made clear when skyrocketing world food prices in 2008 led to riots in capital cities across the continent; West Africa was worst hit with occasionally deadly riots in Burkina Faso, Cameroon, Ivory Coast and Senegal. Memory of 1979 when rice riots arguably contributed to political instability that preceded years of civil war which did not end until 2003; Source: https://www.pri.org/stories/2011-11-28/rice-20-africa-rice-complicated

Rice has remained an essential part of the Indian diet and even while per capita consumption has started showing a declining trend in India, it is on an uptick in West Africa. Noticeably, per capita consumption of rice in Ivory Coast and Senegal has climbed up to the level in India with Mali already having surpassed the same while Nigeria and Ghana's levels are continuously rising towards the same. These figures (Figure 11: Consumption and share of spend on rice by consumption segments and Figure 12: Trend in per capita consumption of milled rice) indicate the rising relevance of learning from India's past experience.

Figure 12: Trend in per capita consumption of milled rice

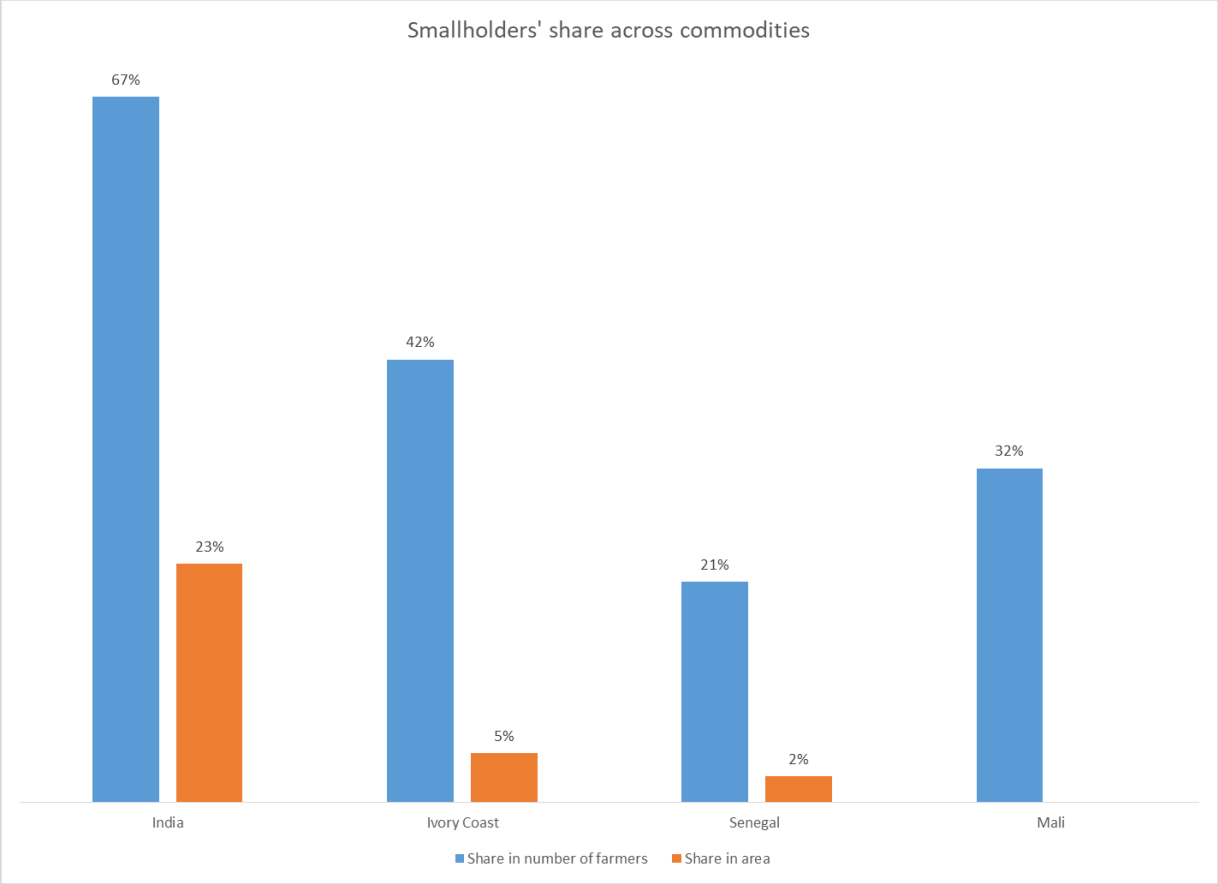


Source: FAOSTAT

India has achieved its rice transformation even while the landholdings of its rice cultivators has remained and continues to increasingly become smaller (Figure 13,

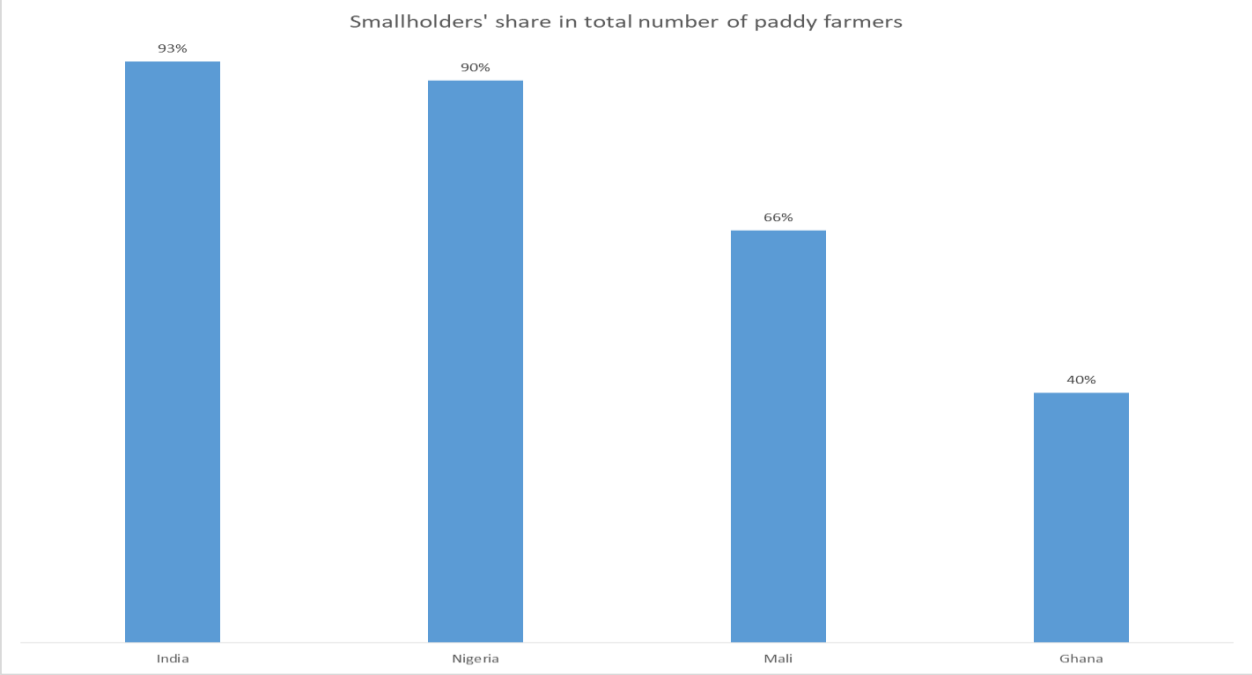
Figure 14 and Figure 15)

Figure 13: Smallholders' share across commodities



Sources: "Doubling Farmers' Income, GoI (2017); FAO (2001, 2013)
Note: Data for India, Ivory Coast, Senegal and Mali is for 2010-11, 2000-01, 1998-99 and 2004-05 respectively

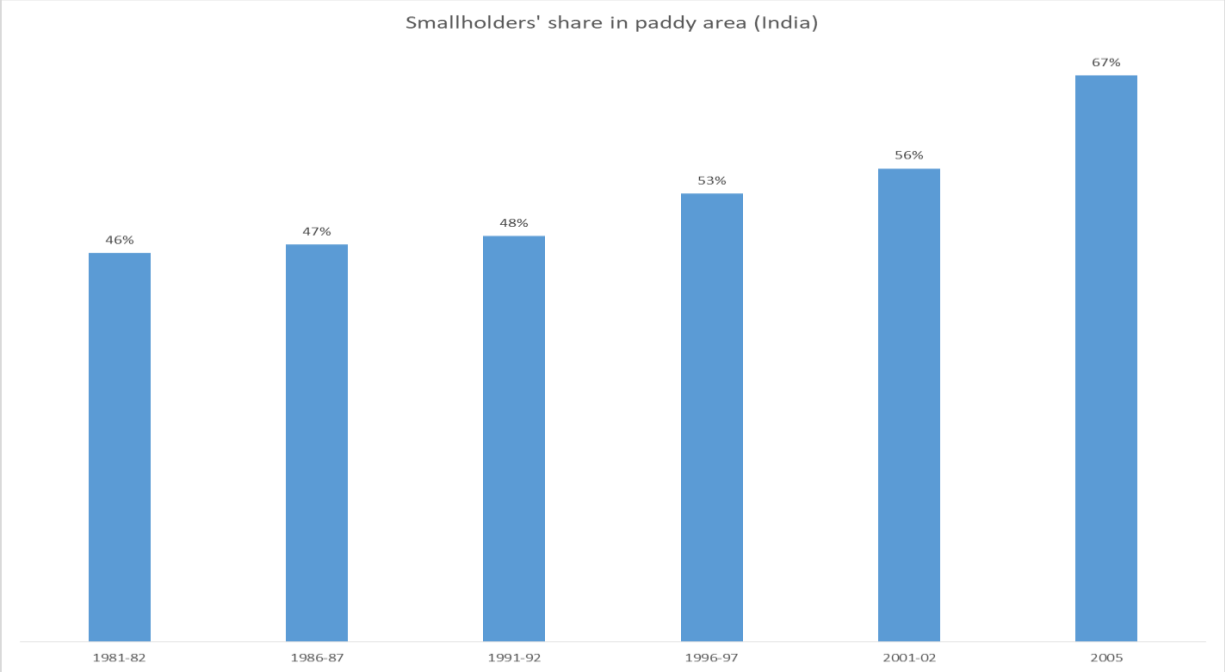
Figure 14: Smallholders' share in paddy farmers



Sources: Rice Production in India — Implications of Land Inequity and Market Imperfections, National Centre for Agricultural Economics and Policy Research (2009), FAO (2001, 2013)

Note: Data for India, Nigeria, Mali and Ghana is for 2005, 2008, 2009 and 2009 respectively

Figure 15: Rising share of smallholders in paddy area

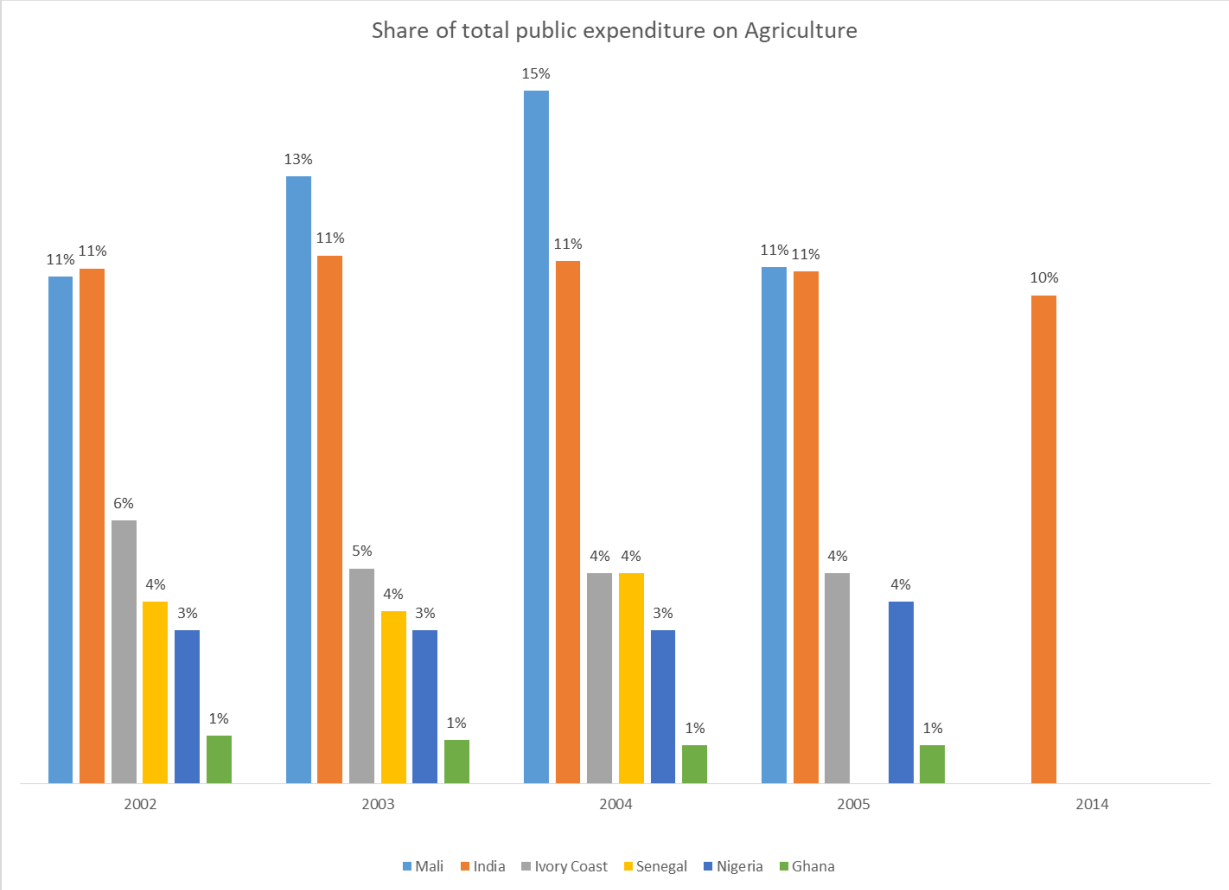


Sources: Rice Production in India — Implications of Land Inequity and Market Imperfections, National Centre for Agricultural Economics and Policy Research (2009)

Competitiveness of Indian rice has hinged upon policy support and private action

First the government focused, and spent heavily, on agriculture. Even while envisioning transformation towards becoming an "industrialized" nation after independence, the government invested heavily on building the foundations for improved farm productivity. Thus significant investments were made in both the major irrigation backbone in the form of canals and dams and incentives for minor irrigation in the form of tube-wells to tap ground water in addition to water management best practices (See Annexure 1A: Current state and historical evolution of Indian rice sector). Research institutions were also strengthened with budgetary allocations and detached from political influence while enabling international collaborations (Figure 16).

Figure 16: Share of total public expenditure on Agriculture



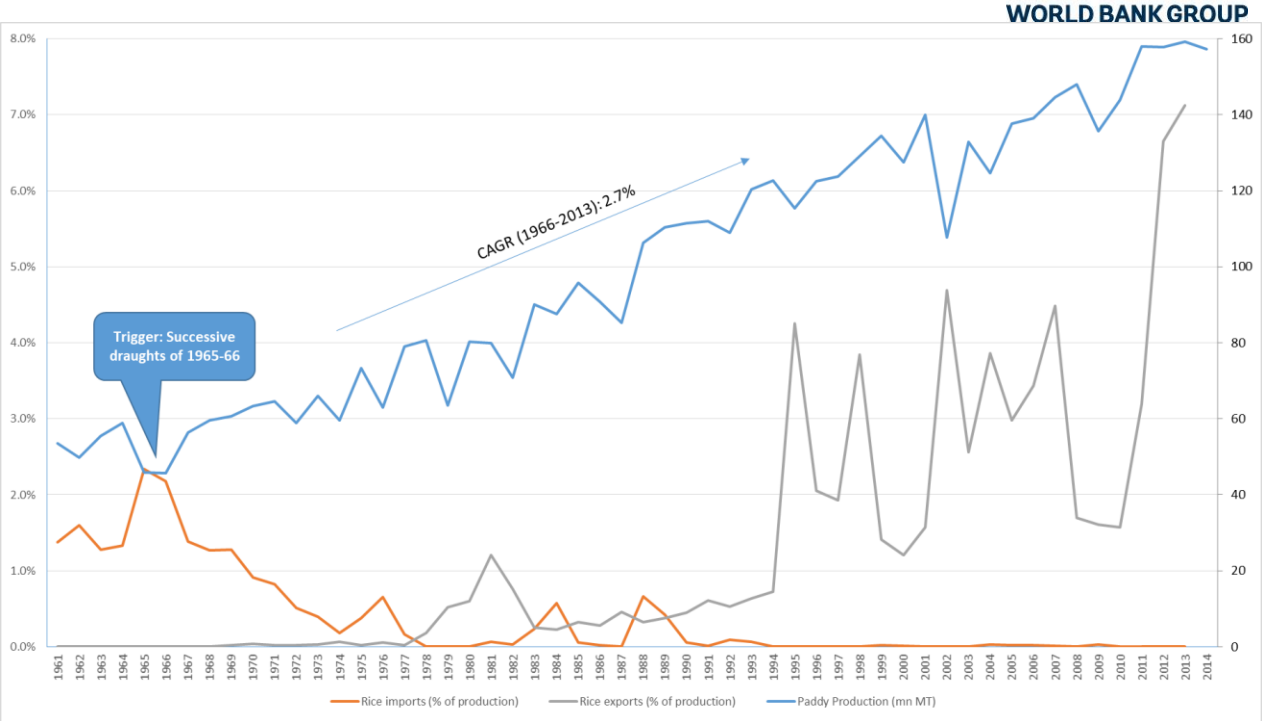
Sources: Public Finance Statistics, GoI; "Tracking Agricultural Spending for Agricultural Growth and Poverty Reduction in Africa, Regional Strategic Analysis and Knowledge Support System (http://www.resakss.org/sites/default/files/pdfs/tracking-agricultural-spending-for-agricultural-gr-1349.pdf)

Second, immediately after independence, India initiated agrarian reforms dismantling an age-old colonial land tenure system that deprived cultivators of ownership or even long term access to the land they cultivated. While it served the purpose of revenue collection for the incumbent administration, it provided little positive motivation to cultivators to invest and develop the productivity of the land they toiled on. Reinstatement and distribution of land ownership rights amongst cultivators and securing rights of tenant-cultivators over their land not only motivated them to work harder on the their land but to make investments with longer gestation periods (eg. tube-wells) and to raise credit.

Third, rapid and focused efforts were undertaken to boost farm productivity. In the early 1960's while India may have become complacent to the flow of imports and aid, when these inflows shot up on account of successive draughts in 1965-66, the government quickly realized the folly of this complacency not only in terms of the loss of self-sufficiency in the rice commodity but also in the implicit loss of sovereignty that aid flows inevitably implied[36] (Figure 17). Arguably, West African nations faced a similar "wake-up" call during the food price crisis of 2008.

Figure 17: Trigger of transformation in India

[36] "How India became self-sufficient in food", Executive Intelligence Review, Volume 18, Number 27, July 19, 1991; http://www.larouchepub.com/eiw/public/1991/eirv18n27-19910719/index.html

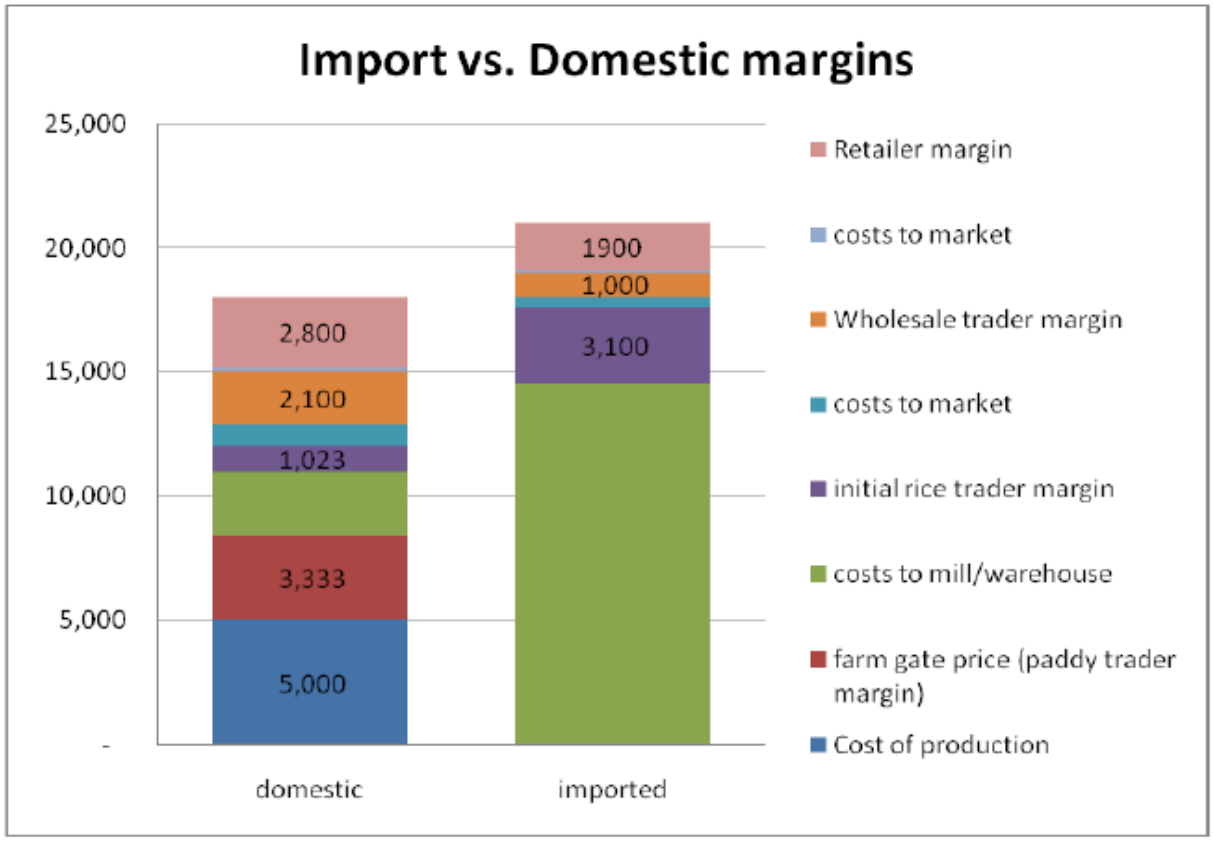


On farm productivity, high yielding varieties were introduced, helped by research investments done earlier and enabled by a context that facilitated close collaborations between Indian and International research institutions – something that was vital for ensuring that modern varieties were developed through an appropriate balance of local cultivars and international breeds (See Box titled "Stages of varietal research and how they played out in the Asian Green Revolution" in Annexure 1A: Current state and historical evolution of Indian rice sector). The more intensive requirement of inputs for these varieties was fulfilled by virtue of the focus on irrigated areas of the Northern plains to start with and investments in the building up of an inputs and extension network involving the private sector, even though prices, levels of storage and freedom of movement were controlled by the state (Annexure 1A: Current state and historical evolution of Indian rice sector). Public institutions participated in the production and imports of inputs and anchored delivery of widespread extension services. While these controls have been blamed for being overly restrictive and stifling private investment, the fact remains that India's inputs ecosystem even while still being under almost the same (though lesser) level of controls even now, has always been dominated by private players. On the other hand, these controls prevented hoarding and disabled speculative trading. In this context, it is perhaps telling that some West African countries present a scenario where domestic rice is cheaper and of poorer quality even while the trading intermediaries make higher margins compared to the imports chain while milling units work on wafer-thin margins[37]. While it would require deeper analysis to establish this conclusively, a scenario where trading margins are high and processing margins are thin

[37] GLOBAL FOOD SECURITY RESPONSE WEST AFRICA RICE VALUE CHAIN ANALYSIS, USAID (Nigeria) 2009

even while value addition for quality and final price is low, is indicative of speculative trading activity by non-value adding intermediaries[38].

Figure 18: Price buildup comparison imported vs domestic rice (Nigeria)



Note: "Figure presents the comparison between a 100-kg bag of rice grown in Taraba, milled in Abakaliki, and wholesaled in Abuja (converted from paddy at 60%) compared to 100 kg of rice imported from Thailand. The margin analyses for each product shows that 54% of the end value for domestic rice is comprised of trader margins (initial paddy trader/grower, paddy to rice trader, rice wholesaler, and rice retailer), compared to 29% from imported rice.30 The biggest margin is actually made at the paddy trade level, buying the rice at the farm and then holding it to sell to traders who take it to the mills". Source: GLOBAL FOOD SECURITY RESPONSE WEST AFRICA RICE VALUE CHAIN ANALYSIS, USAID (Nigeria) 2009

Fourth, export and import of rice was brought under government control to ensure that the exploding domestic demand was available for the domestic producers and that this demand opportunity was not "siphoned" off by imports. Thus, "breathing time" was provided for the domestic cultivators to become competitive with imports with respect to quantity and quality of production without exposing them to a barrage of cheap imports – something that West African countries have permitted, arguably too much too soon, contributing to the destruction of their fledgling attempts at self-sufficiency in the same period when India achieved the same[39]. Not

[38] Another reason for significantly higher trader margins as compared to processing margins could be that the small scale of operations of mills disable economies of scale impacting margins and the low quality of output from basic machinery limits price realization. However, it is well known that in an efficient market with limited information asymmetries, margins from trading are thin and traders' business models worldwide hinge on volumes. This leads to the deduction that either traders have undue competitive advantage in exploiting information asymmetries in an imperfect market and / or their business model is not pure "trading" and instead entails other investments that necessitate a higher markup for profitability. Further research on this aspect would be needed to conclude.

[39] http://www.documentation.ird.fr/hor/fdi:34086; Neoliberal policy, rural livelihoods, and urban food security in West Africa: A comparative study of The Gambia, Côte d'Ivoire, and Mali, Moseley, Carney, Becker, 2010

only did this prevent the perhaps irreversible, heavy and rising import dependency that West African countries find themselves in, it also prevented an "importer" dependency i.e. the rise of large and dominant importers exercising influence on the economy by virtue of their size and their contribution to the exchequer in the form of taxes and duties.

Fifth, both producer and consumer interests were protected with no bias towards the welfare of one over the other. While producers were given the confidence that they would be able to sell what they produce at at least a price that compensated them for their cost of cultivation of paddy plus a reasonable profit, consumers in turn were also guaranteed availability of rice at a fair price. While this required heavy investments by the government on managing the end to end supply chain for the produce that it purchased at the minimum guaranteed price in addition to absorbing the losses incurred in supplying the same to consumers at a price that, more often than not, was highly insufficient to cover the cost of procurement plus overheads of management of the supply chain (transport, storage, handling etc), it also meant that scaled supply chain infrastructure was built across the country and practices (or, in other words, institutional knowledge) for procurement, handling and storage were established at a time when the private sector was grossly unprepared both in terms of the scale and expertise that was required to manage this colossal system (not to mention that functions like maintaining a food security reserve are anyway primarily the preserve of governments worldwide[40]). This system also ensured that a controllable strategic reserve of rice was always at the government's disposal (through the same institution – Food Corporation of India (FCI) - that managed the supply chain and through which exports and imports were canalized) to meet emergency needs. (See Annexure 1A: Current state and historical evolution of Indian rice sector)

Sixth, a thriving private sector milling industry was enabled. With land rights secured, inputs and guaranteed market available, the farmer had every incentive to raise production on a sustained basis. While imposing import controls ensured that the domestic demand was "available" for this production and the physical distribution aspects of the same were taken care of by the government's massive investments as described in the last paragraph, the "manufacturing" activity of milling was left to the private sector. As against a network of nationwide distribution, and storage especially to serve the poor, which by definition requires massive scale, the activity of milling per se is not dependent upon scale for its unit-level profitability, even though efficiencies improve with scale. By creating direct and indirect incentives (as below) for private millers, the government was able to set in motion a process of wide scale development of milling capacities that - while being small in scale, and in fact by virtue of the same - were more physically accessible by farmers and financially accessible by small entrepreneurs.

- Encouragement of cultivation of only one variety in one region ensuring that the mills' challenge of procurement and setup of suitable machinery was made simple
- Provision of soft loans easing the capital requirement
- Facilitating technology transfers with Germany and Japan

[40] Even the USA had a policy of maintaining strategic food reserves until as late as 1996; Source: http://articles.latimes.com/2012/sep/21/opinion/la-oe-kaufman-food-hunger-drought-20120921

- Enabling a minimum level of capacity utilization for millers by tasking[41] them with sourcing paddy on the FCI's behalf (for the government's public distribution needs), milling it and supplying it to the government appointed agency for this purpose

Over the decades, since small mills[42] proliferated on the back of expanding production, consolidation has taken place leading to large domestic enterprises in the current context that have the capacity to manage the vagaries of the supply chain on their own. This incremental approach to development of scale and capacity of the domestic rice sector is a key reason for the success of Indian rice beyond the farm. The disproportionate focus on establishing large mills and enforcing outgrower arrangements on farmers in West Africa without securing the "pride of ownership" that security of tenure entails stands in stark contrast to this.

Seventh, a network of agriculture markets was established across the country with an intent to

- ensure that farmers had a choice of buyers who would bid for their produce
- provide a location for the
    - consolidation / aggregation of small lots
    - grading / sorting of produce

While success of this system is heavily debated now, particularly on account of the governance challenges in the institutions developed to manage it, in the context that India was in when it needed to transform its food supply chain, these markets provided a base to bring some level of organization in the complex web of intermediaries and opaque transactions between farmers and consumers.

Eighth, an enabling system of credit provision was built out through a tiered system of cooperative banks at the state, district and village level, supplemented with mandates for the commercial banks to allocate a minimum share of their book towards agriculture credit.

Key takeaways for West Africa

It is evident from the preceding elaboration of India's current rice value chain context and the historical evolution in **Error! Reference source not found.** that while the trigger for t ransformation in India's rice value chain was technological, policy, institutions and public investments played a vital role in creating the environment for the provides a detailed description of the current state and evolution of the Indian rice value chain expanding upon and explaining further each of the points above relevance and maximization of impact of the technology.

Broad guiding principles on these (policy, institutional and public investment) fronts from the Indian experience are outlined below, followed by more specific implications for West Africa in the following section.

[41] Critical literature abounds on the distortionary impact of mandating private sector mills to provide upto 75% of their produce a fixed prices (above cost) to the government before permitting them to make open market sales. Such literature misses out on the more important fact that the very existence of these mills – which were indispensable for the country's self-sufficiency needs - often depended upon this requirement, providing them assured offtake.
[42] Until 1997, the Rice Milling Industry (Regulation and Licensing) Act required that rice be milled in small-scale operations only. The small-scale sector was defined as units with investments not exceeding INR 7.5 million in 1997

Take "custodianship" of the chain. A public policy approach towards the development of the entire value chain works better than undertaking isolated independent improvements in each segment.

By either bringing under its own control or managing the incentives of stakeholders in each segment of the chain right from inputs[43] up to the final retail distribution, the Indian government effectively made sure that nothing could go wrong in meeting its objective of always having sufficient rice to feed its population at a price they could afford. While this has led to a situation of a heavy drain on the exchequer, the reason for that is at least partly attributable to gaps in governance and divergence from core principles towards populist political mandates. While India applied this principle with tight policy control and heavy public investments across the entire chain (except milling), it is worth exploring other means of applying the same principle in West Africa.

Focus, demonstrate success and replicate incrementally. A deliberate and consistent strategy extending over several years is needed to achieve transformation. Identification of areas that can yield rapid benefits and providing targeted support to deliver success that is visible - even if it may be localized - is effective in ensuring replication. Such an exercise could potentially be undertaken in West Africa as a follow up to the ongoing CARD activities.

By choosing the already well-irrigated areas with relatively larger landholdings and better investment capacity of farmers of the northern plains for proliferation of high yielding varieties success was achieved quickly that made the Green Revolution the shining example it is globally and enabled easy replication of the approach to the Southern parts in the 70s and to Eastern India more recently.

Go deep in research and wide in extension. A deliberate and iterative process of collaboration between international and national research agencies for varietal development is essential. At the same time, adoption has to be driven by providing farmers suitable incentives to grow and assurance of the ability to sell (latter covered under the next guiding principle below).

Development of specific locally suitable high-yielding varieties in collaboration with international research institutes complemented with encouragement of mono-cropping (one variety in one area) ensured that increase in yield was achieved rapidly and milling capacities could scale. Attempts to introduce Asian varieties in West Africa directly without the deliberate and extended process of experimentation to develop locally suitable varieties was one of the key reasons for the Green Revolution to leave the region untouched in the 60s and 70s[44].

Do not subsidize the consumer at the cost of the producer (or vice versa). Achieving self-sufficiency has to balance the goals of providing affordable food to the population and maintaining incentives for the producer to continue to grow the food - doing any one of these single mindedly risks either destroying incentives for producers to grow or creating a burden on consumers that may be unbearable (which has on more than one occasion led to social unrest in West Africa).

[43] Including land
[44] https://foodsecuritysm.wordpress.com/2011/01/13/why-did-the-original-green-revolution-not-reach-africa/

Even at a heavy public cost, Indian policy makers have chosen to stick to this guiding principle throughout its evolution and even through the process of economic liberalization by continuing to have a public institution manage these incentives to ensure food security.

Provide domestic industry "breathing time" to become competitive. Solving market failures that prevent competitiveness takes time - targeted policy protection with a disciplined direction towards addressing these failures goes a long way.

Whether in agriculture or otherwise (though more so in agriculture) across the globe, countries have opened up to global competition in a phased manner ensuring that domestic firms / farmers got at least some time to work on bridging the gap between their competitiveness versus imports. In this period domestic firms/ farmers have typically been supported by the government to address market failures that limit their competitiveness against imminent global competition[45]. While attempts were made by some West African economies to develop internal capacity for self-sufficiency in rice in the 60s and 70s opening up of the economy even while the domestic sector had not had the chance to build competitiveness effectively destroyed the local rice industry even while it had some of the core components for competitiveness in the form of suitable cultivation environments, availability of abundant land, cheap labour etc.

Don't short circuit the (M)SMEs. The spirit of local entrepreneurship can be much stronger and compelling when encouraged and tapped effectively than the lure of a large multinational corporate providing a one stop large scale solution.

Provision of utilization guarantees to small scale private sector rice millers through the levy rice (Details in Annexure 1A: Current state and historical evolution of Indian rice sector) system enabled small entrepreneurs across India to setup rice mills at the same time easing the government's expense and effort in procurement of paddy for its public distribution needs.

Think (and act) beyond rice. Dependency on rice imports can be reduced either by growing more and better quality rice or by reducing its consumption.

Given the relatively more diverse diets of West Africans, encouraging consumption of other cereals could well be a viable means of containing the forex outflow. In India, a biased focus on rice and wheat has ensured that consumption of other coarse cereals is now mostly confined to the rural areas and India is now heavily import dependent in pulses – the core source of protein for most Indians!

Consolidate policymaking. Regional cooperation and synergies can counter many of the disadvantages of the limited size and depth of each individual economy. Given similar needs and objectives of ECOWAS members and the relatively shallow economies of each individual nation makes it imperative for members to seek leverage from this grouping. In a way, states within India can be compared with the countries within West Africa - India's federal structure allowed for agriculture in each state to be managed by the local government while the central government provided guidance and policy direction in addition to budget support. While it may appear over simplistic to draw this parallel, there are also replicable learnings. For example, cost of various

[45] Global Policy Forum (https://archive.globalpolicy.org/component/content/article/209/42719.html)

inputs, particularly fertilizers are high in West Africa because quantities required by each individual nation are relatively small. If volumes could somehow be consolidated for the whole region's requirement, the impact could be transformational. Such thinking already exists and is being worked upon at the ECOWAS commission and development partner efforts could potentially align and strengthen these.

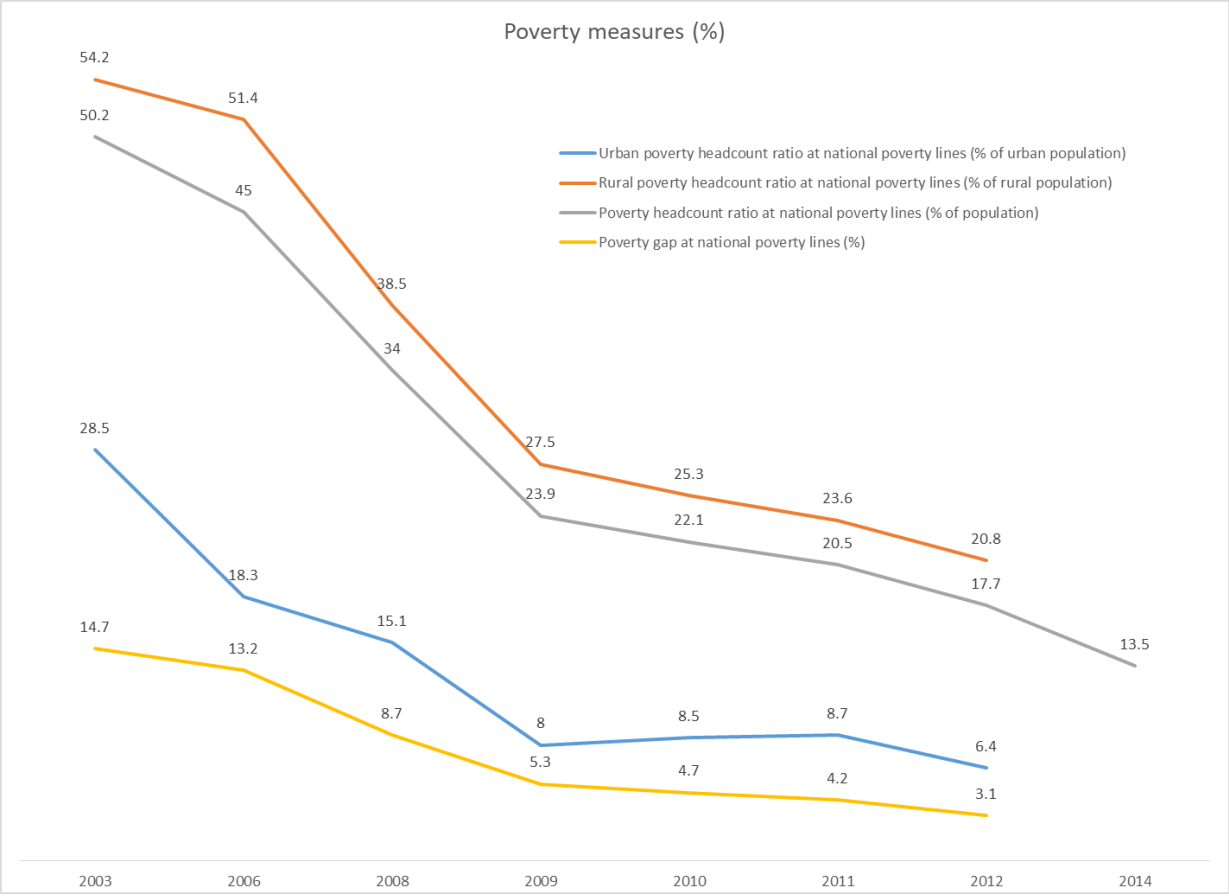
Ensure independence and tight governance of public institutions: It is in the implementation of public policy that failure is more prevalent than in its conceptualization.

But for the governance challenges of two of the most impactful institutions - FCI and the cooperative banks – their effectiveness would have been higher and the drain on public resources would have been lesser.

Chapter 5: Lessons from Cambodia

Much like several parts of West Africa, Cambodia has had a fairly short conflict-free existence but has yet managed to demonstrate a rapid rise in overall development and well-being of its citizens (Figure 19).

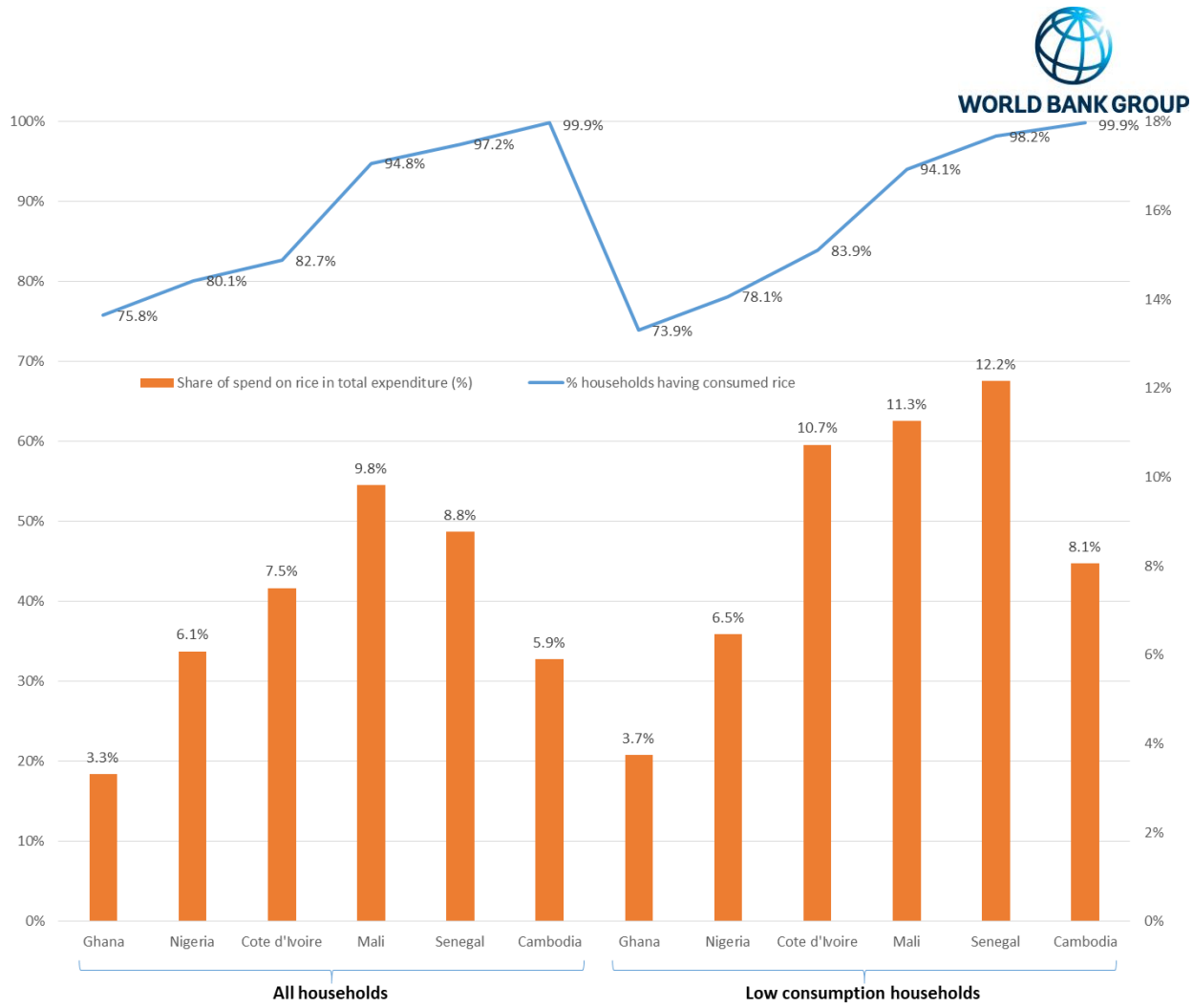
Figure 19: Healthy reduction in poverty



Source: World Bank

Cambodians rely mainly on fish and rice for their daily dietary energy sources. Even though the proportion of calories available from rice has been declining from 78% of total calories available per person per day in 1992, it was still much higher than the rest of the world at 63% in 2011. Per capita rice consumption was estimated at 143-160 kg/capita/year.

Figure 20: Consumption and share of spend on rice by consumption segments (2010)



Source: World Bank

Even with over 80% of area under rice cultivation, production frequently fell far short of targets, causing severe food shortages in 1979, 1981, 1984, and 1987. A host of factors including adverse weather conditions, low skills and poor availability of inputs, security problems, and government collectivization policies are all considered to have contributed to low productivity resulting in a situation where the agricultural sector performed poorly through the late 1980s.

Though in 1991 the government began embracing market-oriented reforms and Cambodia received considerable amounts of FDI, among the three sectors of the economy, industry received the largest share of FDI with agriculture being the smallest.

From the first decade of the new millennium, however - starting with the “The Rectangular Strategy for Growth, Employment, Equity and Efficiency in Cambodia”, in which agriculture was identified as one of the four “strategic pillars” - concentrated attention has been provided to the sector.

Rice remains the principal crop of farmers with its production accounting for 15% of agricultural value added and paddy occupies 75% of the cultivated land. Rice production, processing, and

marketing are estimated to employ 3 million people, or more than 20% of the country's working-age population[46].

Rapid progress under similar conditions make Cambodia a useful case study

A representation of the key controllable and uncontrollable similarities and differences between Cambodia as it transitioned into one of the major rice exporters within the last few years is provided in Table 9.

While the similarities establish the relevance of examining and learning from the Cambodian experience, the (controllable) differences provide an opportunity to gain from what Cambodia might have done that West African countries could replicate, even while keeping in mind that uncontrollable differences create limitations on the "transferability" of learnings.

Table 9: Comparing Cambodian and West African rice value chain context

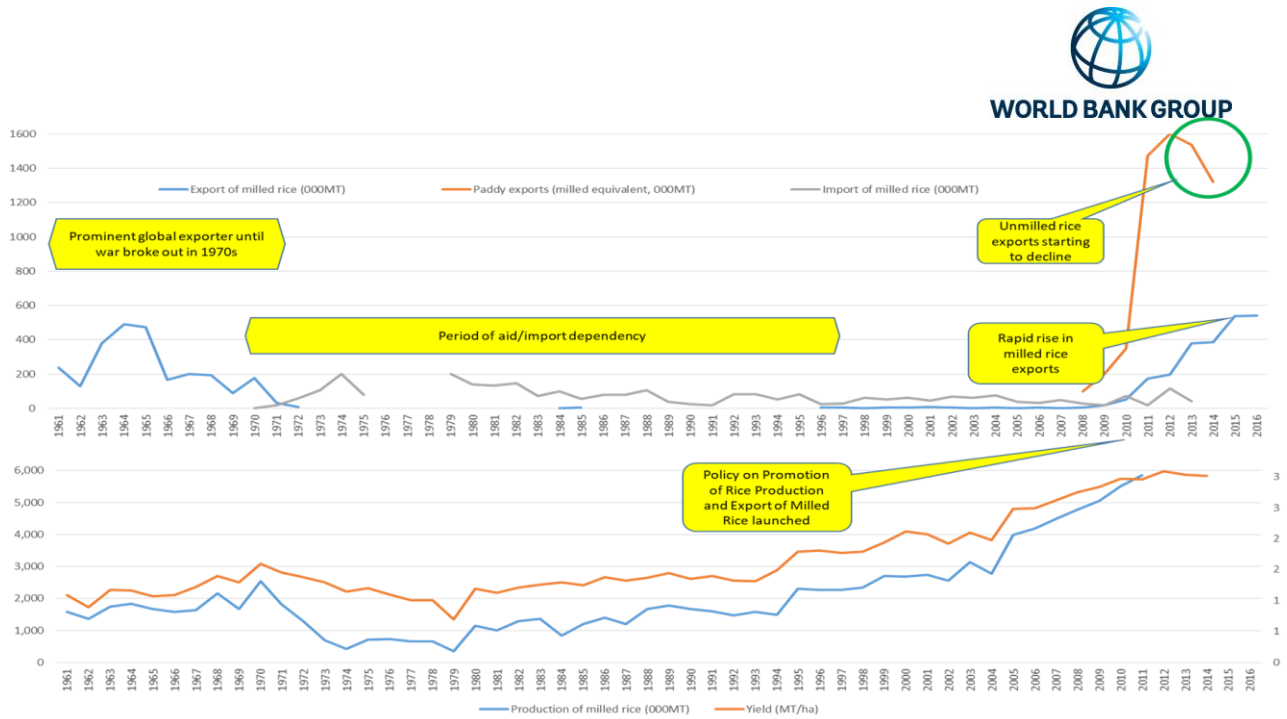
	Similarities	Differences
Controllable	• Consumption palate • Per capita consumption • Landholding size • Role and impact of regional aspects	• Cultivation and supply of high quality rice • Level of private sector involvement
Partially controllable	• Low share of irrigated cultivation	
Uncontrollable	• Size and depth of economy • Duration of stable existence	• Production ecosystems

In terms of the size of the economy, level of development and length of time over which the nations have had the ability to develop agriculture, the situation of West African nations is very akin to that of Cambodia. Cambodian agriculture is also primarily smallholder based with similarities and therefore the relevance of learnings extending beyond the nations to the regions (West Africa and Mekong subregion respectively) they are part of. Many of the nations in each region share their opportunities and challenges with others in their region.

While self-sufficiency has not been a concern for Cambodia since the mid-1990s, the fact that it has been able to create a clear position for itself in the competitive global trade of rice particularly in the high quality fragrant rice varieties provides an opportunity for West Africa to learn from approaches employed by policy-makers to enhance the quality, not just the quantity of rice. Much like Cambodia consciously geared itself up for catering to the premium segment of global rice trade, West African nations perhaps need to gear themselves up for catering to the premium, high quality standards of rice demanded by their own urban customers.

Figure 21: Production, trade and yield in paddy and rice (Cambodia)

[46] https://www.ifc.org/wps/wcm/connect/ed10f08049a04cfd8bbcabe54d141794/Cambodia+Market+Survey-Final-2015.pdf?MOD=AJPERES

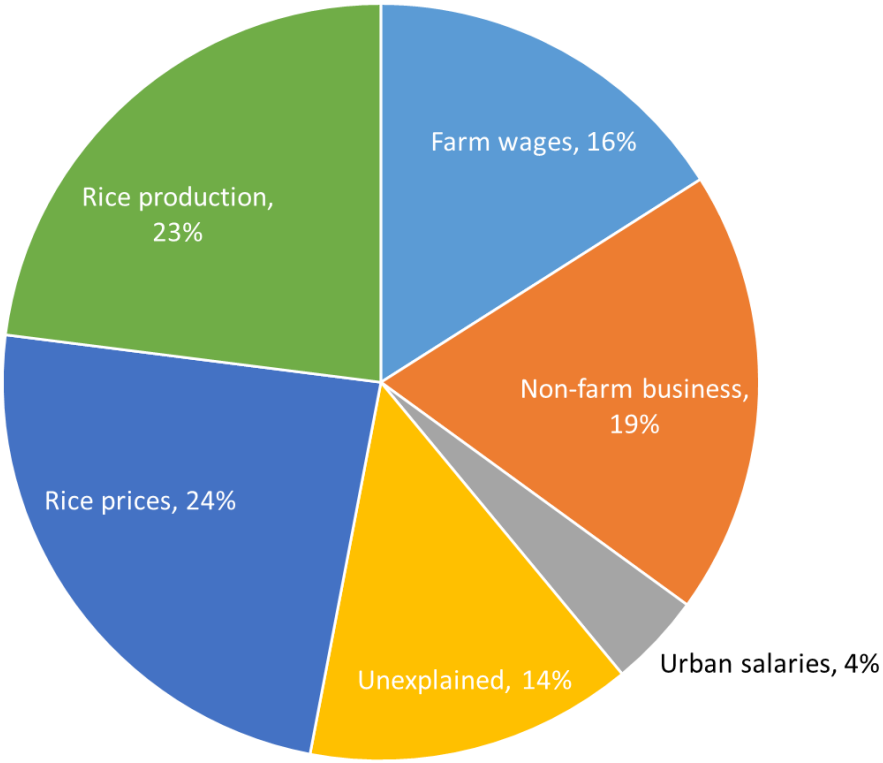


Source: FAO, World Bank, Cambodia Rice Federation

Coherent and directed policy-enablement has underpinned recent fast growth

Realizing the centrality of rice to its economy, not just to agriculture, Cambodian policy-makers have taken a conscious approach of driving development and growth through the same. This realization perhaps came about most strikingly when during the food price crisis of 2008 price realizations from exports shot up - and for a large part - accounted for the significant step reduction in poverty in that period (Figure 19, Figure 21 and Figure 22).

Figure 22: Drivers of poverty reduction, Cambodia 2004-11



Source: "Where Have All the Poor Gone? Cambodia Poverty Assessment 2013", World Bank, Washington, DC

A conscious decision at the apex level to focus attention on the rice sector led to the development of a thorough policy document that covered all segments of the end to end rice value chain without exercising undue control on any segment. An ambitious goal of reaching (formal) exports of 1mn MT of milled by 2015 from a level of about 100,000MT[47] in 2010 supported by this comprehensive policy direction aligned objectives of stakeholders and indicated the government's seriousness with respect to the development of the rice sector[48].

It is however, the hard-nosed follow through of the policy statements with on-ground implementation of the spirit of the policy that particularly stands out in the Cambodian case.

First, the rice sector as a whole and milling in particular was identified as a priority sector that had both high potential in terms of economic and development impact while also being heavily constrained. While self-sufficiency had been long achieved, the lack of a domestic chain for value addition was resulting in heavy leakage of unmilled rice across the border to Thailand and Vietnam from where, after milling and value addition, much of it was being exported globally for high realizations with most of the upside of higher realizations being captured outside Cambodia.

[47] Formal and informal exports of paddy (unmilled rice) are estimated to have been 350,000MT in milled rice equivalent terms

[48] Lessons learned: Leveraging The Rice Value Chain for Poverty Reduction in Cambodia, Lap PDR and Myanmar, World Bank, 2016;

A "Policy Document on Promotion of Paddy Rice Production and Export of Milled Rice"[49] was released in 2010 which laid out a comprehensive program for the establishment of Cambodia as a competitive rice exporting nation. The document made clear the government's intent to "promoting the development of the agriculture sector, with emphasis on a new pace and scale".

Not only did the document lay out a clear intent and specific initiatives that the government would undertake in the short, medium and long term, commitment and endorsement from the highest level was demonstrated and institutional arrangements for implementation were earmarked making sure stakeholders both in the government and private sector got aligned to its ambitious goal of raising milled rice exports to 1mn MT by 2015 and ensuring international recognition of Cambodian rice.

With its pronouncements centred around liberalization of the rice market and market-orientation in addition to the demonstration of seriousness with respect to the same, the policy inspired confidence in private investors both from abroad and within the country to step up investments in milling for production of high quality export varieties of rice which in turn drove private sector activities in the other links of the chain[50].

Government support for upliftment of quality in terms of institution of standards, investments in brand building, support for compliance with SPS standards of importing countries underpinned the growth that was witnessed since 2010.

Second, even with focus on milling, policy-makers paid due attention to all segments of the value chain. In a context where paddy was (and continues to be) exported in large quantities to neighboring countries with value addition being captured outside its borders, the primary task at hand was to get the milling segment in shape. However, even while the focus was demand / market led and the compelling gap to be plugged was identified as milling, efforts spanned across the chain making sure that throughput of high quality market needed rice was maintained. This was critical to ensure throughput was maintained and isolated improvements were not stymied by bottlenecks in the flow of produce along the chain.

The policy was conscious of the inherent long term nature of solutions to address challenges in the pre-milling (management of agricultural land, poor cultivation techniques and other inputs, the lack of infrastructure, research and extension services, finance for smallholders/SMEs) and some post-milling (brand-building for international recognition, alignment with importers' quality standards) parts of the chain.

Nevertheless, a slew of measures were instituted across value chain segments to kick start the process[51] in parallel with milling improvements including inter alia simplification of import procedures for rice seeds, fertilizers, agriculture inputs, machinery, extension of tax incentives beyond import of materials and equipment to purchase of paddy rice and export of milled rice, exemption of export processing fees, profit tax holidays and rebates, special deprecation and

[49] http://www.foodsecurity.gov.kh/sites/default/files/Rice-Policy-Eng.pdf
[50] https://www.opdc.go.th/uploads/files/2558/Asean/4_D1-S1-CAM.pdf
[51] https://www.wto.org/english/tratop_e/tpr_e/s364_e.pdf

special customs procedures. A contract farming law is also in the process of being drafted in consultation with regional peers[52].

The Rural Development Bank (RDB) was tasked with managing a new US$ 38 million credit line specifically for rice millers with announced interest rates of 5%. Recognizing the shortage of working capital as a binding constraint across the value chain, the government took a number of steps to encourage more commercial bank lending to rice value chain stakeholders including mills. It launched the IFC/IDA Risk Share Facility and prepared a partial credit guarantee scheme, which is targeted at providing more commercial bank working capital financing. Options for financing and storage of paddy in key rice production areas have been considered. Community savings and loans institutions are being implemented with the Cambodian Community Savings Federation[53] currently working in a few provinces.

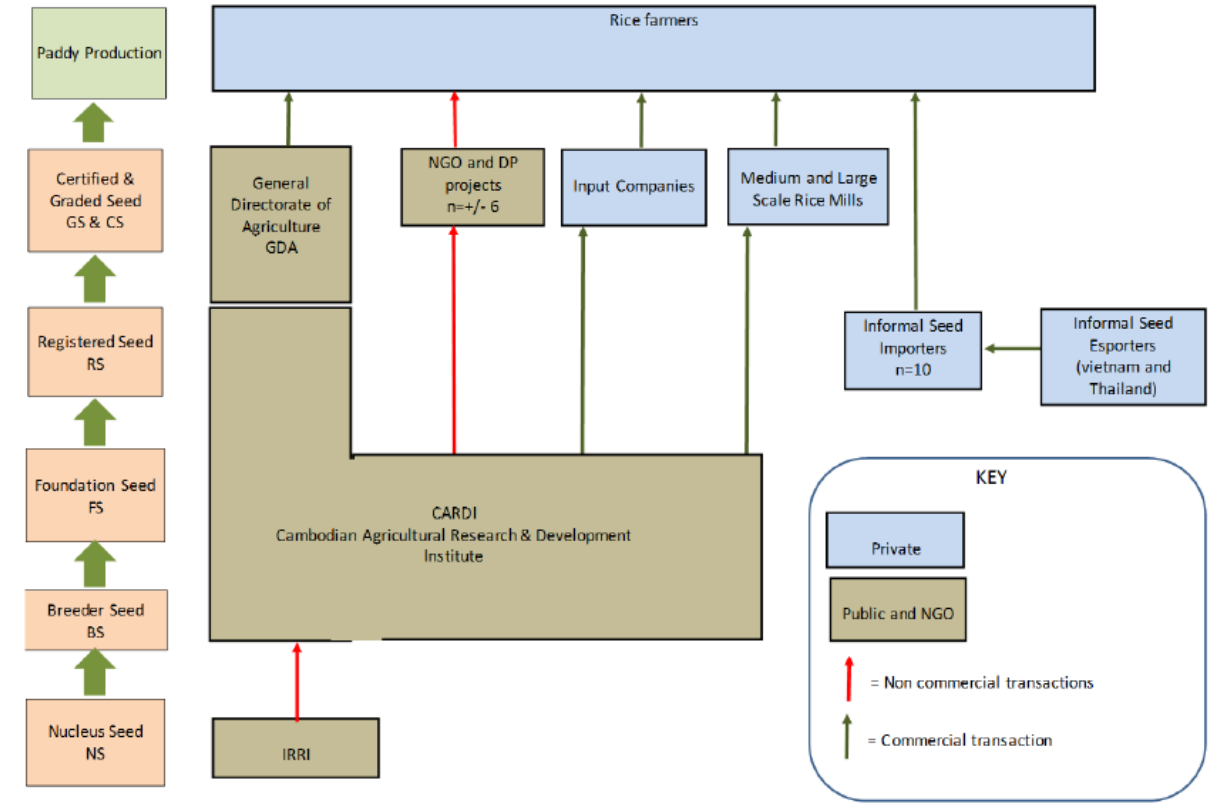
Over the past 10 years, the government made significant efforts to provide regular price information to farmers using two main ways of information dissemination: mass media, including public radio and TV, and interpersonal communication using extension agents.

Recognizing the potential of farmer cooperatives in ensuring benefits reach the smallest farmers, a Royal Decree ("Compilation of legal framework for agricultural cooperatives 2012") provides a model statute for each cooperative to follow in setting its operating rules. The Royal Decree follows seven international principles of cooperatives, as identified by the International Cooperative Alliance.

The Cambodian Agricultural Research and Development Institute (CARDI) was authorized to produce foundation seed, which is then multiplied by licensed private sector seed multipliers to produce certified seed. A large number of varieties have therefore been multiplied. While public-sector CARDI and NGOs dominate the rice seed market, private sector is heavily involved with the dissemination and in some cases rice mills are undertaking the task of working with farmers for the provision of seeds and associated education even without formal contract farming arrangements. NGOs have played a constructive role in seed distribution – they comprise a significant market for CARDI seed. This seed is distributed to farmer seed multiplication groups and small-scale paddy producers. Though there are apprehensions that removal of this seed supply from private channels weakens incentives for commercial investment, it plugs a gap that is not commercially viable or attractive for private sector until a threshold scale is reached – in that sense enabling the environment for private sector entry (Figure 23).

Figure 23: The Ecosystem for Rice seed supply

[52] National consultation on "Greater Mekong Subregion Core Agriculture Support Program, January 2017; https://goo.gl/8XPHp7
[53] http://www.ccsf-cambodia.com/english/history.php



Source: USAID

Even while maintaining a strategic rice reserve through a parasternal – The Green Trade Company - the government avoids creating market distortions by not providing direct price support to farmers and intervenes only marginally in the market. However, VAT exemptions on agricultural inputs are available and some recent decisions have addressed the necessity to ensure access to seeds and fertilizers at affordable prices, especially in times of emergency

Milled rice standards were established for both white and fragrant rice in 2013. These standards, promulgated by Royal Decree, instituted quality assurances that have led to international recognition and confidence from global buyers. Consequently, DNA fingerprints have been established for Cambodian fragrant rice varieties, and more farmers are now able to access higher value seeds and related trainings.

Overall, the policy was clear in the pronouncement of its intent to push for commercialization of agriculture and, while recognizing the limitations of its hitherto sporadic and uncoordinated approach to provision of incentives for the development of the sector, specifically impressed upon its intent to take a value chain approach and commit its close attention to the implementation of the same.

Third, donor support was effectively leveraged. The policy pronouncement of 2010 identified as a guiding principle the promotion of the cooperation and partnership between the government and development partners, civil society and private sector such as rice producers, rice millers, traders and transporters in implementing the policy to promote rice production and export.

Donor partners' guidance has been leveraged and deployed in a comprehensive and consistent manner as against the scattered and uncoordinated milieu of aid programs that is often seen in other parts of the world.

An end-to-end approach in developing the capacity of the rice sector has been visible with aid programs tied together in a "custodian-ship" approach to the development of the entire value chain targeting attention to binding constraints.

For example, IFC's Rice Sector Support Project[54] was launched in 2012 to support the development of the Cambodian rice industry, aiming to not only increase farmers' access to improved inbred rice seed and increase their yields but also to increase milling efficiency and product quality, develop and implement a strategy to increase Cambodian rice exports, and reduce the price differential between Thai and Cambodian rice. The focus was thus demand and not supply driven with a clear view to create a pull for high quality rice through the chain that percolated down to the farmer.

With a stated intent to develop agro-SMEs even while providing direct and indirect support to larger millers, the program tried to ensure that the benefits of improved value realization were not limited or concentrated. By encouraging rice millers to get into seed production and partnering with at least one large rice miller and exporter to train farmers of improved cultivation techniques[55], a base for sustained growth is being created.

Existing small private sector mills that lack sophisticated equipment like quality cleaners and color sorters are not being rendered unviable but instead being leveraged as providers of basic / partially milled rice which is then polished and sorted for both the domestic and export market by a different set of millers.

To boost availability of credit, besides developing and implementing a Risk Sharing Framework, IFC directly invested in Acleda Bank which has a strong focus on community access to finance and offers a range of loan products suitable to rice value chain stakeholders' needs. At the same time to build capacity in the credit system, IFC's Mekong Private Sector Development Facility, in collaboration with the Association of Banks in Cambodia and the ASEAN Bankers Association, has established the Cambodia Institute of Banking.

IFC's program was well complemented with IFAD's Support to the Commercialization of Cambodian Rice Project which made strong progress in linking progressive exporters to rice farmers, including working with farmer Agricultural Co-operative formed under the previous projects in addition to programs by other donors including JICA.

Fourth, public-private collaboration was ensured. The Government of Cambodia has long recognized the value of public-private dialogue and coordination. The Government-Private Sector Forum (G-PSF) was established at the initiative of the Royal Government of Cambodia in 1999 and provides a mechanism for public-private sector consultation on investment climate issues ranging from long range policy to day-to-day operations.

[54] Under a multi-donor trust fund of EU, "MPDF" donors (Finland, IFC, Ireland, New Zealand, Netherlands, Switzerland) and Enhanced Integrated Framework

[55] https://www.finchannel.com/business/65833-ifc-partners-with-amru-rice-to-promote-sustainable-rice-production-in-cambodia

The government recognized that as a new transitional economy, the private sector was very weak in taking care of the agricultural downstream sector and sought IFC support for a G-PSF Coordinating Bureau to help the private sector in organizing itself and in substantiating the problems raised with the Government.

In the same spirit, in 2014, the Ministry of Commerce assisted in establishing the Cambodian Rice Federation (CRF) as a catalyst for government policy implementation and a prime information hub for investors, public institutions, policy makers, and development partners. Through the federation the private is directly engaged in periodical review of rice policy with Government[56].

The Government regularly holds discussions at the forum chaired by the Prime Minister, in order to address challenges faced by the private sector mainly concerning trade-related and investment issues. The G-PSF also provides alternative policy options and recommendations. It enables the private sector to advocate, raise concerns directly with the Government, and provide inputs on business and trade-related policies, laws and regulations.

Some G-PSF working groups are connected to steering committees and have development partner participation. The private sector is represented by business associations with CRF representing interests of rice sector stakeholders. Furthermore, the Government holds consultative meetings with non-governmental organizations (NGOs) and bilateral consultations with other stakeholders.

A strong platform for public-private consultation has not only ensured that policy development maintains a fair balance between often diverging public and private sector interests but also enabled small and medium sized stakeholders to have their voice heard and interests represented. That the forum has been setup and driven by the Government has ensured that the mechanism is trusted by all parties while donor support has ensured that the framework is robust with best practices for governance in place.

The results of these efforts have been spectacular. Between 2004 and 2012, the annual growth in agricultural gross production was 8.7%. Agricultural value added grew by 5.3% during this period. This exceptional growth, among the highest in the world, was driven by crop production, mainly of paddy rice.

Since 2010, the rice milling industry has developed to include competitive modern mills with dryers, cleaners, whiteners, polishers, graders, color sorters, and digital packaging machines. Some mills have been certified as GMP and HACCP for food products (Table 10). Cambodia is now competitive with its neighbors in premium fragrant rice varieties where the margins are higher. Cambodian rice earned a $150 USD per premium for its fragrant rice exports to EU market over Thailand. From 10% in 2010, export of fragrant rice from Cambodia has increased to 45%.

Table 10: Expansion in milling capacity and FDI

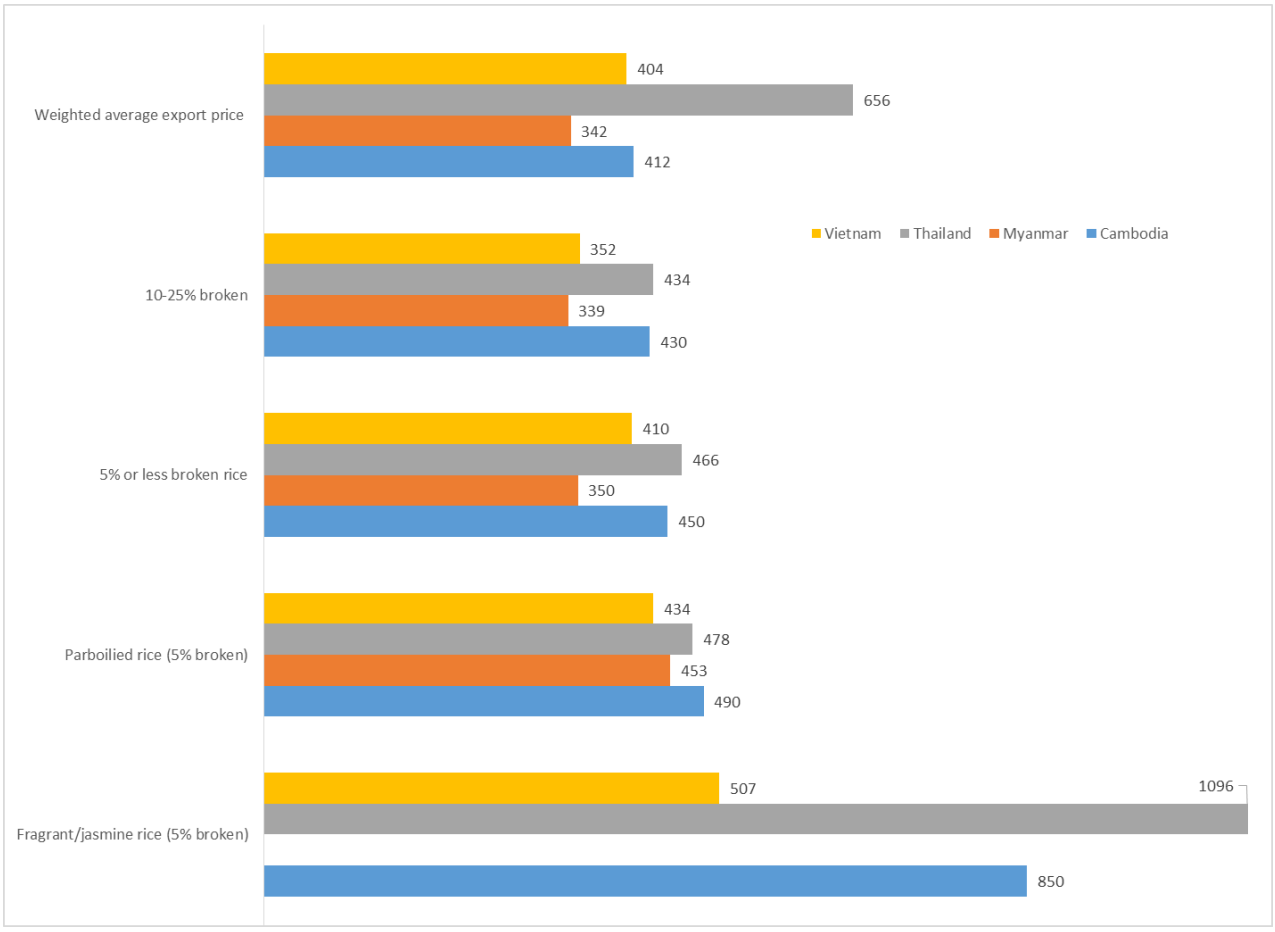
[56] http://www.moc.gov.kh/tradeswap/userfiles/file/uploadedfiles/Gallery/MTP.2016-20202_4_2016_16_5_323_31_2016_8_49_28.pdf

	2009	2011	2013	2015
Large mills (>10MT/hr)		12		22
Small mills		28474		49978
% mills wih FDI	0%		25%	

Source: "Leveraging the Rice Value Chain for Poverty Reduction in Cambodia, Lao PDR and Myanmar", World Bank, 2006

Agriculture lending has risen to 10% of total current financing from under 7% - an increase of 50% over 5 years – predominantly because of the focus on expanding the rice sector. Medium scale farmers have begun to upgrade, by renting or purchasing more land and investing more in to their rice farming operation. All of the investment in large mills came from the private sector, at least 35% of which was from joint ventures with foreign investors. In theory, the existing milling capacity could process almost the entire paddy surplus in Cambodia. Overall commercial bank lending to agriculture increased from USD 400 million in 2010 to USD 970 million in 2014.

Figure 24: Rice export profitability by type in Greater Mekong Subregion (GMS) countries ($/MT); 2015

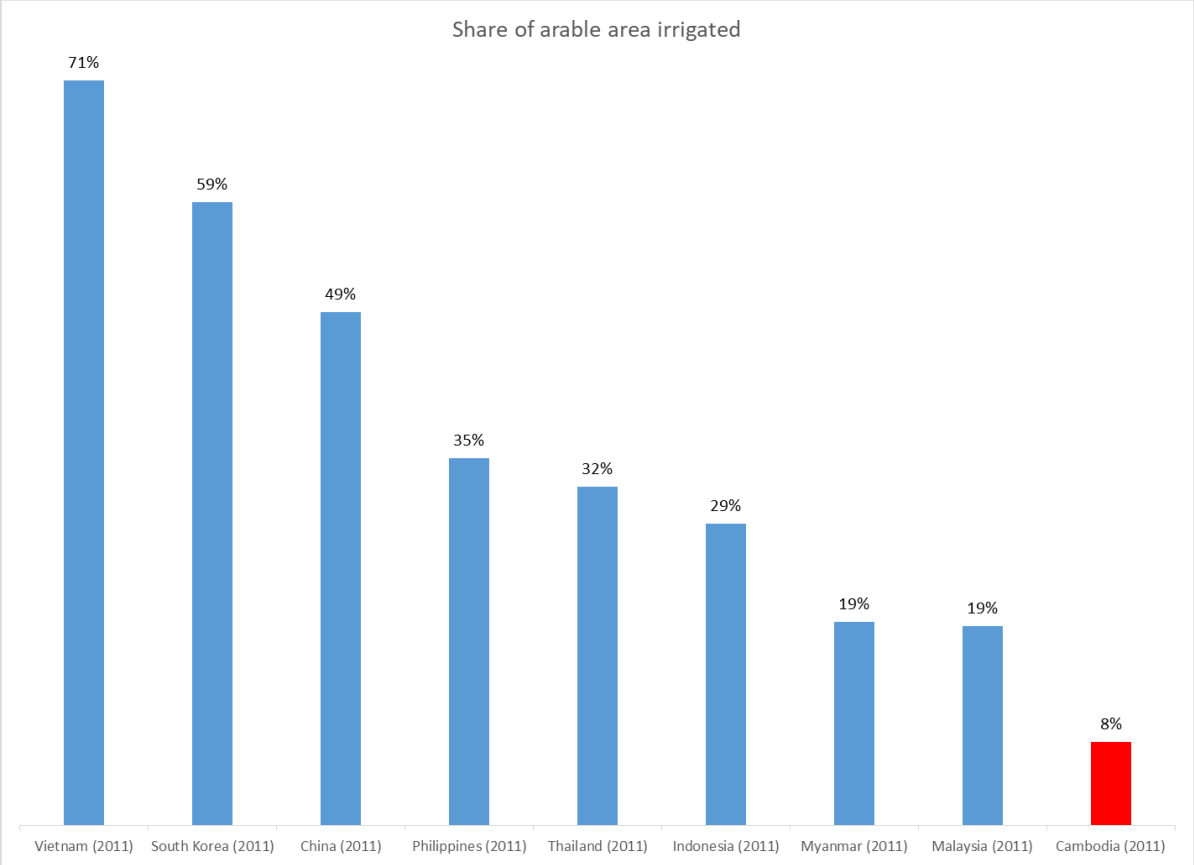


Source: "Leveraging the Rice Value Chain for Poverty Reduction in Cambodia, Lao PDR and Myanmar", World Bank, 2006

In the past eight years there has been an almost total shift from manual and animal traction to mechanical traction. In 1997, it had only 3 agricultural tractors per 10,000 ha of agricultural land, compared with 10 in Laos, 73 in Thailand and 160 in Vietnam.

Demand pull has led to the development of a large, even if informal, network of input providers. That even with one of the lowest shares of area under irrigation amongst rice exporting countries, Cambodia has managed to find a place for itself amongst global premium rice exporters demonstrates the importance of a demand driven approach (Figure 25).

Figure 25: Share of arable area irrigated in select rice exporting countries



Source: Cambodian Agriculture in Transition: Opportunities and Risks, The World Bank, 2015

Key takeaways for West Africa

While the Indian example was primarily about boosting production to achieve self-sufficiency in terms of the sheer quantity of rice needed, the Cambodian case brings out the other (and in the case of West Africa equally important) aspect of boosting the quality of rice delivered to consumers.

The most important takeaway for West Africa from the Cambodian case is to treat their demanding urban markets in the same way as Cambodia treated its export market – with a sharp focus on the preferences of its customers and working back from the same through the entire value chain.

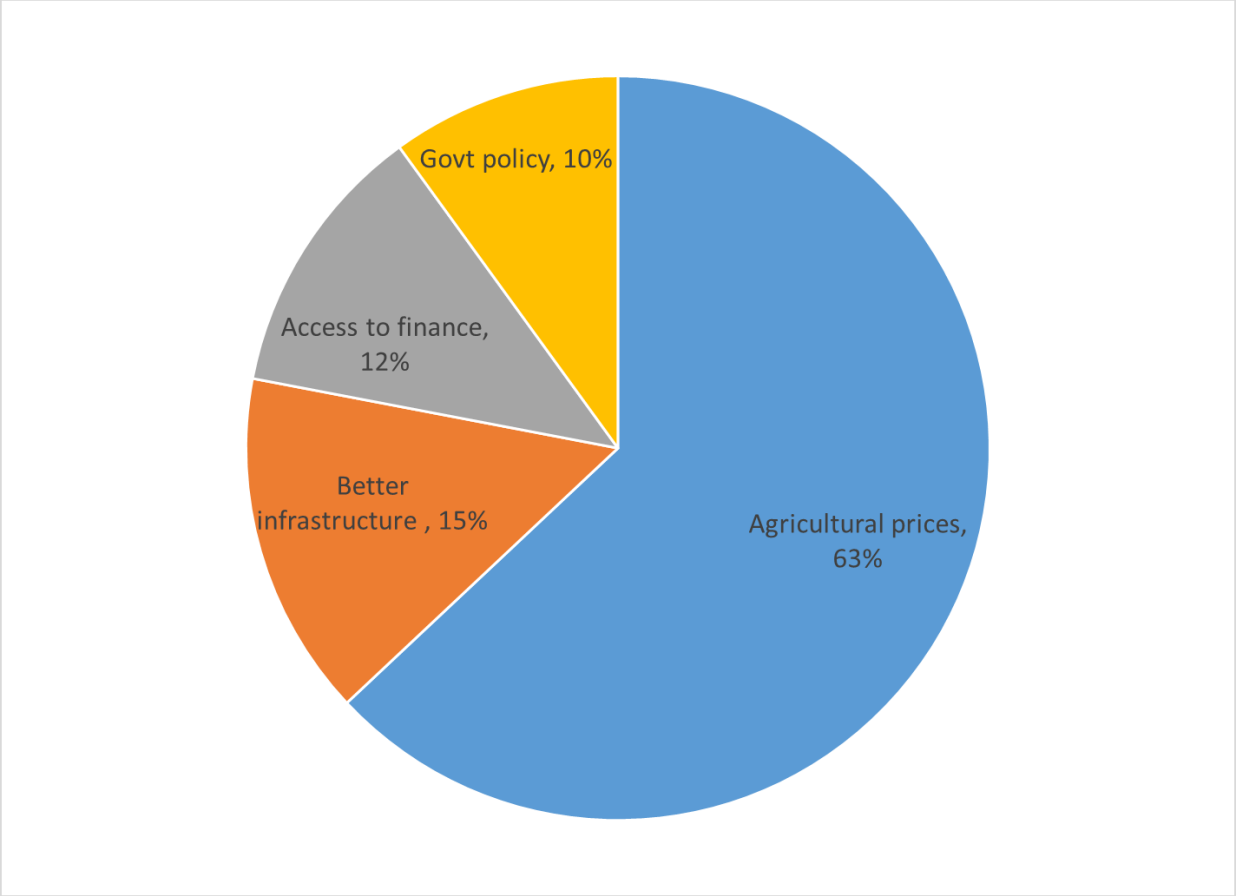
Relatively affluent urban consumers in West African nations have become accustomed to and are able to afford the superior quality of rice that Asian nations have developed over decades. At the same time the relatively poor quality but low cost Asian rice that the urban poor are able to afford has come about on account of scale and government support provided to Asian growers over the decades. Rural producers in West African nations have neither had these opportunities to develop high quality rice for the affluent nor the cost competitiveness to cater to the cost conscious urban poor.

The Cambodian case provides some valuable lessons to accelerate this evolution for the achievement of self-sufficiency in both quantity and quality of rice.

Quality upgradation requires a market-driven approach with a sharp, relentless focus on consumer needs. Cambodia exploited the window of opportunity it had in its access to the European market under the Everything But Arms (EBA) program to push through duty-free exports of rice for this demanding market. By focusing on branding, marketing, positioning and backing it up with quality processing and, most importantly, understanding and mobilizing resources to meet the SPS requirements of these customers, Cambodia was able to drive change from the front. With an urban consumer base that is willing and capable of paying premiums for its quality requirements, policy support has to tilt more towards the downstream end of the chain than it is currently. Though it is tempting to dismiss the downstream part of the chain as something that ought to be addressed by the private sector, the fact remains that private sector capacity remains weak in the region – not much in contrast with the same in Cambodia in 2010.

High agricultural prices that were accessed by policy support for private sector to address demanding European customers were the main driving force behind the high adoption of modern inputs. In order of importance, the reasons driving the high adoption of modern technologies were identified as: the high prices of agricultural products; better infrastructure; and better access to finance (Figure 26: Reasons for use of agricultural inputsFigure 26).

Figure 26: Reasons for use of agricultural inputs



Source: Focus Group Discussions with farmers as part of a study by the World Bank in 2016

With strong demand pull, the private sector rallied around to become active in supplying inputs in all parts of the country, farmers adopted new technologies based on their profitability expectations, which took into account the perceived production and price risks[57].

Clarity of vision, sharpness of focus and senior level sponsorship in policy-making are key to realizing desired outcomes. The Rice Policy of 2010 was clear in that the rationale, specific actions and responsibilities for achievement were clearly defined. It did not hesitate to admit that it would not seek to work on all fronts at the same time and instead overtly emphasized its focus on the milling segment for boosting exports even while recognizing and accounting for development of the other segments over a well-defined time frame. The Prime Minister himself initiated and was involved in the policy formulation[58] and various arms of the government machinery were mobilized and mandated with elements of its implementation. The predictability that mobilization of private sector and foreign investment requires was thus brought about.

Scale in milling does not have to be concentrated in a few large firms. Cambodia continues to have a milling sector that is widespread and diverse with the (often symbiotic) co-existence of both large and small firms. While some small mills have leveraged a better credit environment

[57] Cambodian Agriculture in Transition: Opportunities and Risks, The World Bank, 2015
[58] Presentation on " Cambodian Paddy Production & Rice Exports in Overall Agricultural Policy & Trade Policy" at ASEAN-Korea International Symposium, May 2015

and availability of seeds to work with farmers and scale up their operations, others have become suppliers to larger mills which add further value (through processing / polishing / packaging / branding) to reach high value markets. Targeting the high value market has made sure that even when the number of layers in the chain may be greater, every stakeholder makes enough to be commercially viable. The availability of a strong platform for public private consultation ensures that interests of all stakeholders – large and small – are represented. While contract farming arrangements are beginning to develop, that fact that farmers have other options to profitably make a sale of their paddy even on a transactional basis at one end and the wide availability of inputs at the other end ensures that the challenges around lack of loyalty of farmers in the face of heavy costs from offtakers on provision of inputs to farmers that are so often encountered with contract farming arrangements in West Africa are absent. Donor supported attempts, albeit with limited success, have even been made to develop commercial mills under agriculture cooperatives.

Just as the compliance with SPS and other quality requirements of demanding global customers forced a disciplined approach by public and private stakeholders towards meeting the same in Cambodia, a layer beyond the miller but before the urban consumer may be required in the rice value chain in West African nations without diminishing the primary role of better post harvest practices and milling to deliver clean, consistent and reliable supply of domestic rice. Branding, marketing, promotion, innovative packaging, merchandizing aligned to consumer preferences are distinct capabilities needed to make the urban consumer re-orient back towards domestic rice, a preference that appears to have been lost in the face of decades of poor quality supply from the hinterland. A marketing approach akin to "consumer products" is required the capacity for which is perhaps completely absent from incumbent domestic millers. The rice sector in West Arica therefore perhaps needs to be made attractive to consumer products companies that can function much like the Fast Moving Consumer Goods industry where entities specializing on these aspects outsource production to several SME contract manufacturers allowing for the co-existence of large and small enterprises.

Regional linkages matter and, if leveraged well, can be synergistic. Even when large quantities of unmilled rice was going out from the country into neighboring countries, Cambodia did not disrupt this flow even when "protecting" and making sure value addition may have tempted them to do so. On the contrary, FDI was invited, including from neighboring countries, drawing in investment.

Chapter 6: Lessons from Thailand

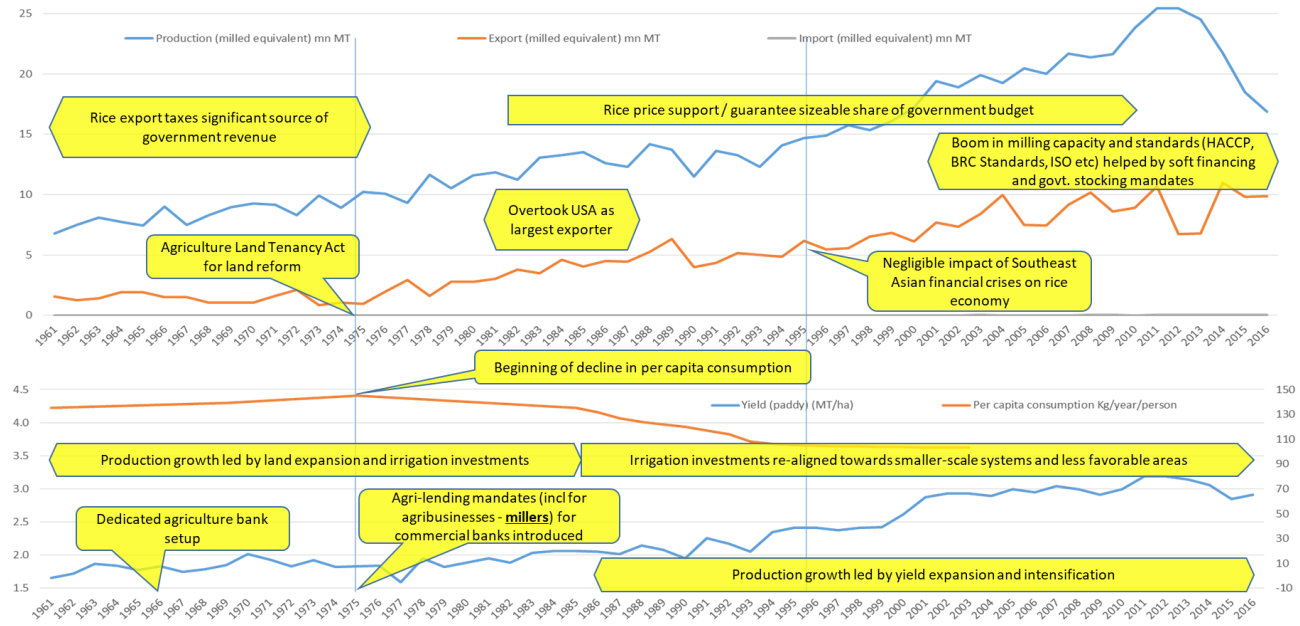
As a traditionally strong exporter and consumer, a lot can be learnt from Thailand

Unlike in the case of both India and Cambodia, Thailand has been a consistent exporter of rice for several decades. A smoother evolution of the rice sector is evident with only relatively minor ups and downs.

The first irrigation project in Thailand was completed in late 1800s, research and development in rice started as early as 1907 and the country has had thriving cooperatives since 1916. In that sense, Thailand offers the greater breadth and depth of experience from a country that has demonstrated more or less sustained progress in the global rice sector with it being the largest exporter of rice in the world since the end of the Second World War.

The success (and failure) of balancing public-private roles is evident

Figure 27: Evolution of the rice sector in Thailand



In the past, Thailand has used policy instruments effectively at different points in time to extract revenues from its dominant position in rice exports on the one hand and supporting producers to insulate them from adverse impacts of volatile global rice prices on the other hand.

Figure 27 traces the evolution of the Thai rice sector over the last 60 years. In stark contrast to the predominance of sustained government support to rice producers in other Asian countries, Thailand had a policy of taxing exports until the 1970s enabling the government to keep domestic prices low without letting export prices fall. Government revenues from such taxation reached close to 32% in 1953. Given its dominant position as a rice exporter which could arguably be construed as a "monopoly", the policy makers could sustain such a policy effectively

leveraging the country's strengths in rice to support its finances for not just the development of the foundations of agriculture – irrigation, land development etc – but for overall economic and industrial development. In this period, land under cultivation expanded exponentially with the the government's policies directed towards enabling clearing of land and protecting peasants' rights. The government helped peasants gain access to land and protected them from aristocratic landlords.

Thus production grew well primarily driven by growth in area under cultivation, generating enough surplus to service both a rising per capita consumption and exports.

By the mid-70s, as per capita consumption started to plateau indicating that consumers (especially urban, the share of whom itself was rising rapidly) were starting to move beyond rice and limits to the expansion of area under cultivation became evident, policy direction turned towards consolidation of the country's position in rice. The Land Tenancy Act was introduced to secure land rights and begin the process of a greater focus on farm productivity from that of focus on volume of production alone[59].

The dissemination of new varieties in the 1970s contributed to the yield increase in the 1980s, since the average yield of dry season crop was twice that of rainy season crop. As input-intensity of production rose, credit flow to agriculture was boosted to enable the same. From 1975, all commercial banks had to allocate 5% of all commercial loans for agriculture at an interest rate lower than the market rate. This was later increased to 11% in 1978, when an additional 2% of lending to agribusiness/agro-industries was also mandated. These mandated shares continued to rise until 1987, when they were increased to 14% for agriculture and 6% for agribusiness. Shortfalls in these targets were to be deposited in interest-bearing accounts with the Bank for Agriculture and Agricultural Cooperatives (BAAC). Since commercial banks preferred to offer credit mostly to large farmers, access to credit for small and medium farmers was primarily pushed through BAAC. Established in 1966, in 1971 it introduced a scheme wherein collateral was not always required and BAAC accepted either group lending schemes or guarantors instead. This enabled small farmers to access short-term credit without land titles. Until the late 1990s, BAAC operations were largely guaranteed by the Bank of Thailand and supported by the international financial institutions.

Price support was provided to producers through a rice pledging scheme (Refer Box titled "The rice pledge scheme explained") to ensure incentives for production remained even when rising competition from a wider basket of rice exporters started to put pressure on export prices. Support was extended in a manner that encouraged the development of milling capacity also

[59] The Agricultural Land Reform Act of 1975 was enacted in an effort to address the high rate of tenancy in certain regions of the country, the large number of landless households, and the encroachment of public lands for cultivation. The Act reaffirmed the state's support for the allocation of state and private land to landless and near-landless households. The Act also provided tenants with opportunities to lease or purchase the land they cultivated and allowed for squatters and others who had encroached on state land to regularize their rights. The Act closed a loophole in the land-ceiling provision of the Land Code by setting household-level ceilings (versus individual ceilings). The Act created the Agricultural Land Reform Office (ALRO) in the Ministry of Agriculture and Cooperatives to implement reforms (KOT Agricultural Land Reform Act 1975).

since millers were mandated to process pledged paddy and play various other roles including storage for the rice farmers pledged to the government.

The Rice Pledge Scheme Explained

The paddy pledging scheme had been the main component of programs for supporting farm prices since the 1990s. The scheme was implemented in the following manner. A farmer pledges his/her paddy in a warehouse of his own, a farmers' organization, or a rice mill in the same province. The government assigns the Bank of Agriculture and Agricultural Cooperatives (BAAC), a state enterprise for accommodating finance in the rural sector, to lend the farmer money equivalent to the value of the pledged rice. The value is calculated at a price predetermined by the government.

Rice mills are allowed to accept rice volume to a maximum of 50 times the daily milling capacity. The mills are required to have facilities for drying and stocking paddy. Milled rice is sent to warehouses arranged by the government. The farmer can choose within three to four months, whether to forfeit or redeem the pawn. In the former case, the farmer keeps the lent money as the payment of the paddy. This means that the scheme guarantees that farmers sell their paddy at the governmentally fixed price. In the latter case, the farmer must pay interest at 3% per annum. The volume of pledged paddy was not significant until the 1990s, in most years, less than 5% of total production (Table 4-2). However, the share reached more than 10%, sometimes 20%, after 2000. It had become a meaningful program for many farmers.

Rice millers welcomed the scheme, too. They received fees for milling pledged paddy, which meant that accepting more paddies gives them more income. Since the capital for paying farmers was provided by the BAAC, the millers could save their capital for other purposes, such as enlarging the scale of production. They had an incentive to develop their facilities since the government allocated the amount of paddy according to the rice-milling capacity and the facilities for drying and stocking. During the period from 2003 to 2007, the number of participating rice mills fluctuated between 400 and 800. Compared with the membership of the Thai Rice Mills Association, which was around 800 in 2009, it can be said that a considerable number of mills joined this program

Extracted from "**THAILAND: TOWARD A DEVELOPED, RICE-EXPORTING COUNTRY**" by **SHINICHI SHIGETOMI**

With the aforementioned initiatives resulting in a healthy private sector milling and exporter sub-sector, the latter utilized their enhanced capacity to invest and availability of credit to enhance the quality of produce to be able to command premiums arising from branding, packaging and implementation of international standards. Along with capital investment some mills invested in developing internationally recognized standards such as HACCP, British Retail Consortium Global Standards, and ISO, among others. This shift in thinking from commodity handling to food processing, which can be seen in mills packaging rice in consumer packs for domestic and overseas markets bears an important lesson for West African nations to secure their sophisticated urban markets.

Thus large mills have grown incrementally from lower capacity levels encouraged by greater availability of paddy (in turn enabled by the government's price support even while direct

support in terms of price for acquisition of inputs has been limited), preferential availability of credit and indirect support from the pledging scheme which reduced the risk from investments in capacity expansion. In contrast, the lack of attention to the key prerequisite of ensuring paddy supply before investing in large capacity upfront is an obvious but, in practice not well implemented, characteristic milling capacity development in West Africa.

Availability of high margin export markets has ensured that each stakeholder in the value chain is able to extract an attractive margin even while being narrowly specialized. Exporters are typically independent of millers who typically work with a network of agents both for paddy supply and rice sale. In West Africa, unlocking the high margin urban demand for the local producers can similarly enable a tiered chain that can co-exist with larger integrated players ensuring the indispensable competitive tension that is a must for sustained efficiency of the value chain.

Key takeaways for West Africa

With its rich and uninterrupted history of dominance in rice, the Thailand case study reinforces learnings from the India and Cambodia examples - that enablement of the private sector and demand orientation balanced with close government "push" can work wonders as seen in the case of Cambodia, that uncontrolled intervention can easily get populist and spell waste as seen in the case of India and Thailand. At the same time, the tempting conclusion that is drawn by large sections of contemporary media - that government intervention always distorts markets – is proven wrong from these case studies. Intervention – whether it is on prices, quantum of export and import or incentives for producers – if carried out on an "exception" basis with a sustained focus on solving market failures and providing for underprivileged populations – is not only desirable but enables, instead of distorting, markets. On the other hand, a single-minded focus on private sector facilitation can sometimes be counter-productive. When the private sector is pulled in to perform what are essentially public services (for eg. enablement of an environment for inputs availability and efficient markets for smallholder farmers) through what are sometimes arguably binding and inflexible outgrower arrangements, the context is better describable as the private sector crowding out the public sector as against the opposite!

At the same time, the transferability of learnings from Thailand is limited by the fact that for Thailand, the rice sector has in the past been exactly the opposite of what it is for West Africa – a cash cow much unlike the cash drain it is for West Africa.

Need to encourage / nudge private sector into the domestic chain. Thailand enabled millers to expand and invest through support for credit while providing opportunities for revenue enhancement and operational efficiency by leveraging their strengths for delivering on its paddy pledging program. The domestic rice value chain in most West African nations has scant incentive to upgrade with almost none of these enablers being in place, which if provided, mend the broken link with urban high value markets.

Price and market intervention policies are sometimes justified but only as long as they are calibrated, temporary and linked to market realities insulating these from populist pressures. The same paddy pledging policy that helped Thailand achieve superior outcomes has, in the recent past, distorted markets by practically delinking farmer support prices from the market.

Each segment in the value chain must be independently sustainable, even while partnership approaches are leveraged for mutual benefit. Vertical coordination is key to developing efficiency value chains but when that coordination is imposed – as against being naturally evolved driven purely by the desire and conviction of mutual benefit – it is bound to fail, as has already been witnessed in numerous failed outgrower schemes in the rice sector in the region. Specifically, enabling farmers to grow more and grow the right quality while having multiple choices (competitive tension) for making a sale is the only way to ensure that they produce sustainably. Resources directed towards solving the farmers' problems must be the centrepiece of public policy – the problems in the context of West Africa being one, the lack of capacity to access the right inputs and two, the unavailability of a competitive market either at the farm gate or at the urban high value markets.

Having some bad middlemen is better than having none. Agents play a crucial role in ensuring that there is competitive tension along the chain. Instead of single-minded attempts to disintermediate middlemen assuming this segment as a whole does not add value the focus should be on creating capacity and an enabling environment for them to thrive while regulating unscrupulous practices. For example, the governments of both India and Thailand, ensured that infrastructure for wholesale marketing of agri produce was developed either by the government or in public private partnership mode to create the essential ecosystem for a farmer to access multiple buyers near his farm.

Without a "demand pull" the best efforts at developing a value chain are bound to fail. While in the case of Asian countries studied for this report the demand pull was clear – India's need to feed its own burgeoning population while controlling imports and Cambodia and Thailand's access to the global market – in the case of West Africa, the demand pull is missing for domestic producers as it is already served by imports. While blocking imports to allow the pull to be directed towards the domestic producers might appear to be an easy solution, it has not worked in the past and has, in extreme cases, even led to social unrest. The current custodians of urban demand – the importers – on the other hand have the both financial and operational capacity to allow this pull to percolate upstream through their existing domestic distribution network. It is imperative therefore to consider options for sparking their interest in leveraging local production to service high value urban demand.

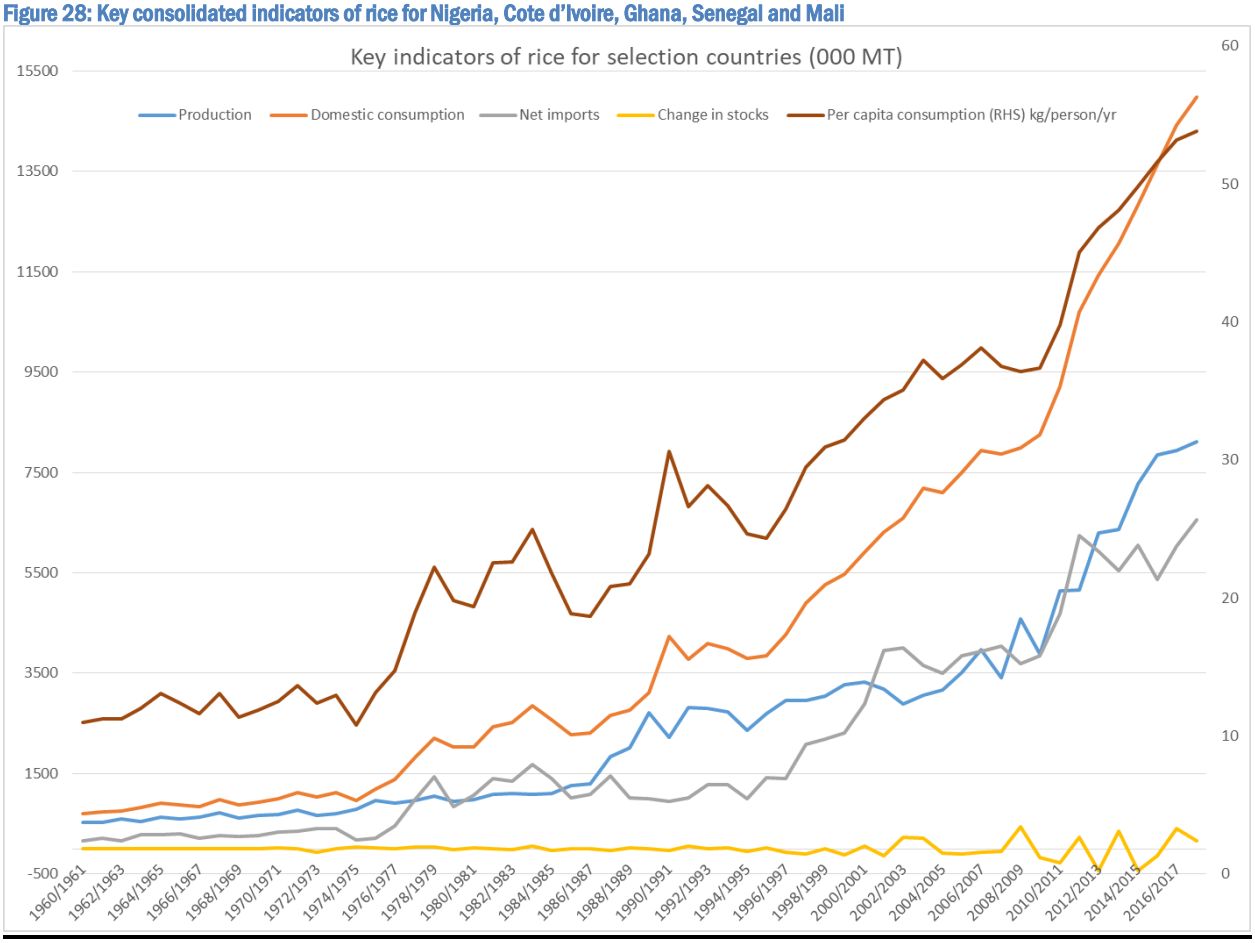
Chapter 7: Reducing rice import dependency in West Africa

Current context of rice value chain in the region

Quantum of consumption and imports

Rice consumption in the focus countries amounted to 15mn MT in 2017/18 having grown at 6.7% CAGR since 2007/08[60]. With production amounting to only 8mn MT in the same year, even with 9% growth in production, the gap (filled by imports) has been widening at the rate of 5% in the same period (Figure 28).

Figure 28: Key consolidated indicators of rice for Nigeria, Cote d'Ivoire, Ghana, Senegal and Mali



Source: USDA, FAOSTAT; Note: Volumes for Nigeria are adjusted to account for leakage of imports through Benin.

It is tempting to conclude from these statistics that sustaining production growth at current levels will lead to import substitution over a period of time since production growth appears to be outpacing import growth. However, this would be a premature conclusion for three key reasons

1. Different types of rice display different rates of consumption and import growth
2. It is widely believed that reported production numbers are significantly overstated

[60] USDA

3. At these rates, self-sufficiency will take another 28 years to achieve, by when another 220mn MT of rice would have been imported, which amounts to $90bn even at current prices[61]!

It is imperative therefore to accelerate the pace of production that is aligned with the preferences of consumers who buy imported rice while taking a deeper look at the nature and root causes of rising imports by type of rice. While lack of reliable data makes this challenging, the following narrative pieces together an understanding of the current situation based on literature review and limited field research.

Nature of consumption and imports by type of rice

Even while rice is a single commodity, there are numerous types of rice that correspond to the specific nuanced requirements of different consumer segments. Characteristics of rice can differ along various dimensions determined by the variety, the length of grain, whether it is fragrant / aromatic or not, how it is processed (eg. Parboiled or not, with/without foreign materials, share of broken kernels etc), how suitable it is for various types of local dishes, how it responds to and looks after cooking in terms of its stickiness, duration required to cook etc.

While it is challenging, especially within the scope of this study, to identify each and every combination of these characteristics that define distinct customer segments, it is learnt from research and discussions with industry players that from the consumers' perspective, the decision to purchase rice is influenced strongly by the following factors (presented in no particular order here[62])

1. Price
2. Quality, which in turn can be driven from
    a. Level of foreign matter
    b. Homogeneity
    c. Quality and variety in packing, merchandizing, placement in retail etc.
    d. Merchandizing
3. Other preferences
    a. Length of grain / share of broken kernels
    b. Aroma / fragrance
    c. Level of processing (parboiled vs non-parboiled)
    d. Consistent, reliable and convenient availability
    e. Cooking performance (sticky or not, time taken to cook etc)
    f. Colour

Some of these characteristics are closely inter-related and may be found in combination with others. For example, it is more likely that consumers who are willing and able to pay a higher price will demand better quality on all the above sub-parameters under "quality" even though "other preferences" can vary widely even amongst these consumers. Also, for example, while for

[61] CIF price at Abuja as of
[62] Which of these factors matter, how much and in what order is a defining characteristic of consumer segments.

consumers who prefer aromatic rice, even a high share of broken kernels can command a premium but for others, a high share of broken kernels would impact price realizations.

In industry practice, rice specifications for wholesale trade are often outlined in terms of three main areas

1. Percent of broken grain which can range from less than 5% to 100% with relatively larger volumes around the standard brokens level of 5%, 10%, 25%, 50%, 75%, and 100%
2. Aromatic / fragrant or not
3. Parboiled or not

Each of the above may in turn display different levels of other characteristics mentioned above.

Per capita consumption of rice in the region is 54kg/person/year though the consumption by country varies significantly. While Nigeria and Ghana have relatively lower consumption per capita, for Senegal, Cote d'Ivoire and Mali it is more than double the region's average at around 110kg/person/year.

While accurate data on preference of consumers in the region along the lines of the above-mentioned parameters is unavailable, piecing some of the information available from a literature review reveals the diversity of preferences amongst countries. (Figure 29)

Figure 29: Consumer preferences by types of rice in the region

Ghana Import shares		Broken share		
		5-20%	30%-90%	100%
Fragrant	80%	Majority of imports	Minority of imports	10% of consumption
Non-fragrant				
Parboiled	1%			
Non-parboiled				
Total	68%	32%		
High preference for aromatic; low preference for high brokens; very low parboiled imports; overall more premium market than rest of WA				

Cote d'Ivoire Import shares		Broken share		
		5-10%	15-35%	40-100%
Fragrant	55%	2%	80-85%	12%
Non-fragrant				
Parboiled				
Non-parboiled				
Total	65-75%	25-35%		
Wider range of brokens; not as inclined as Ghana towards fragrance; Level of brokens is not as important as freshness, aroma and homogeneity				

Senegal Import shares		Broken share	
		5-50%	60-100%
Fragrant		30%	70%
Non-fragrant			
Parboiled			
Non-parboiled			
Total	0%	100%	
Mostly brokens but share of low brokens rising			

Mali import shares		Broken share		
		5-25%	40%	100%
Fragrant		0%	Most local rice	Most imports
Non-fragrant				
Parboiled				
Non-parboiled				
Total	56%	42%		

Nigeria import shares		Broken share
		5-100%
Parboiled		95%
Total	57%	31%

That consumption of imported rice is concentrated in urban areas with local rice finding its way to urban areas only minimally is borne out by the fact that, for example, over 70% of imported rice and less than 20% of local rice in Ghana is consumed in urban areas and over 50% of imported rice in Cote d'Ivoire is consumed in Abidjan alone.

Broadly, rural and urban consumer preferences differ and align more closely with rice available locally and from imports respectively. However, the penetration of imported rice in rural areas is gradually rising.

Import substitution would require meeting the specific combination of requirements of consumers along the dimensions outlined above which are currently fulfilled by imported rice but either unfulfilled or only partially fulfilled by locally available rice.

Nature of domestic supply

Unlike in Asia, the region is dominated by upland rice cultivation that mostly serves subsistence needs with isolated irrigated and limited lowland areas servicing the balance domestic rural and relatively small urban demand for local rice.

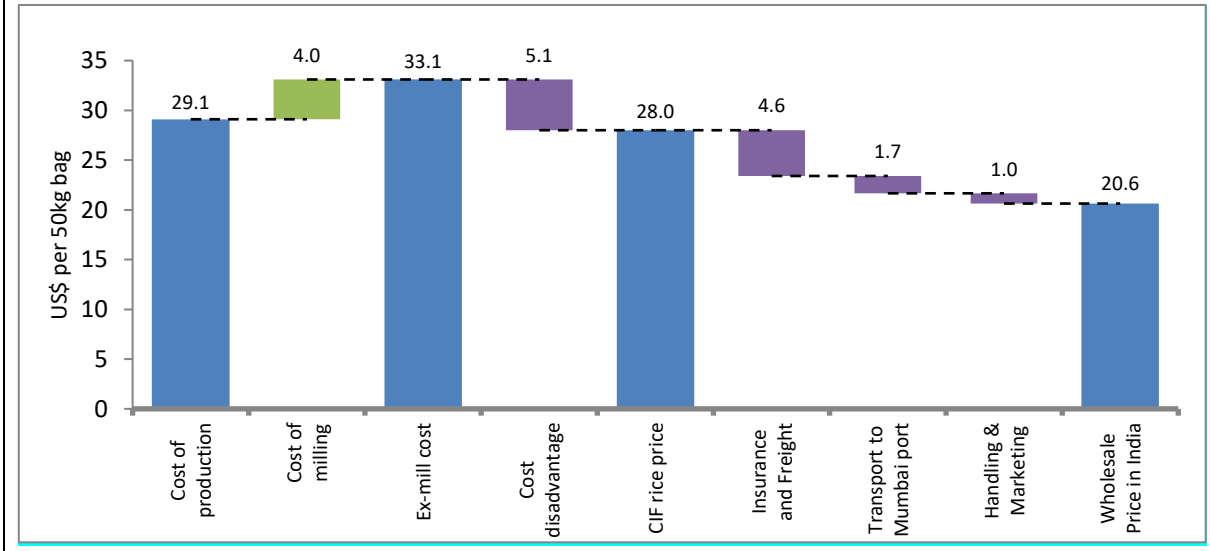
Use of certified seed is limited to under 20%[63] and the penetration of fragrant long grain varieties, while rising, continues to be limited. Penetration of input usage is also relatively low

[63] Interviews with government representatives in Ghana

given that most rice is grown for household consumption[64]. The motivation for generation of high surpluses with the use of better seeds and inputs is limited in a context where options for offtake are limited to the local catchment and the cost of inputs is high. Local production in large parts of the region is stuck in a vicious cycle - production is not aligned to the tastes of urban consumers on account of the abovementioned factors which curtails linkage to these markets and this lack of linkage in turn depresses any motivation for improvement in quantity and quality of produce that the urban consumer easily accesses from imports.

To the extent cultivation is fundamentally aligned with what the consumers of imported rice demand – in terms of fragrance and length of grain / share of brokens – the cost of cultivation per unit of paddy tends to be on the higher side on account of the higher cost of inputs, low scale of production and / or poor yields (Figure 30). Absence of extension services means that even when the inputs might be used, cultivation practices are not optimal – for example, varietal mixing is common which can take place either on account of unorganized / unethical / incapacitated seed suppliers or ignorance of the debilitating impact of the same on the part of the farmer.

Figure 30: Illustrative comparison of Imported rice with Domestic rice competitiveness with upland production under existing methods (50kg bag of 5% broken rice)



Source: USAID, "EXPORT OF RICE FROM INDIA: PERFORMANCE AND DETERMINANTs", Anup Adhikari, Punjab Agricultural University, India (2012/13)

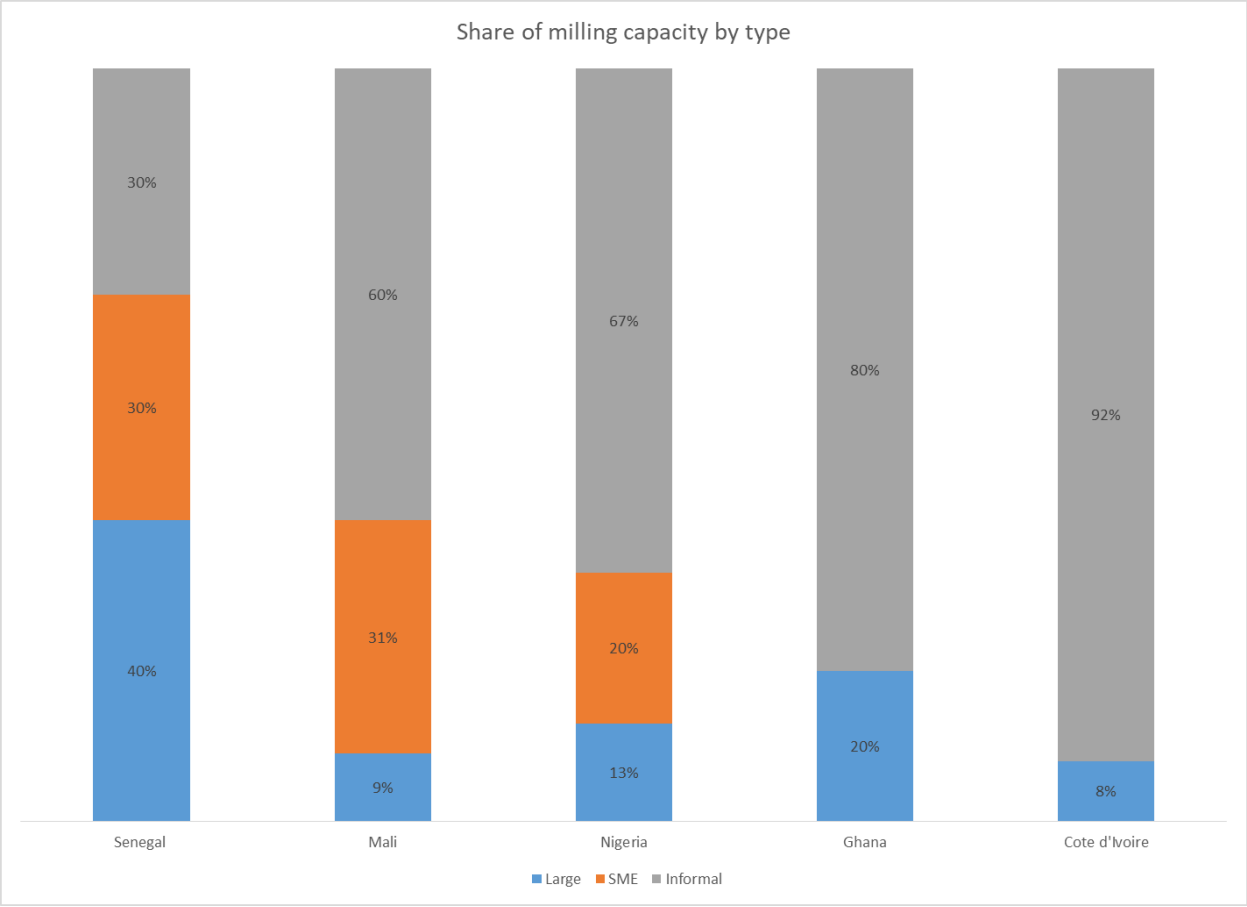
While strong support to farmers by their respective governments, their scale of production and quality and efficiency of milling[65] lowers the cost of cultivation for farmers in Asia, a well-oiled

[64] Fertilizer use in Africa is said to be very low. It is estimated at 6-12kg/ha/year and has supposedly stagnated at this number for the last 10 years. While the average fertilize use rate for middle and low income countries is 100kg/ha, no African country is said to have been able to achieve the 50kg/ha/year target set for 2015 at the Abuja fertilizer summit. (World Bank, 2015)

[65] The level of investment and rigor that goes into preparation of Asian rice or exports to West Africa is evidenced in the fact that Thai exporters have access to dedicated *re-processing* capacity that prepares the milled rice bought from scores of smaller mills further for export. Each importer buys milled rice from these smaller mills and stores it bulk in silos and warehouses, often using grain chilling to prevent pest infestation. Re-processing involves sorting and

chain of efficient logistics[66] keeps logistics costs low. As against this, the West African farmer uses archaic methods for threshing and drying that causes breakage and contamination and sells his rice to mills that are largely artisanal mills which cause further quality loss from breakage and contamination and quantity loss from waste. Parboiling practices also remain largely artisanal for rice milled by informal mills (Figure 31).

Figure 31: Share of milling capacity by type



Source: Global Alliance for Improved Nutrition (GAIN); Interviews; Note: Informal mills are village level mills with capacity of between 0.2-2MT; SME mills are defined as those with a capacity of 2-10MT/day with the rest being classified under the Industrial mills category

Milled rice from these mills is then marketed through a chain of small traders / wholesalers that – for the most part - do not have access to the formal financial systems limiting their capacity to invest in value adding activities like packaging / re-packaging / polishing / merchandizing that large financially strong importers with access to and credibility with formal financial institutions excel in. For the same reason, local rice millers (to the extent commercial millers exist) and

cleaning the rice to produce just the right quality in terms of broken percentages for the West African consumers' palate

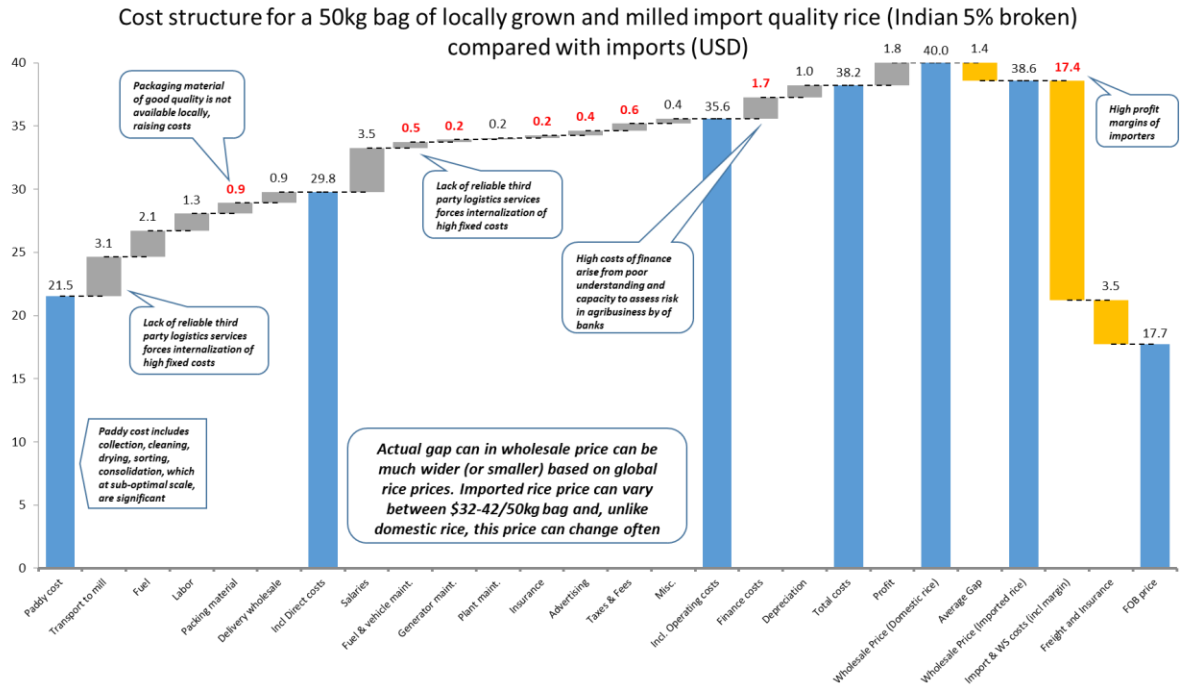
[66] Majority of volumes to the largest markets of Senegal and Nigeria are through bulk shipping at very low ocean freight rates, followed by break-bulk shipping which is marginally more expensive and only marginal volumes are moved in containers by mostly smaller importers at relatively higher unit prices.

distributors are unable to push their produce through the chain as they cannot match the credit terms importers are able to provide to their wholesalers and stockists[67].

Understanding gaps in achievement of latent Competitiveness in the Rice Value Chain

A look at the cost structure (Figure 32) of a typical rice milling operation in West Africa compared with the cost build up for imported rice reveals that key contributors to the lack of competitiveness arise from cost of procurement, finance, packing material, taxes & fees, marketing/advertising, insurance and captive electricity besides the cost of logistics[68]. At the same time, the mark-up between CIF and wholesale price is significant[69].

Figure 32: Illustrative cost structure for a 50kg bag of rice locally grown, milled and distributed



Note: Illustrative example. Key assumptions include purchase price of paddy @ $14/50kg with a 65% conversion ratio from paddy to rice; cost of working capital finance @ 17%; case of a milling operation integrated into distribution up to wholesale packaged into 50kg bags for a mill of 130MT/month milling capacity; working capital finance is included only for purchase of paddy (not for indirect materials nor for distribution channel credit). Sale price is for is 50kg bag of parboiled rice in wholesale market. Miscellaneous costs include stationery, professional services, communication, fumigation etc.; Red highlighted numbers indicate costs that contribute most to lack of

[67] According to a large commercial miller in Ghana that the author interacted with, the company's attempts to distribute locally milled rice in Cote d'Ivoire have triggered strong anti-competitive behavior by one of the incumbent large importers – allegedly the said importer strongly disincentivized all its distributors from carrying the company's locally milled rice.

[68] In the absence of reliable third party logistics services vehicles for distribution are projected to be owned in this model raising total cost of ownership

[69] While this markup includes all costs (and margins) after landing at the port (the breakup of which could not be sourced in this study), the quantum of difference is high and given concentration of the importers market, it can be hypothesized that importer and wholesale margins for imported rice and quite high.

competitiveness in the post-harvest chain; Source: Author's triangulation based on multiple industry discussions, USAID, Food Corporation of India and various government representatives from target countries (2015/16)

Several costs that contribute to lack of competitiveness can also be addressed by improving the business environment. For example, the cost of backup electricity (generator maintenance) and captive logistics (vehicle maintenance and fuel) are inflated because of the absence of public and private infrastructure and services that would otherwise exist in any ecosystem - problems that exporting nations have solved. Similarly, the cost of finance, insurance and taxes & fees can also be addressed with policy reform. Further, domestic manufacturers are compelled to import packaging material for their merchandizing in urban markets to be as appealing as imported rice which raises costs further.

As mentioned in the preceding sections, use of improved varieties can reduce cost of production significantly which, combined with these factors, can not only bridge the gap between imported price and domestic costs but could potentially make rice cultivation in some West African nations competitive for regional exports to its neighbours.

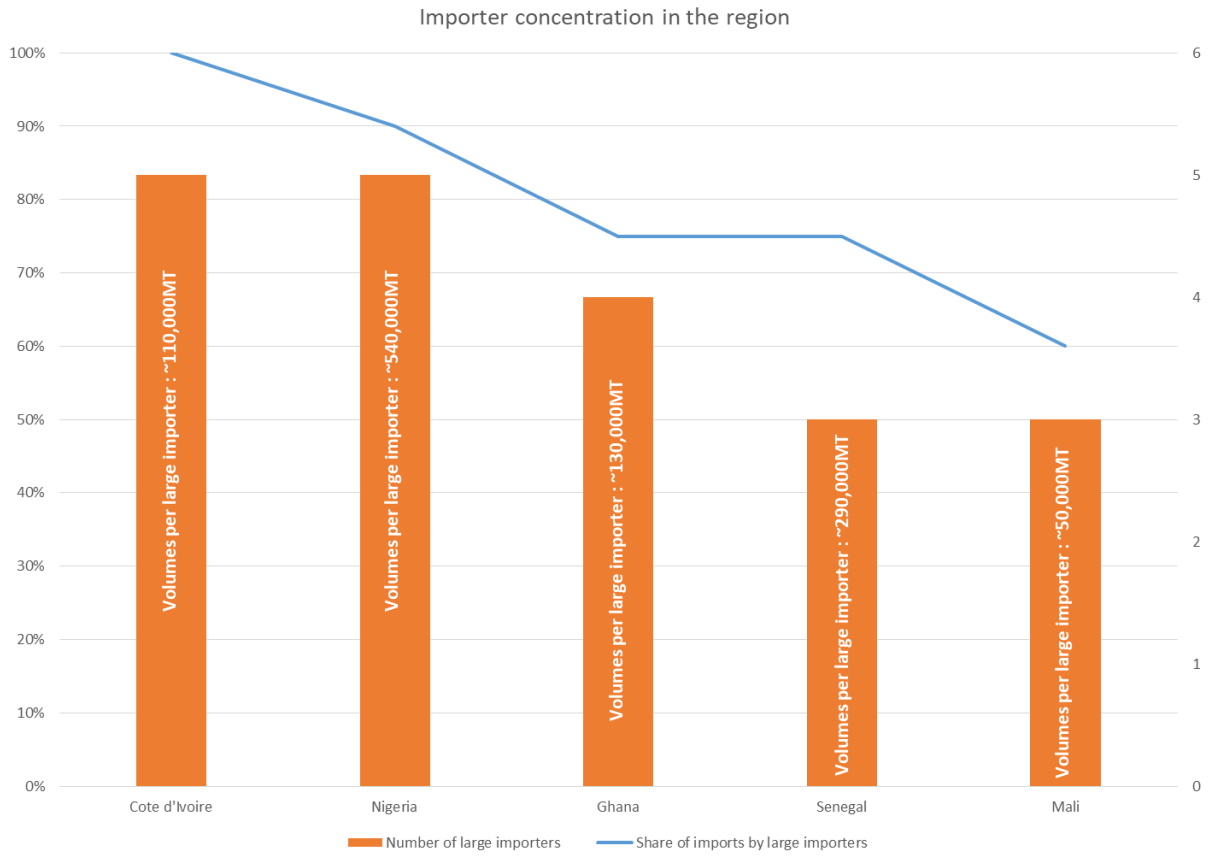
Based on this analysis, if the additional burden of cost on local rice millers can be brought down by 50% (of costs highlighted in red) through actions to improve the enabling environment and recommendations provided in this chapter, it would mean a reduction of almost $2.2/50kg bag (or $44/MT) which is more than the current profit margin of the miller.

Source: Industry discussions

Industry structure of local supply and imports

The fragmented and unorganized local rice supply chain is no match for the concentrated and influential importers. As against several million smallholder farmers selling 15mn MT volumes of rice through thousands itinerant traders to thousands of mills – most being informal with under 1MT/day capacity, with high level of breakage and no access to polishing and packaging comparable to importers - in turn supplying to a myriad of small distributors finally onto hundreds of small retailers mostly on the streets, a majority of the 7mn MT of imported rice is imported by around 15 importers in each country and supplied through a well-capitalized network of distributors (Figure 33).

Figure 33: Importer concentration



The size of importers, their financial strength and the fact that their business ensures the supply of a staple food the shortage of which can destabilize the whole economy creates a concoction that no political establishment is comfortable with changing. Even as controls are imposed on importers, field interviews reveal large scale suspicion of corruption arising from this situation that is allegedly meant to protect vested importer interests even at the cost of developing the local rice supply.

Regional trade and cooperation

Even as each country independently pursues its goal of rice self-sufficiency, imbalances between production capacity of seed and paddy and milling capacity for paddy leads to significant volumes of intra-regional trade[70] (Figure 34). Movement of imported rice into Nigeria via Benin, into Mali via Senegal and movement of paddy and seed from Burkina Faso to Ghana are particularly prominent[71]. A study by the Bill and Melinda Gates Foundation (2012) reports that despite the ban on rice exports in Burkina Faso, the measure is very difficult to enforce. Local

[70] Surveys conducted by USAID for several food staples estimate that between 66% and 80% of intraregional staple food trade is not accounted for in official statistics (World Bank, 2015)

[71] Mali and Côte d'Ivoire supply slightly over half of total rice consumption in the central basin. Although Mali produces 95% of the rice it consumes, other countries in the basin produce only 30% to 40% of their rice requirements. Traders import the balance, primarily via Abidjan but also from Accra for coastal consumption and trans-shipment inland.

traders still find ways to export, leading to unofficial estimates that up to 20% of locally produced rice paddy from Burkina Faso leaves the country illegally.

The Common External Tariff (CET) was launched in January 2015, after 10 years of negotiations. It is organized into five different tariff bands of 0%, 5%, 10%, 20% and 35%. While the 35% band comprises 90% of agricultural products, a notable exception is rice, which is in the 10% tariff band, implying that the interests of rice consumers (low price) prevailed over those of rice producers.

However, there is slow progress on the actual implementation of these regional commitments at national level. The ECOWAS Trade Liberalisation Scheme (ETLS), which is the main ECOWAS operational tool for promoting the West Africa region as a Free Trade Area is poorly respected by ECOWAS Member States and the implementation of the CET has been inconsistent with commitments. Thus, despite longstanding and strong commitments to "the removal of obstacles to the free movement of persons, goods, service and capital", as worded in the ECOWAS Treaty, there are still many barriers to trade[72].

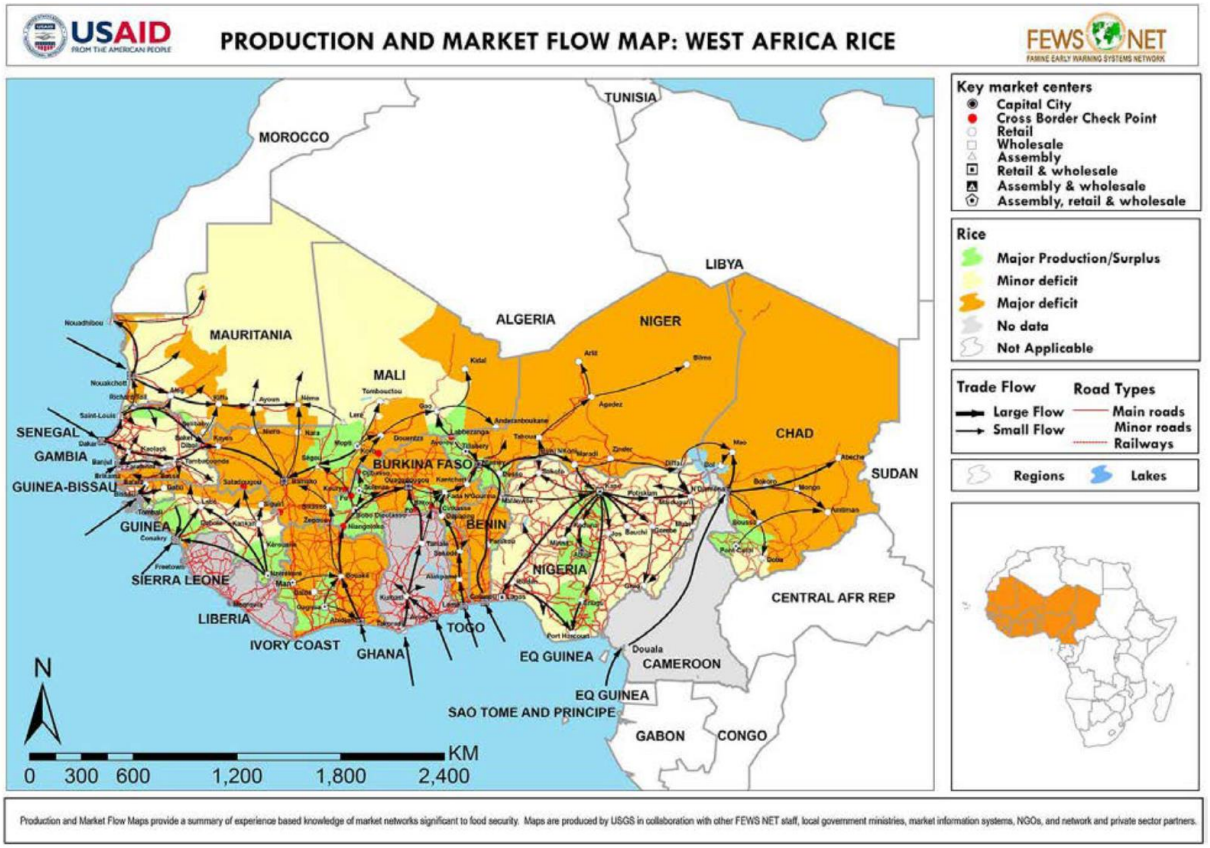
Some ECOWAS member states lack capacity to implement regional commitments, which require strong administrative structures. A lack of knowledge on regional customs and trade provisions has also been identified as an issue. Officials are not always aware of their obligations, while private sector operators are not always informed about their rights. The latter seems to particularly apply to women engaged in cross-border trade, many of who are illiterate and not knowledgeable about trade regulations (Yusuff, 2014). Furthermore, no monitoring mechanism on trade policies exists in UEMOA nor ECOWAS, nor an active dispute and binding sanctions mechanism. With RECs often promoting overlapping agendas, countries pick and choose which aspects of which REC agenda to prioritise and implement, with limited consequences for non-compliance.

Similarly, on rice seed, after extensive consultations with stakeholders throughout the region, new regulations based on advanced international standards were mostly been agreed upon and are helping to guide quality improvements in some countries. Despite these positive developments however, most countries are a long way from having the required capacities and institutional structures needed to implement the agreed trade rules and it will likely be many more years before true harmonized trade can begin.

An important learning can be had here from the case of Cambodia highlighted earlier – faced with uncompetitiveness of local milling capacity and large scale leakage of paddy into Thailand, the approach followed was to encourage FDI (including from Thai millers) to setup mills in the country for local value addition instead of a ban on paddy to purportedly "protect" the local milling industry.

Figure 34: Rice flows in the region

[72] "Overview of trade and barriers to trade in West Africa: Insights in political economy dynamics, with particular focus on agricultural and food trade": Discussion paper by Carmen Torres and Jeske van Seters (ECDPM)



Key challenges and takeaways for remedy

Identifying root causes of the inability of the local rice chain to compete with imports requires a close look at the factors that undermine each of the key parameters that determine competitiveness viz quality, quantity, availability wherever and whenever demanded and price. Since performance on these parameters is inter-related, in effect, addressing these root causes will require carrying out all actions and investments that enable the domestic rice value chain to ensure supply of import-comparable quality rice, in sustained required quantities that can be relied upon at a cost that is comparable to imported rice.

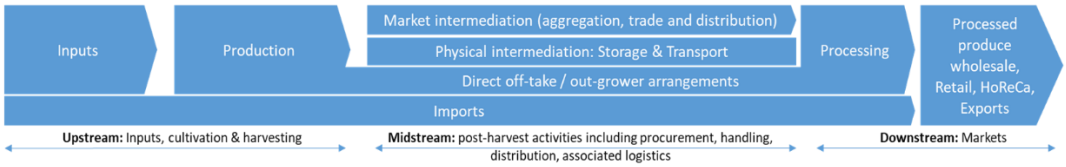
This section takes these parameters apart to home in on the core issues that undermine performance on each (Figure 35). The following chapter takes a comprehensive view of these issues to identify specific recommended actions for WAATP to address the challenge of import substitution holistically.

Quality

Production of good quality milled rice starts at the farm with good quality seeds, and crop care for uniform growth and grain size. The other factors that damage quality such as mixing of

varieties, heat discoloration, contamination, insect damage in storage, fissuring[73] during drying[74], breakage in milling, are controlled in the post-production operations. Further, the lack of activities like polishing, packaging, merchandizing that provide quality (and margin) enhancement for imported rice by making the offering more attractive for customers is missing in the local chain with most of the local rice finding its way to street-side markets sold in the open by the cup.

Figure 35: Self-sufficiency requires going beyond just producing more rice to addressing gaps across the value chain



Self-sufficiency parameters	Inputs	Production	Market / physical intermediation	Processing	Distribution and Retail
Right Quantity					
growing more					
wasting less					
Right Quality					
growing better					
cultivation practices					
harvesting practices					
using appropriate inputs					
managing better post-farm					
wasting less value					
adding value					
Right Time					
Available throughout the year					
Right Place					
Distribute, merchandize, retail					

Notes: Red indicates importance of that segment in achieving respective parameter for self-sufficiency

Availability of certified seeds is limited and even to the extent private sector seed multipliers exist, they complain of the lack of support from the extension system for popularizing these varieties and inability of the certification agency to provide skilled inspectors. The volume of foundation seed that the NARS is able to produce is also limited, constraining the scalability of local rice production of the right varieties[75]. The limited spread of extension services translates into lack of recognition of the value of improving cultivation practices like avoiding mixing, use of inputs etc. Important learnings can be had from India's Krishi Vigyan Kendra (KVK) which conducts on-farm testing to identify *location-specific* agricultural technologies and demonstrate the production potential of crops at farmers' fields through frontline demonstrations. KVK's also also conduct need-based training programmes for the benefit of farmers and farm women, rural youths and extension personnel to update local knowledge and skills. Coordination and relevance can be further ensured by taking lessons from the Indian experience of setting up of multi-

[73] The presence of fissures in milled rice can significantly reduce the quality of cooked rice due to the degradation of starch through rapid water adsorption

[74] The properties of the rice grain such as shape, hull thickness, amylose, protein content, and temperature at which rice becomes gelatinous, influence the drying behavior of any rice type.

[75] The Ghanaian government's flagship project "Planting for Food and Jobs" which provides for subsidized distribution of better quality seeds and inputs suffered from lack of quality seed supply in the year of its launch and much of the seeds required for the second year (an estimated 10%) were imported to meet the requirement.

stakeholder bodies – the Agriculture Technology Management Agency (ATMA) –which is a society of key stakeholders involved in agricultural activities for sustainable agricultural development in the district.

Large continuous flow drying systems designed to receive large volumes of rice of the same variety, with almost uniform moisture content, are not appropriate for countries with small land holdings where farmers work independently. The harvested paddy comes in small batches of varying moisture content and purity. The proliferation of new crop varieties compounds the problem of grading and segregating in-coming grain. With short duration varieties and multiple harvests in the year, drying cannot depend on the sun which necessitates development of near-farm cost effective drying technologies. The axial flow thresher developed by International Rice Research Institute (IRRI) for Asia provided an effective means for threshing that was earlier undertaken using archaic[76] and wasteful methods[77].

The big variables in the performance of rice mills are quality and consistency (uniform varieties in each lot) of paddy, maintenance of the machines, and operator skill. Mixing varieties with different sizes does not allow for proper machine settings. Low operator skill limits higher yields which could be obtained if the rice mill was properly operated.

Success example of an Asia – Africa collaboration in rice

The development of an axial-flow thresher–cleaner in Senegal in the late 1990s based on a design imported from Asia[78]. Ten years after its release in 1997, the ASI thresher–cleaner was adapted and in use in six West African countries: Senegal, Mauritania, Mali, Burkina Faso, Ghana and Côte d'Ivoire.

The main reason for the success was the establishment of an alliance by AfricaRice between re searchers and local agricultural manufacturers. This alliance tested a first prototype imported from Asia via IRRI and adapted it to local conditions. This process meant that the locally built machine could be entirely constructed and manufactured locally, and only the engine needed to be imported.

Good quality milling - even with use of appropriate varieties and inputs - while necessary, is not sufficient to match the competitiveness of imported rice. While small scale or traditional mills serve important purposes like providing offtake for farmers near the farm, ensuring paddy collection from dispersed locations and creating off-farm jobs, rice from these mills may need further actions like re-processing, polishing besides packaging and distribution services to ensure that they achieve the same benchmark in terms of perceived quality as imported rice. (Refer Footnote 65)

Attempts by the private sector and the government in Ghana and Cote d'Ivoire for putting in place quality milling capacity have not achieved much success on account of three key factors

[76] Threshing is often done manually by hitting the paddy against a hard object
[77] The introduction of the axial-flow threshers, combine-harvesters and mechanical dryers in South-east Asia and laser-levelling equipment in India took at least 6 years of support to achieve significant initial adoption that led to sustainable introduction.
[78] Donovan et al., 1998; Wopereis et al., 1998

that are discussed a) lack of availability of quality paddy that has left large investments in milling under-utilized[79] b) limited interest from investors with the financial capacity for investment in investment and working capital c) lack of access to finance for those investors that are limited in their capacity for investment.

Quality can also be impacted negatively with poor storage infrastructure of which very minimal exists currently beyond the ports.

Quantity

While production of rice in the region has been growing at a healthy pace, a large share of the production serves subsistence needs and does not enter the commercial rice value chain. This makes the opportunity available from displacement of imported rice "invisible" to local growers for whom the commercial viability of growing the prevalent "cash" crops like cocoa, coffee, oil palm, horticulture and even maize – for which they are connected with the commercial chain through established national and international agribusinesses - appears to be more attractive. Since subsistence dominates local production, focusing public resources on increasing production quantities alone – unless accompanied by cross-value chain initiatives to ensure import-comparable quality (as discussed under "Quality" above) – will not serve the purpose of displacing imports.

On the contrary, with rising rural-urban migration and the change in tastes towards import quality rice that accompanies the same, such deployment of resources can – over a period of time – lead to excess production of rice that is not import comparable, causing price stress for farmers and consequent unsustainability of such resource deployment. In effect, this would create a situation that achieves the opposite of what development partner support is intended for – the improvement of farmer incomes[80]. It is unfortunate to note that several past donor and government projects have neglected this important aspect[81].

Thus, enabling farmers to grow the right quality of produce by addressing the factors mentioned above and *then* linking them to the distribution chain of imported rice can provide opportunities for more efficient and targeted resource deployment that can directly drive growth in volumes

[79] Particularly telling is the milling investment of a company called Avnash in Ghana. The mill with a capacity of 450MT/day has been functioning at less than 10% utilization since its inception on account of lack of availability of quality paddy. Similarly, multiple government owned large mills that have been handed over to the private sector in Cote d'Ivoire under the poles project have not elicited interest from the large investors. The relatively smaller investors that have come forth are unable to raise the working capital to buy paddy in season at one end and to incentivize the distribution network to sell milled rice at the other end. The author got feedback from a major international development lender that had considered giving out loans to some of these small companies that they could not convince themselves of the creditworthiness of the "pole leader" borrowers.

[80] Seeds subsidized to the extent of 50% under the Planting for Food and Jobs program of the Ghanaian government were reported to be undistributed in large parts (Grain and Feed Annual, 2018; USDA) because rice farmers did not find it worthwhile to procure these even at the subsidized price.

[81] "Food aid can also lead to increased food imports by creating price disincentives for domestic producers, forcing the recipient country to increase commercial imports. Food aid is also thought to encourage the postponement or outright cancelation of investments and costly strategic domestic policy reforms in the recipient countries, and to stimulate increased future food imports"; "Implications of food aid and remittances for West African food import Demand"; African Journal of Agricultural and Resource Economics Volume 8 Number 1 pages 30 - 44

from a “market-pull” as against a “donor push”. For demonstration of quick success, it would be prudent to start this in areas where base productivity levels are high i.e. irrigated, followed by lowland areas. Having said that, given that upland rice is dominant in the region, moving to these farmers should come as a natural succession. These farmers would require greater effort for conversion given that most of them grow rice for self-consumption and that, partly for the same reason, they are disconnected from the existing input and output markets.

However, even with growth in volumes from the farm, it would be important to ensure aggregation can take place near the farm itself so that other post-harvest activities like drying, grading, transport and storage can leverage scale economies and farmers or farmer groups can increase their bargaining power. Support for existing aggregators and farmer groups in the setup and management of such infrastructure can be a good starting point. Further to avoid mixing of varieties, farm practices and zone-based planting by farmer groups, as was ensured in the Asian countries, would be necessary.

Price

The rice value chain in West Africa suffers a cost disadvantage vis-à-vis its Asian counterpart in every link of the chain (Figure 30 and Figure 32).

As far as inputs (seeds, fertilizers, pesticides and farm equipment) are concerned, almost all current Asian exporters to the region have at some point directly or indirectly subsidized their farmers especially to set off the high costs of inputs required for cultivation of varieties that give better farm yield. It is also true that once the scale of production brought enhanced competitiveness, such subsidies have been tempered or removed altogether. West African farmers, on the other hand, enjoy precious little support of a similar nature. Deployment of resources towards improving the unit economics of cultivation – even if it means temporary subsidization of inputs - while working on the above factors around quality and quantity of import-comparable produce to leverage scale economies can provide a better and more sustainable utilization of resources and can go a long way in making local rice more price competitive vis-à-vis imported rice.

Even while high-yielding and hybrid varieties of rice reduce cost per unit of production by virtue of their superior farm yields, these are typically input intensive demanding greater application of fertilizers and pesticides. Larger scale cultivation and harvesting may also require mechanization and larger quantity of output will necessitate larger post-harvest infrastructure like drying and cleaning spaces. In effect while total income of the farmer may increase by using these varieties, the upfront costs also rise – often disproportionately - which, in the absence of functioning credit systems, can create high barriers for farmers to move to these varieties even if the greater profits are visible since these profits are realized only after all investments / costs for cultivation and post-harvest processing have been made / incurred. In case credit is available, local informal sources can be extremely expensive affecting actual profitability for the farmer negatively enough for them to be discouraged in taking up cultivation of these varieties.

Investment in quality milling can be expensive since most equipment has to be imported, raising the costs of procurement, installation and service. Support for technology transfer and capacity building of local fabricators is missing much unlike the case in Asian nations. In India, for

example, technology transfer agreements were entered into with German mill manufacturers whose mills provided for significantly lower waste levels. After German mills were used for some time, Indian fabricators were able to develop indigenous versions of these mills at much lower cost with comparable levels of lower waste.

Beyond milling, while imported often rice comes in pre-packed from the origin, the poor availability of packaging in the region raises costs for this other key element required for competitiveness.

Finally, low volumes of local rice translate into lower bargaining power of local suppliers vis-à-vis supermarket retailers from where the urban consumer can easily and conveniently purchase imported rice placed attractively.

Larger factors that go beyond the rice value chain itself including poor quality of roads, limited connectivity, high cost of electricity are other also add to the overall costs for local producers that their peers in Asia do not have to contend with to the same extent.

It is evident from the above narrative that enhancing performance on each of these parameters requires action that spans across the chain, accounting for the inter-relationships and economic trade-offs between these parameters and the developmental trade-offs between value chain segments.

Achievement of self-sufficiency is therefore a question of making subsistence farmers commercially oriented. Since farmers are mostly impoverished smallholders and commercialization requires investments much beyond their individual capacity, public resources are better deployed on the same. At the same time, this must be done in lock-step and close consultation with private investors so that appropriate incentives are in place for them to make investments in the rest of the chain.

Application of guiding principles in the region will require careful calibration

In a way, just like the successive draughts of 1965-66 reinforced an existing but practically de-prioritized goal of self-sufficiency in India, the food price crisis of 2008 did the same for West Africa. Nevertheless, even when the trigger for a renewed focus on self-sufficiency is similar and guiding principles from Asian experiences are valuable, West African nations will need a customized strategy for rice self-sufficiency. The development of such a customized strategy will require more detailed assessment of the specific context of the region to adapt and contextualize the guiding principles outlined above.

Given that import dependence is deeper and more widespread in West Africa than it was in the selected Asian countries, in addition to the fact that agro ecology in West Africa is different, a more incremental approach to building the value chain would be prudent. Further, a high level of "importer" dependence makes it prudent to leverage the importers' strengths of distribution and their very nuanced and specific understanding of the consumers' preferences. While this may seem paradoxical given that self-sufficiency would negatively impact the importers' business, it has to be looked at in the wider context of importers being businessmen primarily motivated by shareholder value creation – something that can be very well also be achieved by addressing the

domestic market. Emerging implications for West African nations outlined below derive from this overarching philosophy.

A balance between efforts towards development of the irrigated and rainfed ecosystems is needed. Given the heavy investment requirements for the development of irrigation infrastructure combined with the fact that relatively low capital intensive activities in the more widespread rainfed areas (eg. for water control in lowland areas[82] and proliferation of locally suitable NERICA hybrids in upland areas) can yield benefits, there is merit in balancing the limited resource available between rice production ecosystems. It would be prudent to select clear areas with high potential in the irrigated (and irrigable) ecosystem for investments along with wider – but still clearly demarcated - areas in the rainfed ecosystems for a focused program of interventions cutting across the value chain.

In these areas[83], a package of incentives to boost production may be implemented that cuts across provision of inputs at (if necessary, subsidized) procurement and credit cost that can be justified based on market prices available. The idea would be to create a demonstration effect that can be replicated with a rising share of private sector investments.

Create direct and indirect incentives for entrepreneurs (including, but not limited to, existing importers) to develop the domestic value chain. To ensure that rising production from productivity enhancing actions outlined above are balanced and coordinated with actions in the post-harvest chain, the following could be considered

- *Encourage large investors to develop integrated mechanized irrigated rice farming*. Entities that have the ambition, motivation and financial strength to share the needed investments with development partners if encouraged through incentives and financial support in the form of matching grants, long term and flexible, if needed even concessional loans, financial guarantees etc. can create the demonstration effect needed to trigger more and more private investment.
- *Encourage medium-small and enterprising small rice farmers to commercialize.* While small and medium farmers cannot be expected to make investments for farm yield improvement upfront, the base volumes created on the back of investments by larger players can act as the anchor volumes not only to demonstrate viability for smallholders but for the creation of an ecosystem of input supplies and distribution services on which they can ride.
- *Work with existing importers and encourage SMEs to develop local rice distribution and value addition network.* It makes sense to work with existing importers for several key reasons as outline below.
    a. Importers already have country-wide distribution arrangements which can be leveraged for distribution of domestic rice
    b. They would be attracted towards alternate revenue enhancement opportunities given that their core business is likely to be impacted on account of
        i. imposition of tariffs in compliance with ECOWAS requirements
        ii. rising competitiveness of domestic rice

[82] Moving towards the Asian 'Sawah' model, of bunded, well-leveled and puddled rice fields that reduce risk and facilitate investments in mineral fertilizer.
[83] The region provides for suitable choices amongst the ECOWAS member countries to kick start the process – with Ghana and Ivory Coast dominating in upland areas and Senegal and Nigeria with high shares of irrigated area.

c. They understand consumer behavior, taste and quality preferences like no one else currently would

- The above would need to be balanced with
  - calibrated import (and export) controls to maintain domestic supplies
  - if needed, mandates, with punitive action for non-compliance
    - on importers to source from domestic sources
    - on traders to prevent hoarding and speculative trading

It is hoped that with the above menu of actions, a competitive environment for procurement of paddy from farmers would be developed while at the same time ensuring that the lure of access to the domestic premium market would be enhanced with these incentives to ensure the quality and quantity requirements of the region's milled rice requirements is met.

A delicate and continuously monitored balance between controlling imports in parallel with raising the quality and quantity of production through the above actions is needed. Given the highly sensitive nature of this balance and the risk of social unrest in case of loss of the same, it may be prudent to establish a dedicated analysis wing perhaps directly under the head of the state to provide inputs on the sequencing of production boosting, value chain enhancing and import-controlling actions of the government.

If and only if the above process appears to be faltering, may government intervention in sourcing and distribution be considered though the costs of the same will have to be thoroughly assessed and financing options for the same considered carefully.

Directing greater spend towards the development of agriculture will be essential for achievement of self-sufficiency. Agriculture has long been ignored and prematurely exposed to the vagaries of market forces in the region even when the most developed of nations have sustained their public and policy support for this sector. It is time to correct this anomaly and raise the share of expenditure on agriculture targeted in a manner that aligns with the guiding principles outline above. Research, especially for varietal development[84], investments in irrigation and capital and revenue expenditures for ensuring the availability of inputs for farmers are the key areas of public investment that are required for achievement of rice self-sufficiency.

West African nations can accelerate the march towards self-sufficiency by enhancing efforts to secure land tenure security. There are several fundamental reasons why long term security of land is essential for securing the cultivator's motivation and therefore the quantity and quality of his production besides his loyalty.

- While cultivated land provides value at each harvest, its ability to continue to do the same depends on a complex process for replenishment. While this process of replenishment can be shortened with the use of fertilizers, it nevertheless spreads over several years
- Returns from agricultural production can be highly variable ranging from very high in some years to negative in other years depending on external, often uncontrollable, factors

[84] Close collaboration with international research institutes, particularly CGIAR to allow for maintain diversity even while pursuing development of high yielding varieties.

like weather. By the law of averages, therefore, long term possession of land provides for greater security of earnings.

- It is human nature for individuals to take care of (in other words, invest in, work hard to improve) what belongs to them or that which they have long term possession of in precedence to what may belong to them for short periods or what may be theirs temporarily.

While this is a known and vexing problem not unique to achievement to self-sufficiency in rice, it is nevertheless fundamental to achievement of the same.

Closer regional coordination to identify synergies can accelerate achievement of self-sufficiency. Coordinated policy-making aligned with the above, synergistic identification areas for piloting improvements and leveraging collective bargaining power to reduce burden of imported inputs are just some examples of the realizable benefits from coordination.

Chapter 8: Conclusions and recommendations

Conclusions

Imports of rice in the West African region continue to grow exponentially even while affirmative government, development partner and private sector actions have delivered healthy production growth. The widening gap between production and demand is manifested not only in terms of the quantity[85] but also the quality[86] of rice available in the region from domestic cultivators vis-à-vis what is available through imports from Asia.

The critical importance of rice for the region is demonstrated in the fact that (a) rice is a staple crop in the region that is still beset with widespread food and nutrition insecurity (b) rice imports are a significant drain on foreign exchange[87] (c) high risks are associated with availability and price of rice in international market[88] (d) rice cultivation has latent competitiveness in the region as demonstrated by multiple pilots[89]. Various government and development partner initiatives including the World Bank's (WB) ongoing project in the region – West Africa Agriculture Productivity Project (WAAPP) – have been cognizant of the compelling need to develop the rice value chain in the region.

However, the approach has hitherto been on initiatives that start with - and focus almost exclusively on - activities to boost total production and farm level productivity without concomitant attention to the other parts of the value chain. Recognizing that addressing the issue of import dependency will require taking action beyond the farm as part of a cross-value chain approach, a study was undertaken to identify and diagnose challenges that span the value chain. Findings from this study would be incorporated the project design for the proposed WAAPP follow-on project – the West Africa Agriculture Transformation Project (WAATP).

This report consolidates the core issues, key takeaways and leading recommendations on actions that are needed, some of which could be undertaken as part of WAATP.

Core issues

[85] Between 2002 and 2014, net imports of rice in the ECOWAS region rose at a compounded average growth rate of 14% to cross $2bn in 2014

[86] Gap in quality arises from a combination of the use of varieties not aligned to the urban consumers' palate that is more akin to Asian varieties, poor quality of post-harvest activities like drying, husking, milling that causes significant breakage and adulteration and lack of effective marketing, distribution, branding and merchandizing that can compare with the same carried out by imported rice distributors; the quantity of rice of the right quality for import comparable tastes is limited primarily because there are policy and public investment issues that limit viability (cost competitiveness) of this rice – one part of which is that scale is not achievable, partly again on account of lack of domestic capital with owners equity being limited because investors have a risk perception (often justifiably, given the government's dichotomy / lack of seriousness with respect to rice) and debt is not available due to high perceived risk and lack of policy support to financial institutions comparable to that available in Asian and other exporting nations.

[87] Share of GDP that is spent on rice imports in the region ranges from 1-10%

[88] Global rice trade is thin - <10% of global rice production is traded with trade being concentrated over 80% of trade is controlled by 3% of exporting countries (6 countries)

[89] USAID, WAAPP

Unlike most other emerging markets with smallholder dominant agriculture, West African nations face market failures at both ends of the chain. Emerging markets with smallholder dominant agriculture face a compelling market failure stemming from high transaction costs of procurement of small volumes from a multitude of smallholders. Poor capacity to invest in changing traditional practices to align with market needs is compounded by lack of transmission of end-consumer needs to the farm level. Few emerging markets present a context as constrained as that of West Africa with respect to the latter with a large part of the end-consumer demand in these nations already met – often more cost effectively - with imported rice.

A large part of the domestic rice demand is captured by importers while domestic supply remains largely limited to subsistence or local informal markets. A sustained flow of bulk imports over several decades channeled into the domestic market by a concentrated set of importers has led to; (a) a gradual shift in diets (especially urban diets) from a more diversified basket of staples to an increased concentration on Asian varieties of rice; (b) low marginal cost of imports riding on sustained high volumes of demand; (c) significant market power of importers with risks arising from oligopolistic behavior; (d) high entry barriers for new suppliers with importers' deep understanding of consumer segments and their preferences in terms of taste, price, branding, packaging and merchandising; and (e) entrenched and loyal distribution networks for imported rice[90] supported with credit and sustained reliable supplies. Thus, importers are able to provide a compelling proposition for both high value consumers that place a premium on quality over price and those that are price conscious leaving local rice to cater largely to subsistence needs, sold in informal markets or in some cases supplying niche varieties not available from imports, like red rice.

Thus, even while catering to global demand for key cash crops, the region's nations are unable to access their captive demand for rice commercially. Most of these nations opened up their markets to global competition at a time when their domestic capacity to compete with global competition was weak. Thus, even while the agro-climatic conditions for cultivating rice in the region are suitable, poor basic infrastructure and business environment has meant that local producers and millers are unable to meet the taste, quality and even packaging and merchandizing requirements of their own urban consumers. Countries that currently supply into the global trade, on the other hand, have gone through a sustained process of development of their domestic capacity – often with overt tariff and other policy protection – over several decades before they opened up their markets.

Though some national governments in the region have demonstrated a commitment towards resolving the challenge, a coherent and conscious strategy to resolve the problem has not been developed . While strategy documents have been produced and statements have been issued emphasizing the importance of developing local rice value chains, precious little affirmative action has been seen[91]. Short term actions driven by a desire to ensure consumer

[90] Distribution network of domestic and imported rice is almost entirely exclusive from each other

[91] Field interviews with stakeholders across two key economies in the region – Cote d'Ivore and Ghana – threw up several instances where private players including banks were not aware of the government's actual position with respect to the rice value chain. Some players had been spoken to or engaged by the government sporadically without any follow up action on intent. This was particularly visible with respect to the poles project in Cote d'Ivoire. While the national rice office – ONDR – sees this program as a flagship with significant resources being channelized into

welfare (affordable availability of rice for consumers) in the form of tariff waivers and favorable import policies have not afforded the local industry breathing time to develop. Sporadic actions towards farmer welfare (ensuring remunerative prices of paddy to growers) in the form of government / donor purchase of paddy at the farm-gate at above-market prices have, on the other hand, distorted markets and created disincentives for organized private sector millers, in effect crowding-out private sector investment.

To the extent strategic action has been taken, it has been supply driven and limited to isolated on-farm improvements not linked to or "pulled" by demand. Often this is a manifestation of the structure of the government itself where the agriculture ministry is by mandate limited to (or incentivized to) focus on farm level activities while commercialization and competitiveness – which are critical for the rice sector in these countries, unlike for the predominant cash crops – falls in the domain of the Commerce / Finance / Trade ministries. There is no dearth of donor / development partner / government programs to boost input (seeds, fertilizers etc) supply and provide extension to demonstrate high productivity but most of these programs stop at this level without providing commercialization of the increased produce thus delivered. While a one-time increased production of import-comparable quality could still find a one-time buyer, the lack of demonstration of the capacity to deliver volumes on a sustained basis keeps serious investors / organized millers away.

It is ironic therefore that when some local players have taken initiative to develop the local rice supply chain[92], one of their biggest challenges has been in sourcing paddy supply. Compounded by constrained financial capacity, under-developed external financial markets, poor public infrastructure and disabling policy, these initiatives have met limited success or failure. Compared with the well-oiled chain of imported rice operated by established companies with substantial reserves, fledgling local entrepreneurs have stood no chance when long term finance for investment in; (a) scaled mills for cost effective high quality milled rice; and (b) branding, marketing, merchandising spend to match that by imported rice has not been available. At the same time, short term / working capital finance to procure large quantities of paddy during harvesting season has not been available even in cases where mills were subsidized / financed by public funds.

To the extent available, local paddy supply is misaligned with the flavor and quality requirements populations (especially urban) have come to expect. Input intensive cultivation with high yielding varieties that align with the taste preferences of consumers currently buying imported rice is beyond the capacity of existing local farmers. Governments don't appear to have realized the greater need for strategic public support to address this aspect given the developmental nature and long gestation of activities to address these. At the same time, with no access to this high value demand for local entrepreneurs, they have not been able to establish commercial viability of investments for improved post-harvest management (to prove to finance providers).

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the same, there is has been limited sustained interest from private investors with requisite capacity and there is lack of clarity around selection criteria of pole leaders.

[92] As witnessed in the case of RMG or Avnash in Ghana or Gan Logis or Sicomsi in Cote d'Ivoire

With no overt support for local industry or investors in the local rice chain to match the challenge of imports it is not surprising that very few private investors have come forth to invest in the local rice chain. Even those with substantial reserves and the capacity to invest for the long term – existing importers like Olam, Louis Dreyfus and large local business houses - have stayed away in the face of lack of demonstrated commitment by governments, the high risk and fundamental lack of commercial viability of investments in upgrading smallholder capacity.

Thus, demand remains invisible and unavailable to farmers, providing them little incentive to increase either the quantity or quality of production, even when capacity may be provided by donor / government programs sporadically. This percolates through to a lack of demand for quality inputs for cultivation in the form of certified seeds and fertilizers. This is evidenced in the fact that even while development partner support enables the release of varieties there is little interest or capacity in the private sector to engage in seed multiplication. Even to the extent private seed multipliers exist, they face challenges in certification arising from poor capacity of local research and certification setup.

With consumer taste preferences now strongly aligned to characteristics of Asian varieties and quality of rice[93], it is imperative for the local value chain to align with these. At the same time, local value chains have to be able to deliver such rice at an affordable / comparable in price with that of imported rice.

Guiding principles from Asia

Each selected Asian nation that has transformed its rice value chain – India, Thailand and Cambodia – provides for key takeaways that can be adapted to the West African context. A synthesis of these takeaways as outlined in the main body of the report leads to five broad guiding principles.

Guiding principle 1: A public policy approach towards the development of the entire value chain works better than undertaking isolated independent improvements in each segment of the value chain.

In India, boosting *production* through proliferation of location specific HYVs supported by public extension services that ensured zone-wise plantation was matched by provision of a competitive *post-harvest* market for the rising paddy supply through public financed spot markets. Private sector *millers* were provided policy support through the "levy rice" mechanism and export/import controls ensured the local industry had time to build competitiveness. Support services in the form of *mechanization* were encouraged through technology transfer arrangements and encouraging local fabrication while credit was ensured through regulation for banks to set aside some part of their assets for agriculture as a priority sector.

In Thailand, the early action to secure land tenure and development of HYVs was not isolated. It was accompanied by the paddy pledging scheme that ensured offtake for the farmer at one end and return on capital for private sector millers at the other end. The lack of substantial fiscal or

[93] These characteristics include various combinations or all of aroma, fragrance, length of grain, share of broken grain per kg.

other incentives to encourage local millers to invest and expand in many parts of West Africa is telling contrast.

In Cambodia, the access to higher prices from European markets was the key lever for driving improvements upstream. Such access to higher prices exists within the region in West Africa.

Guiding principle 2: A deliberate and consistent strategy extending over several years and involving the private sector is needed to achieve transformation.

The National Rice Development Strategies developed by West African nations were a comparable and commendable step in this direction. However, studies have found that many of these strategies were focused primarily on supply-shifting investments that have been insufficient to make domestically produced food competitive[94]. Also, while appreciable strides in production have been made on the back of this and other initiatives, involvement or encouragement of the private sector has been limited[95].

Guiding principle 3: Sustained public financing and policy support is imperative to capacitate smallholders – albeit in tight lock-step with policies and incentives to draw in private investments in post-harvest chain.

The persistent market failure that arises from high transaction costs of dealing with smallholders not only in procurement of paddy but in ensuring adherence to best practices in input usage, cultivation and harvesting by smallholders limits scale and success of private investments downstream. The poor availability of investment for capacitating smallholders through provision of inputs, extension services and through development of on and near-farm infrastructure is a binding constraint that individual smallholder farmers are incapacitated to overcome. Availability of suitable financial support to farmer groups, as is evidenced in the case of the Asian countries studied, helps counter the constraints arising from this market failure.

While in most contexts, addressing the above mentioned market imperfections in the upstream and midstream segments automatically triggers activity in the downstream, in the case of the West Africa, the well-oiled and cost effective channel of delivery of cheap imported rice to large urban consumption centers makes aggregation and logistics costs relatively prohibitive and makes these urban centers "inaccessible" and creating the need for public support towards support in the downstream segments.

Guiding principle 4: Scale efficiencies can be achieved organically even while leveraging the experience and strengths of existing value chain stakeholders (small mills, aggregators, distributors)

It is noteworthy that none of the Asian countries studied have any material existence of outgrower arrangements wherein a large private miller would contract with hundreds or thousands of farmers for a committed offtake of their produce in exchange for support that the

[94] "Reversing urban bias in African rice markets: A review of 19 National Rice Development Strategies", Demont, 2013
[95] http://www.fao.org/3/y4751e0q.htm

offtaker provides in the form on inputs, credit and other near farm post-harvest activities. In the Asian examples discussed in this report, existing stakeholders undertaking the activities of input provision, aggregation and milling were involved in the process of uplifting the chain in tandem with larger investors who leveraged these available strengths instead of replicating them.

Guiding principle 5: Regional linkages matter and, if leveraged well, can be synergistic.

Various approaches for drawing upon regional synergies adopted in Southeast Asia have delivered benefits. For example, an "ASEAN Plus Three Emergency Rice Reserve (APTERR)" was agreed upon in 2012 and an ASEAN Rice Trade Forum was established in 2011. Originally established as ASEAN Emergency Rice Reserve (AERR) in 1979, APTERR was organized to ensure rice availability during emergencies, stabilize the price of rice, and improve farmers' income and welfare among the member countries. The Rice Trade Forum seeks to serve as a platform to promote coherent and coordinated policies and investments affecting the regional rice market to advance food security in Southeast Asia.

Recommendations

In a situation where **market forces are not working to deliver local and regional demand to the region's growers**, and challenges around land tenure security limit the potential for large scale commercial farming, the need for public intervention spanning across the value chain is clear. However, the intervention required is as much – or more – in the nature of facilitation of private sector stakeholders than in the nature of direct involvement or investment in segments of the value chain.

In most emerging markets with smallholder dominated agriculture, **governments inevitably support the farming community with financial and technical capacity while the private sector plays a greater role in the post-harvest chain.** In the West African region however, both public and private sector action has been sub-optimal. Not enough is spent on upgrading the capacity of farmers at one end[96] and, even to the extent such expenditure is undertaken, it does not follow a deliberate or defined strategy.

Private investors shy away from investing in the rice value chain in the region because they are not assured of sustained volumes of paddy or rice of the quality that they require to meet the requirements of their customers, especially when the same is easily available from imports. While investing in milling, pre-milling activities (like basic grading, sorting, cleaning etc.) and segments of the value chain after milling (like distribution, packaging, branding, merchandizing, retailing etc.) in a market that can absorb large volumes of high quality milled rice can be commercially viable, aggregating volumes of paddy from a diverse set of disparate small farmers, each using inconsistent practices of cultivation, inputs[97] and post-harvest management[98] is very often not so. Often, therefore, public investments in infrastructure and capacity near

[96] Share of spend on agriculture is under 10% for the region compared to between 1-10% on rice imports; as against this the world's current largest exporter – India – spends close to 6% on subsidizing domestic agriculture alone.
[97] Especially different varieties and generation of seed causes irreversible issues in milling
[98] Drying, cleaning etc; different moisture content paddy being mixed can cause excessive breakage in milling reducing the price realization of even superior varieties

farms in support of smallholders is sufficient to trigger private investment in the rest of the chain because doing so enables investors to earn return by catering to the available demand. The non-availability of this demand to even to those investors capable of investing in the chain and even when smallholder capacity is supported by public investment in the West African context makes it imperative for policy and public action to go beyond the farm level. The nature of such public action is however more in the form of targeted investments to crowd in more private investment, policy action, facilitation and the development of a supportive business environment, especially for the affordable availability of long and short term finance.

This provides context for the core recommendation from this study – that **public sector action must be directed towards creation of incentives and developing the confidence of private sector players operating in the import value chain towards investing in the domestic rice value chain**. With their impeccable understanding of the finest segments of consumer demand and their specific preferences, close control on the distribution chain for rice to discerning consumers and capacity to invest by virtue of their financial strength, rice importers are best placed to be encouraged for investing in the domestic rice chain. However, in the absence of importers' ability to manage cultivation and, more importantly, for the government to ensure the welfare and livelihoods of smallholder farmers, the government must tightly align and link smallholder support with these investments[99].

Directional recommendations for West Africa

With the above overarching philosophy, it is recommended that development partners undertake the following activities to be supported over the next few years by each stakeholder (Table 11) to support achievement of reduced import dependency in the region:

1. **Develop a rice sector strategy** for the region that switches focus from development of productive capacity to achievement of competitiveness at the value chain level.
2. **Establish a regional rice platform[100]** to (a) organize regular regional public-private (including importers) consultations (b) identify synergies for collaboration and facilitate consensus on the same (including those identified below and tariff actions) (c) carry out research to inform decision making for region-level policy making (d) provide

[99] Importers are already actively involved in domestic rice milling in Nigeria goaded by government incentives and mandates (for example, lower import duty rate applies for importers that have domestic milling capacity) but with under 50% capacity utilization rates of the major mills and over 2/3rd of domestic rice still being milled in informal mills with around 1MT/day capacity while 40% import dependency continues, it appears that other measures along the chain that are needed to boost paddy supply are not keeping pace. Ghana has also witnessed incipient initiatives from rice importers to get involved in the domestic rice chain (particularly noteworthy was the attempt by a prominent importer – CCTC – which invested in a rice mill to sell branded rice locally. However, similar to the case of Nigeria, feedback from field interviews reveal that the initiative has not gained traction, in part, on account of lack of quality paddy supply. Cote d'Ivoire is also learnt to have considered imposition of mandates on importers akin to Nigeria but these were not implemented.

[100] A beginning has been made in Ghana with the setup of the Ghana Rice Inter-professional Body (GRIB) Donors have contributed in the past to the Ghana Rice Inter-Professional Body (GRIB), a 10,000-member association of rice farmers, millers, processors, agrochemical input dealers, and traders which has organized a National Rice Festival for some years. While national bodies can provide a grounding, realizing regional synergies will require intra-regional consultation and collaboration for the development of a vibrant rice industry through public-private partnership for food security.

implementation support for regional (ECOWAS) policy decisions. A regional research and advocacy setup may be meaningful to identify and exploit synergies between ECOWAS nations with respect to the common goal of rice self-sufficiency. Given the dynamic nature of global trade and the multiple potential areas for regional synergies, such a sustained setup may be useful to provide sustained bandwidth and resources for continuous exploration and exploitation of mutual benefits. For example, intermittent tariff and non-tariff measures may be required as the above actions are undertaken so as to ensure that the process of development of local capacity is not impacted negatively by a potential downward movement in global prices or oversupply on account of bumper harvests in exporting countries. Such measures would however need to be carefully calibrated to ensure sustained domestic availability even while avoiding failure of local development efforts on account of a non-recurring event in global trade.

3. **Draw out agreements between the government, interested private sector investors**[101] **and farmer groups** growing rice and interested in commercialization outlining specifically the investments to be carried out by the government – potentially through WAATP[102] – to capacitate farmers / farmer groups to meet the quality and quantity requirements of investors in milling and distribution of local rice.

a. Such government investments could include, inter alia,
   i. Shared, near-farm post-harvest facilities like drying, small scale storage, cleaning, grading, sorting, bagging, weighing etc.
   ii. Capacity building of local agriculture research body for
      1. The development of selected few varieties (by region / ecology) that closely match flavor / taste preferences of consumers buying imported rice
      2. Training and recruitment of qualified seed inspectors
      3. Distribution of greater volumes of breeder and foundation seeds
   iii. Capacity building for closer regulation of certified seed quality available in the market
   iv. Development and capacity building of farmer groups for
      1. Cultivation of these new varieties with appropriate use of inputs and good agriculture practices
      2. Training on best practices to avoid varietal mixing
      3. Post-harvest practices to ensure paddy supply of required quality to millers
      4. Commercial transactions – working capital management, book keeping, contracting etc.
   v. Capacity building of the agriculture extension arm of the government to achieve the above on a sustained basis
   vi. Credit enhancement and capacity building support to local financial institutions to enhance their risk appetite and risk assessment capacity for agriculture lending

[101] Or even large land owners that may be interested in commercial rice farming

[102] Such support could include, inter alia, shared near-farm grading, sorting, cleaning, drying, storage infrastructure, in the near term and infrastructure for wholesale markets, for spot transactions in paddy intermediate storage etc in the medium term as the domestic paddy market evolves with rising volumes

b. The World Bank can orchestrate agreements between importers/other private investors[103] and the government where latter invests to capacitate smallholder farmers towards the delivery of sustained volumes of import comparable varieties of high quality paddy to these investors (as above) in exchange for commitments from the investors to invest in the rest of the chain and purchase this paddy at remunerative prices that enable them to deliver import-comparable rice to urban consumers at import-comparable prices. Private investments under these agreements could comprise, inter-alia
   i. Milling capacity of the right scale and quality to ensure minimal waste and breakage
   ii. Credit support for farmer groups and distributors to match that provided by importers
   iii. Merchandising and branding investments
   iv. Other post-harvest infrastructure like storage, mechanized graders, color sorters etc
   v. Contract milling arrangements with existing smaller millers that enable the latter to upgrade while leveraging their paddy sourcing strengths and continuing to create near but off-farm jobs
c. Doing this can mend the broken market linkage triggering the virtuous cycle of demand driven supply creation. With a view to demonstrate "quick-wins" such action should be commenced around areas where the gap in farm yields of import-comparable varieties of rice is relatively lesser and which are well connected with urban markets in terms of road infrastructure and logistics services (for example the Volta region in Ghana).

4. **Given that different countries in the region have different levels of capacity in segments of the rice value chain, such agreements could span across borders at two levels – for the supply of seed and for the sourcing of paddy.** For example while there is organized milling capacity overhang in Ghana with one large investor unable to utilize its capacity beyond 10%, the opposite is true in some neighboring countries. Similarly, Mali's capacity to raise rice production appears to be greater than that of its neighbors in the region given the large irrigated areas available in the country. Cross-border contract farming arrangements potentially along existing or upcoming corridors could be explored as part of the implementation of this recommendation[104]. Further, capacity for the development of seed varieties in some countries in the region exceeds that in the others.
5. **Create and develop the capacity of farmer groups for large scale commercial mechanized farming** of rice and support these groups with infrastructure for near-farm processing / preparation, inputs, training for cultivation, harvesting, business and finance skills for transactions and finance for both for inputs and working capital to hold on to stocks leveraging mechanisms like Warehouse receipt financing amongst others

[103] Or any other interested and capable private investors in the post-harvest chain including, primarily, milling. A few potential private investors who could be considered for partnership already exist in key larger regional economies. (eg. RMG in Ghana, Gan Logis in Cote d'Ivoire to name only a couple that were met with during the limited field visits for this study to two of the regional economies)

[104] Such arrangements were and continue to be common between Thai millers and Cambodian paddy growers. The Abidjan-Lagos corridor, West Africa Growth Ring, Tema-Ouagadougou and Abidjan-Bamako corridors, among others, being developed could provide a sound base for developing these arrangements around. This could be explored further during project detailing.

6. **Incentivize existing and new small scale millers to invest or upgrade in improved milling capacity**. While all millers cannot be expected to supply directly into the retail market to displace imported rice, distributed small / medium scale milling not only ensure off-farm job creation but also enables secured supplies for larger millers / food companies by having a tiered chain of suppliers beyond their own networks. Credit enhancement in the form of revolving funds, guarantees, risk pools, favorable terms of short and long term debt which can be transformative for small and medium millers could also potentially be considered for provision through the project.
7. **Develop the seed value chain:** Once concerted action as outlined above is undertaken, demand for certified seed of varieties that compare well with imported varieties in terms of taste/flavor will rise as farmers align with the needs of the urban consumers. However, if public sector capacity in certification does not keep pace, private sector investment in multiplication could get stifled. It would therefore be useful to direct funding towards developing the capacity of the research setups in the region in terms of technical knowhow and manpower.
8. **Provide catalytic credit enhancement:** As outlined in the narrative above, various means to adjust for the higher cost of credit in the region on account of extraneous factors not addressable by individual enterprises would be required to encourage farmer groups and small and medium enterprises to take part in the domestic chain as it develops. This could be done in the form of a pool of capital under WAATP that supports local entrepreneurs with debt, equity or other structured finance that is not otherwise available from local financial institutions or IFC or through policy action to incentivize banks to enhance lending to agriculture and / or provision of credit enhancement measures to reduce the risk absorbed by financial institutions while lending to SMEs in the domestic rice value chain. Seasonal working capital for paddy purchase and provision of favorable payment terms to distributors by millers are particularly important for the success of the above measures[105].
9. **Build trading infrastructure and storage in the medium term:** Over time, as domestic / regional paddy volumes rise and multiple scaled millers and producers / producer groups get formed, it may be useful to invest in common infrastructure for spot trade in paddy to ensure competitive markets exist for paddy.
10. Given the similarity in the context of several Asian countries that transformed into major exporters and the transferability of learnings from them to West Africa, WAATP could **fund study tours defined around specific topics considered useful by domestic rice stakeholders**. For them to be meaningful, such tours must however be preceded with a careful and detailed identification of specific areas for onboarding learnings which could be done through regional stakeholder workshops.
11. Besides the actions identified above, **some other policy actions** to align with the recommendations above could include:

[105] Interesting models to support the credit needs of smallholders and agri-enterprises have been seen emerging in the region. Some of these encountered during field visits include the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL, and its successor in Ghana - GIRSAL) and the activities of AgDevCo (https://www.agdevco.com/) in Ghana

a. Strict regulation to ban the sale of imported rice labeled as local rice
b. Mandate importers to procure a share of their imported volumes from the local value chain – the acceptability of such a mandate would be much greater as the above recommendations are undertaken
c. Provide incentives for / mandate government institutions to procure only locally produced rice
d. Provide incentives to
   i. promote cultivation and regional and global (diaspora) trade in niche segments like red rice
   ii. local financial institutions to increase exposure to agriculture
   iii. packaging and other support service industries (like equipment and input suppliers)
   iv. brand and advertise local rice towards (urban) consumers currently purchasing imported rice

Table 11: Directional recommendations for West Africa by stakeholder and timeline

		Short-term	Medium-term	Long-term
1	Develop regional rice sector strategy	DP, Govt		
2	Establish a regional rice platform		DP, Govt	
3	Draw out investment agreements	All	All	All
	Near farm infra investments	Govt, DP	Govt, DP	
	Mid-stream infra and policy		Govt, PPP	Govt, PPP
	Downstream		Private	Private
4	Cross-border agreements for the supply of seed and for the sourcing of paddy		Govt	
5	Create and develop the capacity of farmer groups	Govt	Govt	
6	Incentives for investment or upgradation of milling capacity	Govt	Private	
7	Develop the seed value chain:	Govt		
8	Provide catalytic credit enhancement	Govt	Govt	
9	Build trading infrastructure and storage in the medium term		Govt	PPP
10	Study tours	Govt		

Specific recommendations for WAATP

As a flagship program for agriculture development in the region that follows on from a successful project that addressed core productivity challenges (WAAPP), it is logically consistent for WAATP to broaden the support across the value chain, for which lessons from Asian experience outlined in this report provide important pointers. Specific recommended actions for WAATP are outlined below:

Research: Focus on adaptation of a limited number of selected varieties - that align with consumer tastes - for each area / ecology as against a scattergun approach to varietal development. In addition, provide for enhancement of the capacity to deliver quality foundation seeds.

Extension: Expand network to deliver location specific technologies and insights while driving adoption through on-farm demonstrations and ensuring uniform adoption of select varieties to prevent mixing

Inputs: Leverage regional synergies for sourcing and innovation platforms for driving rapid adoption/dissemination and realizing scale economies. Ease finance to encourage village entrepreneurs for agro-dealerships. Consider time-bound direct subsidy for key inputs for smallholders.

Production: Bridge the yield gap by deploying short maturity varieties in rainfed areas and prioritizing cutting-edge practices like System of Rice Intensification (SRI) in existing irrigated areas as against an all-out investment in irrigation. Leverage innovation platforms for scale and collectivization benefits - paddy aggregation, credit access, reduced waste and transaction costs

Post-harvest management: For provision of near farm infrastructure that is typically found unviable by private investors on account of its scatted and low scale to cater to smallholders, the project should invest in "Farmer Service Centers" for shared infrastructure (drying, cleaning, grain storage etc) and equipment (harvesters, tractors, irrigation equipment etc) and / or partner with / incentivize private players for investments in the same. Expand access to finance through leasing, Warehouse Receipt Finance, guarantees to provide credit enhancement for private investors in post-harvest infrastructure etc.

Milling: Incentivize investment by importers and other investors in large scale and efficient milling by building confidence in paddy supply through above actions and promoting linkages between small and medium sized millers and large processors. Adopt / transfer technologies for parboiling, sorting, grading etc. from Asian countries.

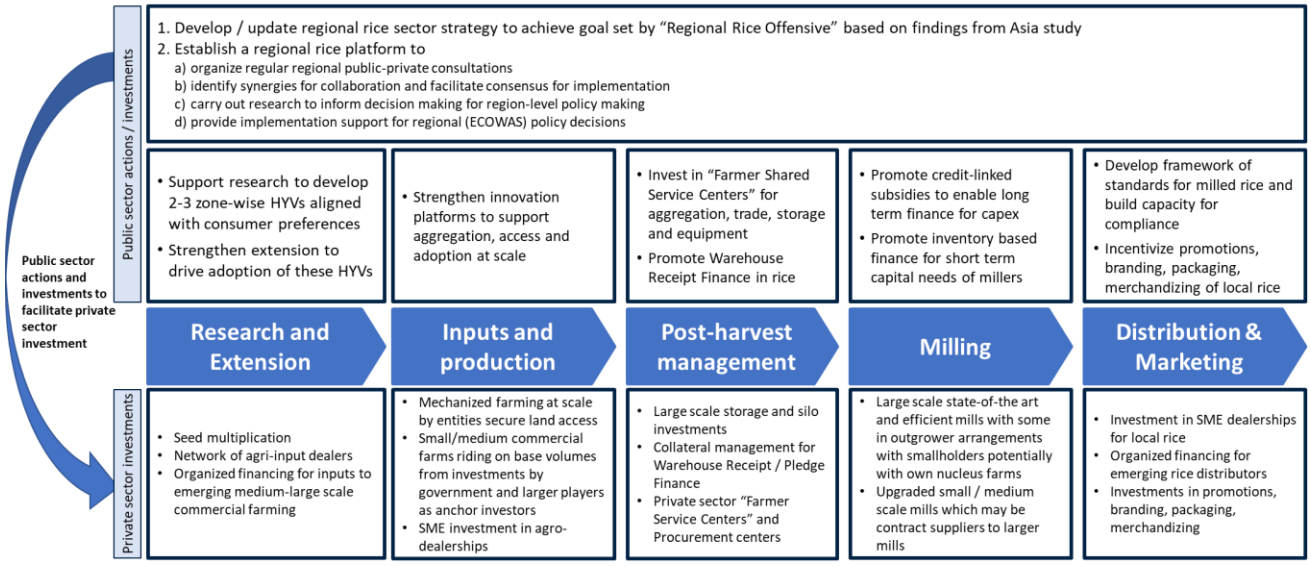
Distribution and Marketing: Encourage importers to extend their distribution network for local rice. Potentially, in conjunction with above actions, impose mandates for local sourcing on importers and government institutions. Develop a framework of standards for milled rice and enforce compliance while providing training on the same.

Overall: Develop a rice sector strategy and implementation plan for the region that switches focus from development of productive capacity to achievement of competitiveness at the value chain level and create a regional institution / setup to mobilize sustained analytical and execution capacity for the same. This setup would also continuously identify and plan for implementation of synergies between regional nations and organize a regular public private consultation at the regional level. Facilitate agreements between innovation platforms / cooperatives and millers (including but not limited to outgrower arrangements) for sustained supply of paddy to the latter in exchange for offtake guarantees from them.

Figure 36: Schematic with recommendations for WAATP

WORLD BANK GROUP

Illustrative schematic with snapshot of recommendations for WAATP



Annexure 1A: Current state and historical evolution of Indian rice sector

Current state of Indian rice sector

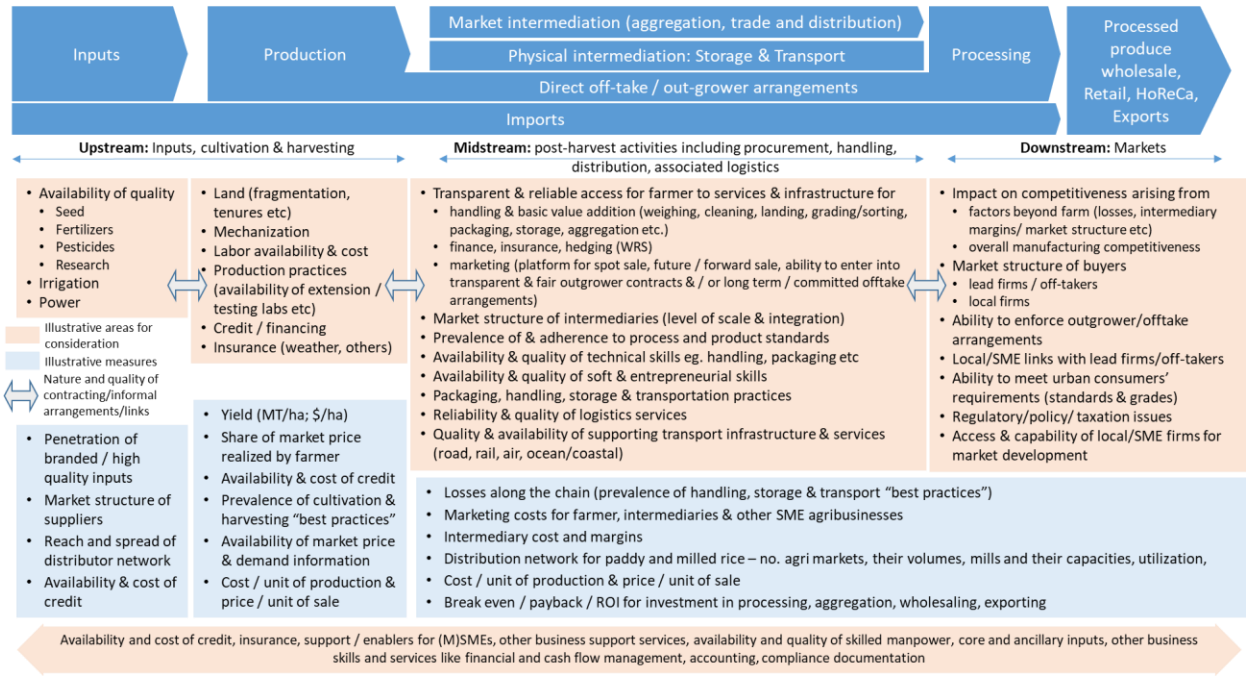
As the second largest producer of rice globally with the largest area under rice cultivation and a steady position at the top of the list of rice exporters, especially of high value "basmati" rice, India's current position belies a difficult past in the 1960s when it was dealing with severe supply shortages and aid dependency to feed its burgeoning population. This section provides a snapshot of the current status of the Indian rice sector which will be followed in the next section by a detailed account of how the transformation to achieve the current favourable position of the country in the global rice sector took place.

The rice value chain is well-oiled, albeit with high public spend

A broad framework that provides a snapshot of typical considerations in any agriculture value chain is provided in

Figure 37. This framework is used across this report to structure the analysis and takeaways.

Figure 37: Agriculture Value chain framwork

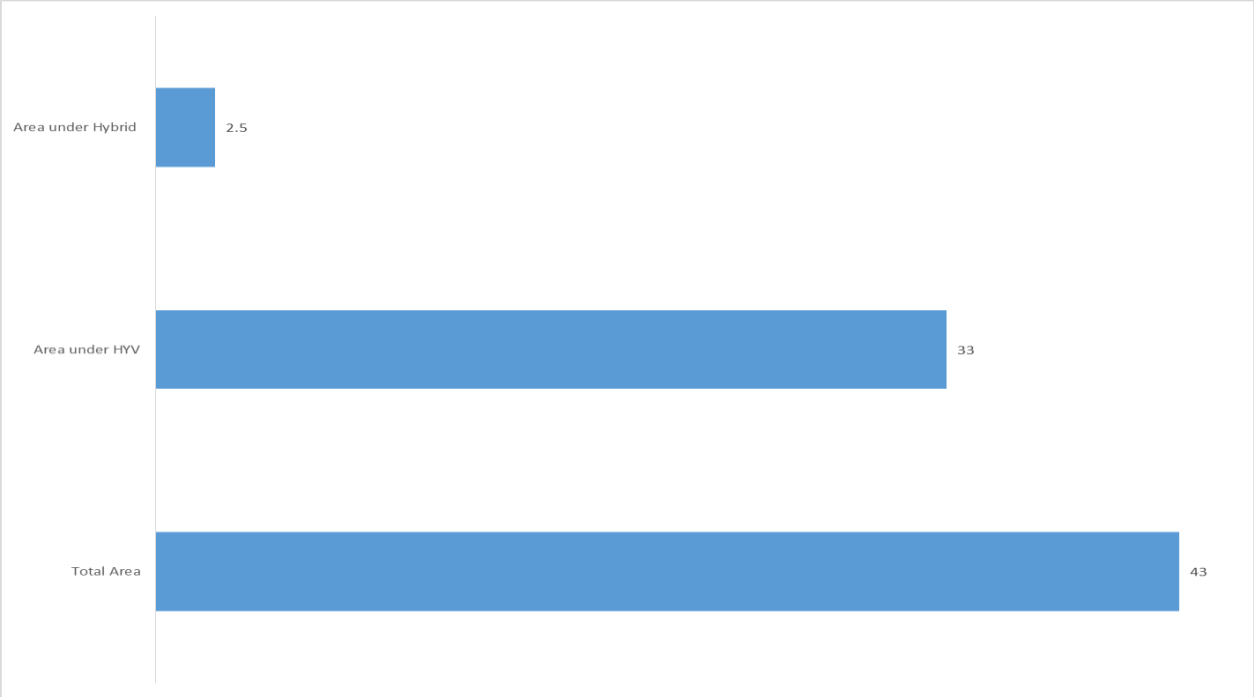


Upstream

On the upstream side, as far as *seeds* are concerned, development and distribution of rice seeds is dominated by the private sector and demonstrates high penetration of modern high yielding varieties (MV/HYV) even when private sector involvement in non-staple crop seeds is relatively higher (Figure 38: Area under high yielding and hybrid variety rice in India). Even though most

rice seed is self-pollinated, the share of public sector is nominal and the private sector supplies 60-80% of commercial paddy seed in the states of Haryana and Andhra Pradesh[106]. Overall, close to 90% of the requirement of rice and wheat seeds is met from seed saved from the previous crop and exchanged / sold between farmers themselves.

Figure 38: Area under high yielding and hybrid variety rice in India (mn ha; 2012-13)



Source: Agriculture Statistics as a glance 2016, Ministry of Agriculture, https://www.linkedin.com/pulse/hybrid-rice-india-2016-status-raja-vadlamani/

Policy permits private investment in multiplication of public and private-bred varieties and distribution of rice seeds though some restriction on imports and exports prevail[107]. The industry is vibrant with co-existence of public and private sector companies with a sizeable, though not dominant, position of the global mega seed corporations. The leading private sector seed companies in hybrid rice seed production include Hybrid Rice International which is owned by Aventis, Spic-PHI Biogene which is part of DuPont, Syngenta, homegrown Indian or joint venture companies like Mahyco, Advanta India, Indo-American, Parry Monsanto and Nath Seed company. Half a dozen other private seed companies are also engaged in hybrid rice seed production on a smaller scale[108,109]. Surveys sponsored by the Syngenta Foundation in 2011

[106] Low marginal cost and risk in producing paddy seed and potential lucrative market for hybrid rice boosts private sector's participation in rice seed especially in the favorable production environments. Source: https://ageconsearch.umn.edu/bitstream/47356/2/4-Harbir-singh.pdf (2008)

[107] http://dgft.gov.in/Exim/2000/NOT/NOT15/noti2316.pdf

[108] https://www.grain.org/article/entries/34-hybrid-rice-in-asia-an-unfolding-threat

[109] https://www.researchgate.net/publication/254371430_Rice_in_India_Present_Status_and_Strategies_to_Boost_Its_Production_Through_Hybrids

showed that at that time 22 companies including both public and private sector were active in seeds research in India[110].

With over 65 *research* institutes focusing on agriculture out of which around 20 work directly or indirectly on rice and one focused exclusively on rice (Central Rice Research Institute established in 1946) working in collaboration with multiple international research institutions including the International Rice Research Institute (IRRI), The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Consultative Group on International Agricultural Research (CGIAR) among others[111], the research infrastructure in the country is robust.

Other key inputs like fertilizers, pesticides and equipment production and distribution are also dominated by the private sector though prices, like seeds, and freight remain subsidized[112] and controls on the import, export, domestic movement and storage of fertilizers remain. Fertiliser subsidy is the second largest subsidy in India, after food, with an expenditure of USD 11bn in 2015-16 and a share of spend amounting to around 1% of GDP having reached a high of 1.4% of GDP during the global food price crisis of 2008 (discussed later) (

Figure 39: Spend on fertilizer subsidy in India). Various subsidy programs are also implemented for purchase of agri-equipment and pesticides though the incidence is of the same is lesser than for fertilizers. There is a dedicated ministry – Ministry of Chemicals and Fertilizers - at the central government level that deals with fertilizer and pesticide regulation.

Extension services are provided by a network of government institutions with field offices close to the farms. Agricultural development being the state subject, the major responsibility of implementing all the extension programs of central and state governments lies with the state department of agriculture. The major State Development Departments (Departments of Agriculture, Horticulture, Sericulture, Animal husbandry and Fisheries) undertake outreach primarily. In addition, District Level Agriculture Technology Management Agencies (ATMA) are funded by the central government and administered by respective State Agriculture Departments. ATMA is a registered society of key stakeholders (farmers, line/development departments, NGOs, input dealers, agribusiness companies, farmers organizations, etc.) involved in agriculture activities for sustainable agricultural development in the district. Every district prepares the Strategic Research and Extension Plan (SREP) for implementing ATMA in respective districts. Further, the Indian Council of Agricultural Research (ICAR) operates Krishi Vigyan Kendra (Farm Science Centre) at the district level. KVKs conduct on-farm testing to identify location-specific agricultural technologies and demonstrate the production potential of crops at farmers' fields through frontline demonstrations. They also conduct need-based training programmes for the benefit of farmers and farm women, rural youths and extension personnel to update local knowledge and skills. Finally, State Agricultural Universities lend support in implementing ICAR sponsored extension programs and provide other research and extension services.

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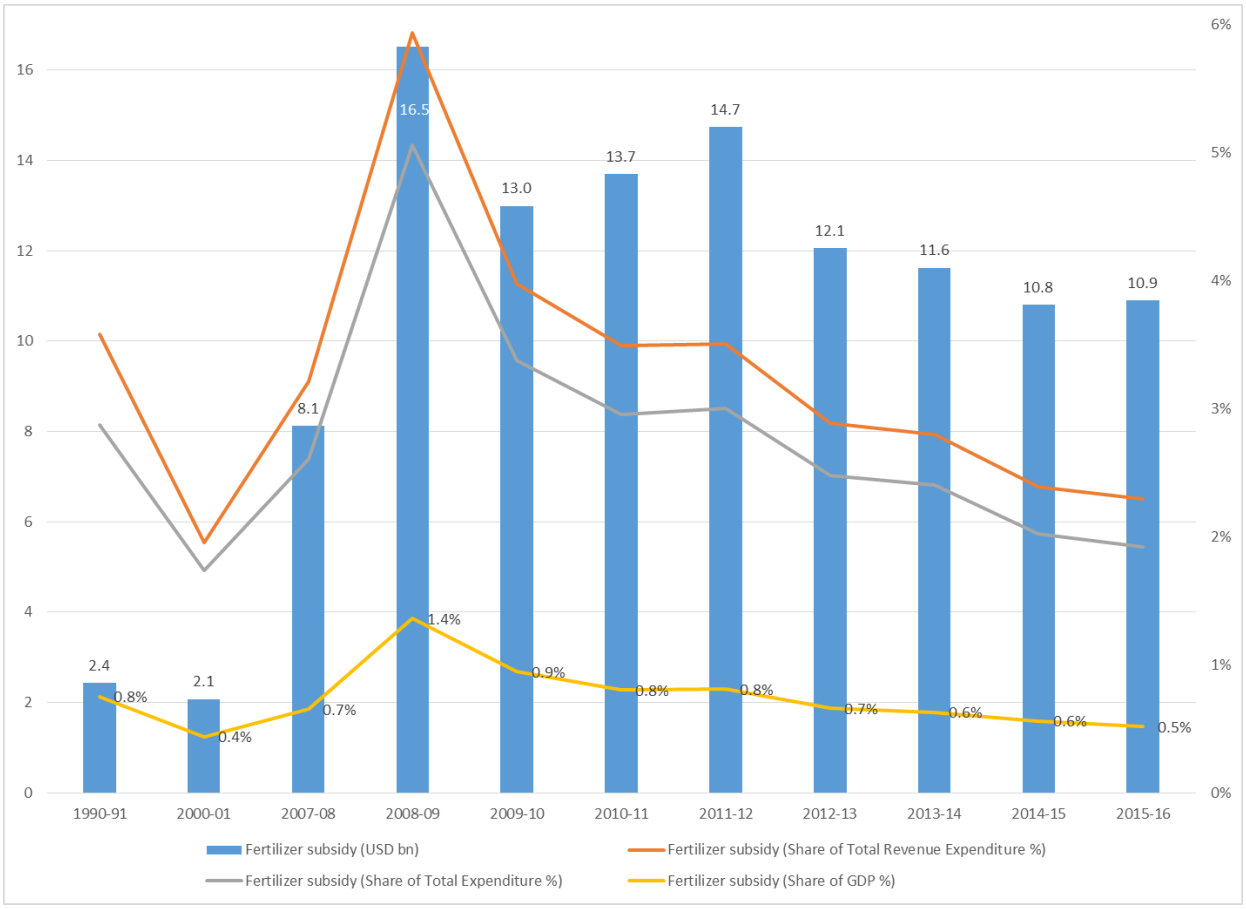
110 https://www.syngentafoundation.org/sites/g/files/zhg576/f/india_private_sector_ag_transformation_may_2017.pdf

111 http://www.dst.gov.in/sites/default/files/ANNEXURE-I%20-List-of-Indian-institutions.pdf

112 Farmers pay only 58 to 73% of the delivered cost of potassic and phosphatic fertilizers, while the rest is borne by the government as subsidy; Source: Economic Survey, 2013, GoI

Figure 39: Spend on fertilizer subsidy in India



Source: India Public Finance Statistics, Ministry of Finance, GoI

Midstream

The midstream segment comprising post-harvest activities, transactions in paddy on/near farm, logistics (including transportation and storage) and milling operates through two distinct and mostly parallel channels each owned, operated and controlled by the public and private sector.

About 30% of the production of rice is procured by government agencies at the state and central level anchored by the parastatal institution - Food Corporation of India (FCI)[113] at a price (called the Minimum Support Price – MSP) declared by the Commission for Agricultural Costs and Prices (CACP) based on a detailed estimation of production costs. Procurement of paddy[114] directly[115] is done by FCI or respective state governments either directly from farmers at FCI denominated procurement centers or at an existing network of agriculture markets (referred to as Agriculture Produce Market Committee – APMC markets) across the country created by state

[113] FCI is a public sector undertaking under the Ministry of Consumer Affairs, Food and Public Distribution
[114] In this case milling is carried out through contracts with local millers
[115] There are instances of indirect purchase by government agencies also; for example in Punjab, FCI procurement also takes place through local commission agents. Source: http://www.thehindubusinessline.com/2000/05/12/stories/071203ya.htm

governments and governed by state-level institutions called the Agriculture Marketing Boards. The paddy procured is milled through custom milling arrangements with local private sector millers.

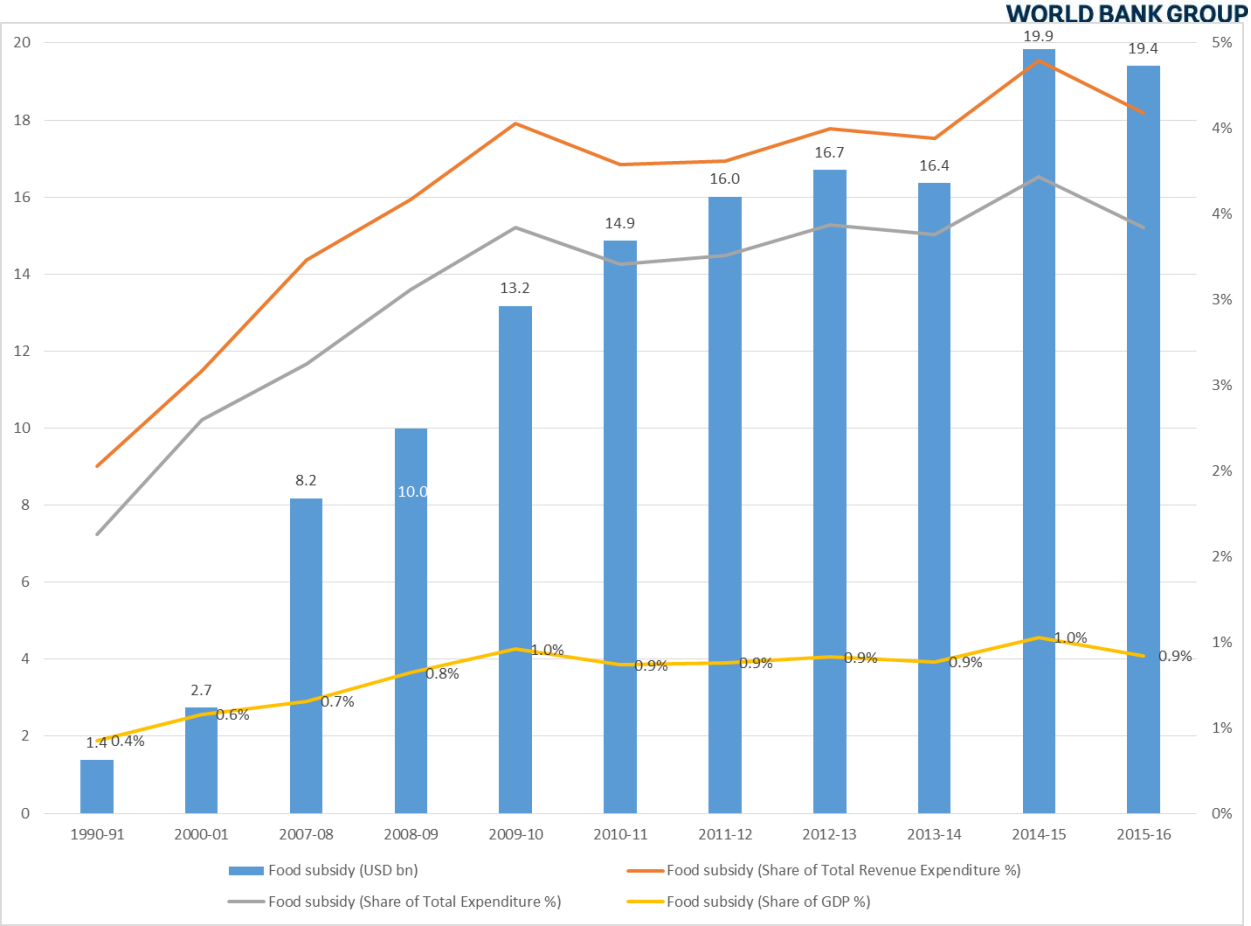
FCI manages a colossal nation-wide network that transports, stores and distributes the rice (among other cereals including primarily wheat but also some other coarse grains and recently, pulses) thus procured across the country under various government programs of which the "Targeted Public Distribution System" is the most prominent. Under this system, rice (and wheat) is distributed to over half a million[116] designated outlets (called "Fair Price Shops" or "Ration Shops") across the country at designated retail prices. Different prices are announced for "Below Poverty Line", "Above Poverty Line" and "Poorest of the Poor" segments of the population. Preferential access to railway wagons and rakes for the movement of foodgrains across the country and concessional working capital credit for containing the holding cost of buffer stocks is provided to FCI from the government's budget.

The difference between the sale proceeds from this channel and the outflows on account of payment of MSP to farmers and other associated costs including maintenance of buffer stocks, logistics, overheads etc. gives rise to the food subsidy – the single largest head of subsidy in the GoI's budget amounting to around 3.5% of the total government expenditure and around 1% of the country's GDP. Looking at Figure 7, Figure 39: Spend on fertilizer subsidy in Indiaand Figure 40: Spend on food subsidy in India together reveals an interesting observation – the Indian government's spend on food and fertilizer subsidies as a share of its GDP is comparable to a few West African countries' spend on rice imports as a share of their GDP[117].

Figure 40: Spend on food subsidy in India

[116] http://indianexpress.com/article/india/india-news-india/government-to-computerise-all-ration-shops-by-march-2017-ram-vilas-paswan/

[117] Even while this may be an oversimplified interpretation, this statistic reveals that by re-orienting the foreign exchange outflows that are currently spent on import of rice into the region towards the development of the domestic industry even if that means redirecting spend largely towards internal public expenditure (as is being done in India) can perhaps institute the core enablers for self-sufficiency.



As of early 2016, FCI has access to 82mn MT of storage capacity of which about 15mn MT is either hired from or developed in partnership (PPP) with the private sector[118] while the balance is owned either by FCI or other central and state government agencies including centre and state-level public sector undertakings called the Central Warehousing Corporation and State Warehousing Corporations.

The private sector channel of rice distribution operates entirely independently of the government channel for the premium "basmati" variety of rice which is exported in large quantities to the developed markets and consumed in equally large quantities within India amongst the relatively more affluent population. Several prominent exporters of rice, some in partnership with or acquired by international companies, operate in the multi-million dollar basmati rice segment.

Table 12: Select Rice Exporters in India[119]

Name	Export Value (In Million USD, 2016)
KRBL Limited	14.54
D.D. International Inc.	13.93
Kohinoor Foods Ltd.	11.87

[118] Food Corporation of India, GoI; www.fci.gov.in

[119] http://www.exportgenius.in/blog/rice-exporters-in-india-data-and-report-of-rice-export-from-india-march-2017-27.php

Name	Export Value (In Million USD, 2016)
PJS Overseas Limited	10.01
Supple TEK Industries Private Limited	8.69
Amirchand Jagdish Kumar (Exports) Ltd.	7.85
L.T. Foods Ltd	7.02
Veer Overseas Ltd.	6.25
HRMM Agro Overseas Pvt.Ltd.	6.21
Bharat Cereals Pvt. Ltd.	6.10

The private sector channel for non-basmati rice however is covered under some regulations, particularly those that govern the storage and movement of rice under the Essential Commodities Act and the Prevention of Black Marketeering and Maintenance (PBMMSEC) Act under which stocking limits and movement restrictions can be prescribed from time to time with the intent to control hoarding and black marketeering.

There are an estimated to be 450,000 rice mills in India of which approximately 150,000 to 200,000 mills are registered while the balance constitute the unorganized sector. Of the registered mills, close to 35,000 are above 1 MT/hr capacities. Close to 50% of the overall rice production is processed by modern mills[120] (either semi or fully automated), 40% by conventional mills[121], and the remaining 10% by hand pounding.

Mills across the country procure rice from farmers directly[122] or through commission agents or traders, who in turn purchase and consolidate from farmers, often also playing the role of cleaning, grading, sorting of paddy before making the sale. Traders may also get the paddy custom milled at rice milling units and either sell loose rice in local markets or, in the case of large traders, package and sell the same through a distribution network of shared or dedicated distributors, stockists and retailers. Several of the current large rice millers forward integrated from their commission agency or trading business to invest in mills.

A large share of paddy trade and transactions takes place at APMC markets across the country. These markets which are developed by the state governments under respective Agriculture Produce Marketing Committee Acts (APMC Act)[123], are locations where farmers sell their

[120] Modern rice mills are the units, in which the paddy processing activities are carried out by using rubber roll shellers along with a paddy separator, efficient polishers and graders, i.e., modern technology which is relatively more efficient. Majority of the activities at these mills are carried out using equipment such as driers, aspirators, graders, polishers etc. Modern rice mills have lesser breakage, need fewer manual labor and also result in increased utilization, thereby improving overall mill productivity. A rice mill can be completely modern and employ automated processes throughout the rice milling process or semi-modern and implement automated equipment only for some of the milling processes.

[121] Conventional rice mills are units in which paddy processing activities are carried out using steel hullers an older technology. Different activities like cleaning, drying, grading, polishing, etc. are carried out manually.

[122] Though practices differ across states, typically smaller mills buy directly from farmers while larger mills use the services of agents or wholesale traders

[123] Since agriculture is a state subject, the marketing of agricultural produce is governed by the Agricultural Produce Marketing Acts of respective State governments. The Act empowers state governments to notify the commodities,

produce to through commission agents to traders or representatives of rice mills. Close to 7,000 primary regulated mandis and a host of further "sub-market yards" ("mandis") operate across the country. Mandis provide the infrastructure and ecosystem for

- Transparent transactions through auctions
- Consolidation / aggregation of produce
- Grading and sometimes bagging of produce

While spot trade takes place at these mandis, forwards and futures trade in several agri commodities also takes place at private sector operated commodity exchanges, though futures trade in rice has been suspended since 2007.

The rice landscape in India provides practically no instances of contract farming and / or outgrower arrangements in stark contrast to the dominant and persistent discussion on the same as a viable approach in West Africa. This is because there is no specific regulatory framework or provision for formal contract farming arrangements though "informal" contract farming is widely prevalent for seed rice across the country. Land ownership and tenancy regulations brought about with the intent of ensuring land security (discussed in the next section) have, on the flip side, created strong disablers for private sector companies to lease land for cultivation.

Downstream

Downstream activities of storage, transport, distribution, packaging and retailing in the non-government channel function in a free market though a sizeable quantity of rice even in the non-government channel moves through the railways network almost entirely owned and operated by the Indian Railways (except for containerized movement which is open to licensed operators). Though the rice milling industry is heavily fragmented, a few large players operate independently as typical Fast Moving Consumer Goods (FMCG) companies with their dedicated brands and distribution networks. While these rice companies cater to the niche upwardly mobile urban consumers, the large majority of rice continues to move through informal networks of multiple tiered intermediaries supplying loose or locally packaged milled rice to households.

Export of rice is permitted currently though there have been several instances of abrupt restrictions on the same in the past, especially for non-basmati rice (discussed further later in this chapter). The Agriculture Produce Export Development Authority (APEDA), a central government body, provides various incentives and enablers for export of all agriculture commodities including rice. While imports of rice seed is restricted, import of rice for human consumption is permitted through State Trading Enterprises alone.

Cross-cutting enablers

Enabling activities like credit provision witnesses a strong participation / facilitation by the government primarily directed towards the cultivation segment but also lately in the post-harvest

designate markets spread geographically across the state and market areas where the regulated trade must take place. The Act also provides for the formation of agricultural produce market committees (APMC) that are responsible for the regulation and operation of the markets

chain. Several formal agencies for extension of credit exist including a tiered network of credit cooperative banks, Regional Rural Banks (RRB), Scheduled Commercial Banks, nonbanking financial institutions (NBFC), self-help groups, microfinance institutions, and other government agencies. In addition, the National Bank for Agriculture and Rural Development (NABARD) is an apex development financial institution in India that implements various credit schemes of the government and provides refinancing to cooperative banks. Private play in post-harvest finance for farmers and traders is also prevalent through a Warehouse Receipts System regulated by the Warehouse Development and Regulatory Authority (WDRA).

The banking regulator, Reserve Bank of India, mandates all domestic commercial banks and foreign banks to adhere to "Priority Sector Lending" targets which mandate them to allocate a designated minimumPercentage (announced from time to time) of their overall credit portfolio to the agriculture sector[124].

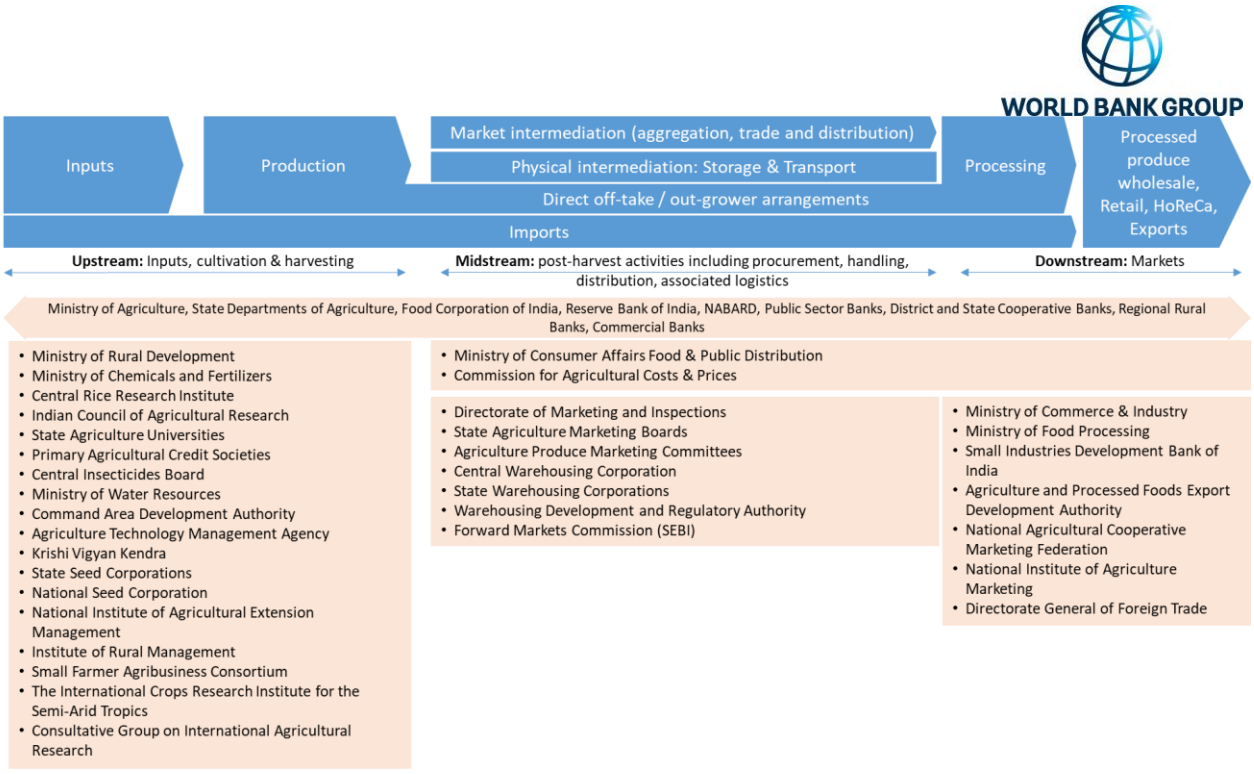
Despite the above, the local village level money lender who provides credit from his own means and often doubles up as an inputs providers and / or offtaker / commission agent / trader of the farmers' produce remains a key source of credit by farmers. Overall, over two thirds of the credit to farmers across the country is from informal sources[125].

A dedicated Ministry of Small Scale Industries also provides various incentives to Medium and Small Scale Enterprise ensuring a vibrant ecosystem of small and medium enterprises thrives in the country.

Figure 41: Map of Institutions that govern or influence the Rice Value Chain

[124] https://www.rbi.org.in/scripts/FAQView.aspx?Id=87

[125] The formal agencies include cooperatives, Regional Rural Banks, Scheduled Commercial Banks, nonbanking financial institutions, self-help groups, microfinance institutions, and other government agencies. The informal sources comprise moneylenders, friends, relatives, traders/shopkeepers, employers, and others; Source: http://www.indiaenvironmentportal.org.in/files/file/Institutional%20versus%20noninstitutional%20credit%20to%20agricultural%20households.pdf



Evolution of the Indian rice sector to its current state

The rice sector in India which forms a significant part of the overall agriculture sector of the country, along with wheat, has gone through a long path of trials and tribulations tracing its own unique learning curve that nevertheless provides valuable learnings from the success and failures of its overall approach and specific experiments.

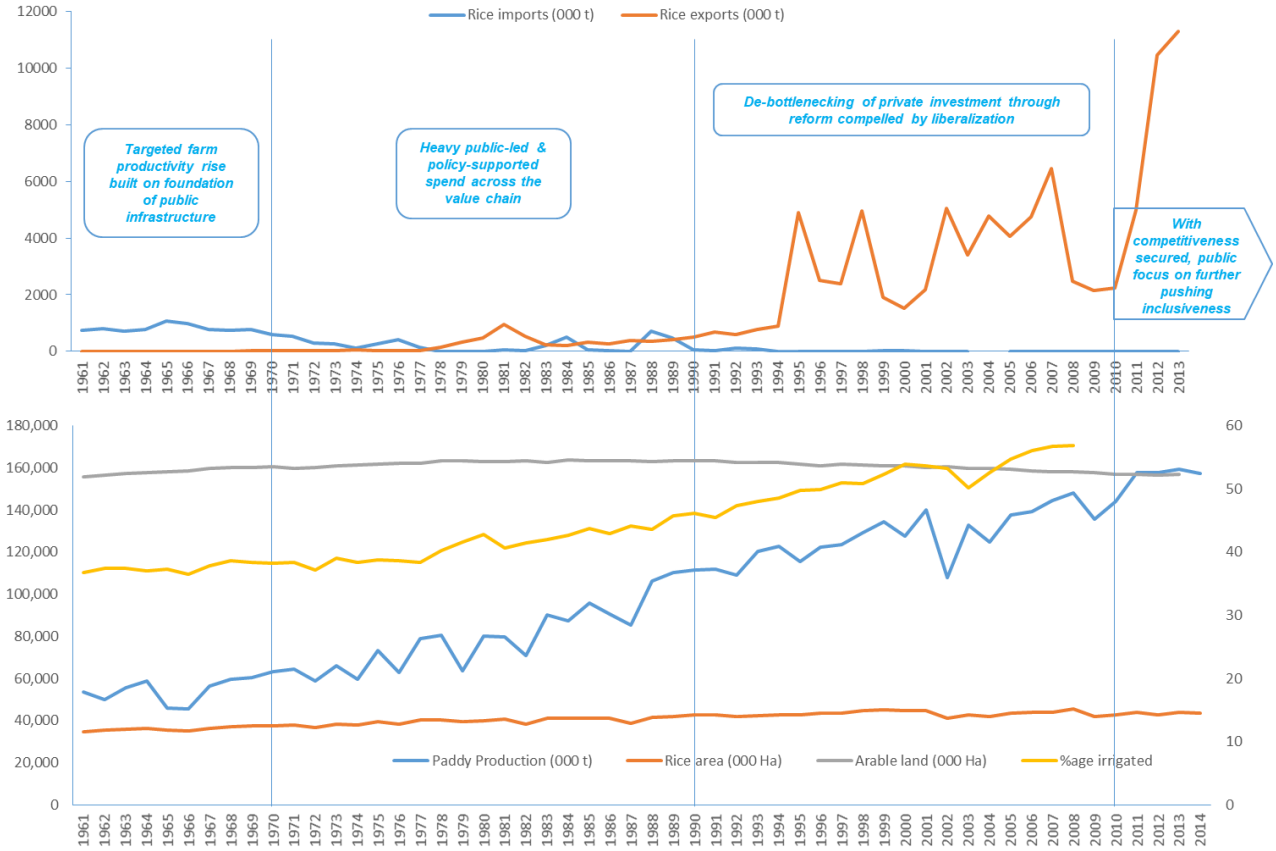
The transformation of India's rice value chain passed through distinct phases

Tracing the evolution over the last seven decades makes it clear that changing macroeconomic conditions and the political environment have not permitted the pursuit of a deliberate and consistent strategy – even while India has followed a very strong planning driven policymaking and budgeting approach - instead forcing course corrections, reversals and often even knee-jerk reactions to circumstances that were not accounted for or envisaged in the planning process.

To decipher the policy making and associated institutional development that has influenced the rice sector in India (since the times when it appeared to be hopelessly dependent on rice imports in the 1960s) and take lessons from the same, it is essential to look at four distinct phases in this evolution as delineated in Figure 42: Phases in the development of rice value chain in India.

The subsequent sub-sections take apart each phase and provide insights into the policy-makers' intentions and achieved outcomes thereof, highlighting what influences played a role in bringing India to its current position of dominance and competitiveness in the global rice sector and what the successes and failures of policy and institutional actions reveal as lessons for West African nations seeking to replicate the outcomes.

Figure 42: Phases in the development of rice value chain in India



Farm productivity was built on foundation of infrastructure spend and land reform

Aligned with the national impetus on "industrialization" of India and "modernization" of rural society, the first government of independent India focused on correcting anomalies that came about from decades of neglect and lopsided development oriented towards the needs of the colonial dispensation. Closing the yawning gap in core infrastructure to boost agriculture production and building the base for rural income growth in combination with grassroots agrarian reform thus formed the foundation of policy action for the first few years after independence.

Upstream

Central to agrarian reform was reform of the prevalent land tenure system that had been built with the primary purpose of collection of levies to bringing about rural development and equity and the "pride of ownership" of land that creates not only the motivation of the owner-farmer to invest in quality production but also enables access to the formal financial system. The Zamindari Abolition Act in 1950s was enacted with the basic objective of eliminating land intermediaries, ensuring ownership rights to the tillers of land, and ensuring a permanent improvement in the quality of the landholding. A ceiling was placed on the size of holdings, state control was exercised on idle or unused lands, and some of the idle land was distributed to the underprivileged rural people. Provisions were also made to ensure that recipients of this land do not lease out or sell the land. The consolidation of fragmented and scattered landholdings was

encouraged so that farmers could have better access to mechanization and land improvements could be made. 40% of cultivated area was thus released from the incumbent oppressive and inequitable system as a result of which 20 million statutory tenants acquired occupancy rights leading to considerable increase in the area under owner-operated system[126].

The other policy thrust in this phase for enhancing food production and improving food security was large-scale investments in irrigation and power. Thus significant investments were made in both the major irrigation backbone in the form of canals and dams and incentives for minor irrigation in the form of tube-wells to tap ground water.

Strengthening of research and extension networks was also undertaken combined with governance reforms – for example the position of the head of the agricultural research establishment which was occupied by a permanent civil servant was replaced by an eminent scientist and internationally known plant breeder and the governing body of the council was reconstituted to include a number of eminent agro-scientists.[127] The first planned attempt to build the extension network started with the launching of Community Development Programme in 1952, followed by the National Extension Service in 1953. These programs were able to educate responsive farmers to take up improved methods of farming across the country. The other important Area-Based Special Programmes included Intensive Agricultural District Programme (IADP, 1960), Intensive Agriculture Area Programme (IAAP, 1964) and High Yielding Varieties Programme (HYVP, 1966) besides Farmers Training Centers (1967) to train farmers on high yielding varieties and improved methods of farming to back up the above programs. Though these programs contributed to increased productivity, only modest production growth was achieved mostly enabled by expanding area of cultivation than productivity increase.

This process, which was delivering a slow and steady increase in rice (and the other staple – wheat) production, was interrupted due to two successive draughts in 1965 and 1966 leading to a situation of food aid dependency as described earlier. The foundation of strong research and extension in addition to the irrigation investments made till then however enabled a rapid turnaround that is now famously referred to as the Green Revolution.

A systematic approach to development of new varieties underpinned by close collaboration with international research institutions like the International Rice Research Institute (IRRI) led to the development of modern high yielding varieties that enabled an acceleration of production supported by the extension system. Though dramatic yield improvements were delivered, they were at this stage localized to the irrigated areas of the northern plains. Nevertheless, the production increase achieved from these areas alone was sufficient to realize self-sufficiency at a national level.

The National Seed Corporation (NSC) was established in 1963. The Government of India enacted the Seeds Act in 1966[128] to regulate the growing seed industry. The NSC provided

[126] Economic and Political Weekly, June 29 1996

[127] http://www.larouchepub.com/eiw/public/1991/eirv18n27-19910719/eirv18n27-19910719.pdf

[128] The Seeds Act stipulated that seeds should conform to a minimum stipulated level of physical and genetic purity and assured percentage germination either by compulsory labelling or voluntary certification. Along with the Seeds Control Order of 1983, the Act provided statutory backing to the system of variety release, certification and testing; The Seeds Control Order also brought seeds within the scope of the Essential Commodities Act that, as explained

foundation seed, training and technical assistance to State Governments and private companies. This was followed in 1969 by the Terai Seed Development Corporation that became the model for State Seeds Corporations established later in the 70s and 80s.

The private sector also significantly stepped into the seed business in these years though it was reserved exclusively for the small scale sector effectively disabling larger investments in varietal research by the private sector[129]. Given that high yielding varieties of rice at this time were self-fertilizing and that imports and foreign investment in seeds was prohibited, the focus of private sector was not on paddy seeds and the development of these remained confined to the public sector.

Since high yielding varieties required more intensive use of fertilizers and pesticides, there was a need to ensure availability of these which was also achieved by ramping up imports of fertilizers while ensuring easy availability by exercising public sector control on the storage, movement and most importantly pricing of these inputs even while permitting the private sector to play these roles. To make fertilizers affordable to the farmers, a uniform maximum retail price is fixed by the government. A Central Fertilizer Pool for import and distribution of fertilizers was in existence since 1944 as fertilizers were in short supply and their equitable distribution was necessary. The central Government channelized all fertilizers-imported as well as indigenous-through the Pool, which was run by the Ministry of Food and Agriculture as a state trading scheme till 1965-66[130]. The entire supplies of nitrogenous fertilizers were routed through the Pool to various state governments which sold it to the agriculturists through their Agriculture Departments, through-co-operatives and through private agencies[131].

With the demand rising sharply in the wake of the uptake of high yielding varieties, in 1966, the Government through the Department of Fertilizers under the Ministry of Chemicals and Petrochemicals liberalized controls over fertilizers permitting indigenous producers to market a designated share of their production in areas of their choice at a price to be determined by them. The balance production was to be given to the Government for distribution through the Pool, at the retention price fixed by the Government.

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earlier, enables the government to place restrictions on the movement and storage of seeds. It mandated all seeds sales outlets to be licensed. Source: https://pdfs.semanticscholar.org/ebc0/2905119dff5fbda3e3390eba32b484136afa.pdf

[129] The small-scale sector owes its definition to the Industries (Development and Regulation) Act, 1951. The sector is defined in terms of value of investment in plant and machinery (original value) which was determined to be under INR 3.5mn until 1985.

[130] The Central Government promulgated in April 1957 the Fertilizer (Control) Order under the Essential Commodities Act, 1955. This order empowered the central government to fix the maximum price or rates at which any fertilizer could be sold, and it prohibited any manufacturer or dealer from selling any fertilizers at a price exceeding the maximum price fixed by the Government. Under the Order any person dealing in fertilizers had to obtain a license from the appropriate State Government.

[131] http://webcache.googleusercontent.com/search?q=cache:http://14.139.60.114:8080/jspui/bitstream/123456789/741/19/Control%2520Over%2520Fertilizer%2520Prices%2520and%2520Distribution.pdf

Midstream

The current system of public sector procurement and distribution of foodgrains explained earlier was conceptualized and implemented in this period.

Even while there was a focus on the agriculture sector immediately after independence it was implemented as part of the overall drive towards industrialization with agriculture playing an essential but supporting role. It is argued by some researchers that this led to complacency towards the relatively easy availability of aid and imported rice (and wheat) in the initial years. While making foodgrains available in abundance was considered necessary, farmer incentives for growing foodgrains – which inevitably get depressed when cheap / free imports are available - were perhaps not paid concomitant attention.

Successive draughts on 1965 and 1966 that constrained foodgrain availability shattered this complacency and the goal of self-sufficiency became paramount. The government was thus faced with the task of ensuring that affordable staple food was made available to the population even while keeping producer prices remunerative enough to encourage growth in production to meet the needs of a rising population with improving incomes.

The task of ensuring surplus production of rice that largely came from the northern plains but was generally spread across the country was distributed across the length and breadth of the country was mammoth. Given the welfare orientation of the task, the lack of market integration due to inadequate public goods, such as roads, telecommunications, and other marketing infrastructure, absence or inadequacy of risk-mitigating institutions such as insurance and credit in addition to the fact that there were no large private enterprises who could be tasked with the same, the government took it upon itself to construct and operate the system for procurement – to the extent that it could procure at a price that it considered remunerative enough for farmers to continue producing[132] - storage, handling, transportation, distribution and sale – at a price it considered affordable by the poor - of foodgrains entirely on its own.

Thus was established the Food Corporation of India (FCI) in was setup in 1965 to discharge these functions in conjunction with state governments and agencies. A network of storage facilities to hold buffer stocks at a minimum level as strategic reserves was built under FCI itself and under Central and State Warehousing Corporations.

Even when rice milling was left open to the private sector, a provision of "levy rice" was imposed on all milling units that mandated these mills to procure paddy at the Minimum Support Price on behalf of the FCI and sell a designated share of their total output to the government agencies at pre-determined prices linked to the paddy MSP based on a calculation of remunerative returns for the miller, Millers were required to provide the rice to FCI before making any rice sale in the open market. While this limited on the millers' flexibility, the fact that close to half a million rice mills have mushroomed across the country as of 2015, indicates

[132] During the mid-1960s to mid-1970s, the government used to announce minimum support price (MSP) and procurement price (PP). The MSP was based on the variable cost of production and MSP was required to ensure farmers remain in business as long as their variable costs are covered and also to encourage farmers to adopt new technologies without fear of a price collapse if the output increased substantially. The procurement price (PP) was determined based on both the variable cost as and the fixed cost of production.

that entrepreneurs found the arrangement worthwhile – the fact that imposition of the rice levy guaranteed a minimum capacity utilization of their plant, that paddy supply was booming supported by high yielding varieties, that rice consumption was also growing and finally that there was prevalent corruption[133] makes it easy to understand the proliferation of rice mills despite the limitation on flexibility.

While close to 70% of the domestic rice trade was taking place outside of the purview of the FCI, this trade also leveraged public support in the form of APMC "Mandis" (described earlier) that were intended to provide a platform for transparent transactions, grading / sorting / cleaning / bagging and for consolidation of produce from small farmers. While enabling regulation for the development of these markets existed since the early part of the 20th century, the development of these markets accelerated only in the 1960s on the back of rising supply of produce.

Downstream

Rice procured through the Public Distribution System was distributed through a nationwide network of "Fair Price Shops" run by private entrepreneurs. The price of sale at these shops was determined by the respective state governments based upon the Central Issue Price (CIP) declared by the Agricultural Prices Commission which came into existence in 1965 in parallel with FCI.

Rice that was not part of the Public Procurement System flowed to consumers freely albeit with preventive restrictions around stock limits that were periodically imposed while import and export of rice were placed under the full monopoly control of FCI.

Cross-cutting enablers

Soon after the independence, the Government of India following the recommendations of All India Rural Credit Survey Committee (1951) felt that cooperatives were the only alternative to promote agricultural credit and development of rural areas[134]. Provision of affordable *credit* to the farming community was a priority of the dispensation in this period and the primary means of bring about the same was through the setting up of a tiered network of cooperative banks. Cooperatives received substantial help in the provision of credit from Reserve Bank of India as a part of loan policy and large scale assistance from Central and State Governments for their development and strengthening. Many schemes involving subsidies and concessions for the weaker sections were routed through cooperatives.

With the intent of releasing farmers from the stranglehold of local moneylenders who were often exploitative, the cooperative credit movement was emphasized resulting in the development of close to two million agricultural cooperatives by the mid-1950s. Credit extended by these cooperatives increased from 8% of total borrowings of cultivators in the early 1950s to 30% by mid-1960s.

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[133] https://thewire.in/18346/the-government-must-act-on-the-cags-damning-report-on-rice-milling-and-paddy-procurement/

[134] Ramana Reddy. V. V. (1999), "Role of Institutional Finance in Indian Agriculture", Anmol Publications, New Delhi.

With a less than 1% share in rural credit, commercial banks were playing a marginal role in agriculture until several banks were nationalized in 1969 and stringent mandates were given to them for extension of credit to the "priority sectors" of which agriculture was one. First, according to the new branch licensing policy, commercial banks were required to open four branches in unbanked rural areas for every branch opened in metropolitan areas. As a result, only 1443 rural branches of banks in 1969 rose to 35,134 rural branches by 1991. Secondly, according to the policy of priority sector lending, 40% of the net bank credit was to be compulsorily provided to those sectors of the economy (or sections of the society) that would not get timely and adequate credit in the absence of binding targets. These sectors were, typically, loans to farmers for agriculture and allied activities (18%), micro and small enterprises, poor people for housing, students for education and other low income groups and weaker sections (10%).

Primary Land Development Banks (PLDB) which were setup in 1920s also received strong support from RBI and the Agricultural Refinance Corporation[135] to reorient their lending policies in favor of marginal and small farmers.

In *summary*, in this period, policies were directed towards plugging the infrastructure gap, reforming the agrarian system and enhancing the capacity of rural folk through research, extension and credit so as to create the foundations of greater productivity. Such focus was useful in launching the Green Revolution when food shortages in the mid-60s created a crisis. Concern over maintaining food security was so high and capacity of institutions and adequacy of core infrastructure (transportation, credit, telecommunications) was so low that the government chose to take over the mantle of managing the entire end to end value chain, to the extent that it was considered necessary to meet the nutrition needs of the poor.

Heavy public-led and policy-supported spend followed across the value chain

Perhaps as a manifestation of what is sometimes in early literature referred to as aid-induced complacency, India did not have a comprehensive agriculture policy – let alone a rice policy - until 1976 when it was developed by the National Commission on Agriculture (NCA) with main thrust on production, land and water development by addressing the problems of soil and moisture conservation issues of water management. The Commission reviewed the progress of agriculture in the country and made recommendations for its improvement and modernisation.

The continued development of improved varieties, spread of high yielding varieties beyond the northern plains along with significant ramp up of credit support underpin this period. Having tasted success, spend was almost unconstrained through the strains of maintaining the same appear to have dawned upon policymakers in the latter part of this period where leakages arising from governance challenges in a pretty much entirely publicly controlled supply chain were rising. This is witnessed in the move towards reform and expenditure control in the latter part of this period.

[135] The Agricultural Refinance Corporation was established by an Act of Parliament in 1963 and started functioning from 1st July 1963. Although primarily a refinancing agency, the Corporation had from the beginning assumed certain functions which are essentially developmental and promotional in nature.

Upstream

Though the immediate crisis triggered by the successive draughts in mid-1960 was addressed and the quantum of imports starting showing a declining trend, production more or less stagnated till late 1970s keeping the administration on its toes and providing the motivation for continued domestic varietal research and the impetus for spreading the benefits of the high-yielding varieties beyond the northern states that, until the Green Revolution, had not been major producers of rice but became so on account of the superior irrigation infrastructure, extension network and relatively larger land holdings.

For the research setup in the country, working closely with international institutions also enhanced capacity to take forward the research for the development of further high yielding local varieties suited for local requirements in other parts of the country, especially the South, where rice had traditionally been grown in rainfed lowland (and to an extent upland) environments without irrigation (referred to as MV3 – please refer Box titled "Stages of varietal research and how they played out in the Asian Green Revolution (GR)").

Stages of varietal research and how they played out in the Asian Green Revolution

First-generation Modern Varieties (MV) is a regional public good, in the sense that it is widely diffused not only in the country in which it was developed, but also in other countries in tropical Asia, thereby accruing benefits to wide areas. During the GR, research knowledge leading to the development of MV1 was widely shared across country borders. If only individual countries for the purpose of generating "local" public goods for their own benefits had carried out agricultural research, the Green Revolution would not have been possible.

New rice varieties are public goods, because farmers can easily reproduce seeds of MV. Therefore, agribusiness firms are not interested in the development of MV analyzed by the papers included in this special issue. Thus private firms have been interested in the development of hybrid rice and genetically modified (GM) rice varieties, which cannot be reproduced, for favorable areas in general and those in advanced countries in particular.

Although MV1 is potentially high yielding, it is susceptible to pests and diseases. Moreover, its yield potential is realized only in favorable production environments, such as irrigated and shallow rainfed areas. This was clearly the case in India, where the Green Revolution took place most notably in northern irrigated states in the 1970s. Thus, in reality, the average yield effect of MV1 was not very. However, MV1 increased the productivity of subsequent breeding research by providing high-yielding genes to the "second-generation MV" (MV2), which are resistant to pests and diseases.

Gradually, national agricultural research systems (NARS) undertook breeding research using both MV1 and MV2 as parental materials. As a result, MV3 was developed primarily by NARS, which is characterized by higher-grain quality and wider geographical adaptability because of the development of a large number of location-specific varieties. Thus, the

adoption areas of MV reached almost three-fourths of the rice growing areas and the average rice yield more than doubled in Asia.

In India, yield growth started to slow down in intensively irrigated rice ecosystems, although rainfed ecosystems picked up through the spillovers of MV from irrigated states. It is important to emphasize that because of its location specificity, MV3 is typically a "local" or "national" public good, whose provision should be undertaken by NARS. It is also clear that the productivity of NARS research was enhanced by prior research by IARC, which also benefited from the cultivars collected and contributed by NARS. Thus, there has been mutual cooperation between IARC and NARS.

Extracted from "RICE GREEN REVOLUTION IN ASIA AND ITS TRANSFERABILITY TO AFRICA: AN INTRODUCTION"; Keijiro OTSUKA and Kaliappa P. KALIRAJAN, Foundation for Advanced Studies on International Development and National Graduate; Institute for Policy Studies, Tokyo, Japan"

The NCA's review of the Indian seed industry recommended expansion, varietal registration, seed insurance, tax benefits, seed processing ,storage, seed research, seed law enforcement, seed certification, grow out tests and inclusion of seed technology as a course in Agricultural Universities.

The National Seed Project (NSP) was launched in 1974, and the National Seeds Corporation (NSC) which was setup in 1963, was assigned the lead role to develop the seed industry in the country. Under this World Bank Program between 1975-85 several enabling institutions and programs were created in the form of State Seeds Corporations (SSC), State Seed Certification Agencies, State Seed Testing Laboratories, Breeder Seed Programmes etc. Together with the state seed certification agencies, the SSCs played the key role of producing, certifying and distributing high quality seeds bred by the public sector research institutions. They however also stimulated private sector activity in direct (through dissemination of foundation seed) and indirect (through the creation of expertise in seed technology, processing and distribution) ways.

While the New Seed Development Policy of 1988 liberalized the seed sector and brought down restrictions on foreign investment and importation of some seeds, control on export and import of paddy seeds were retained. Nevertheless a large number of private sector seed companies were established in the 1980s. The government made seeds of public-bred varieties available to the private sector for multiplication and distribution encouraging the growth of domestic seed companies. While the private sector increasingly took over research on non-open-pollinating varieties, self-fertilizing seeds like those of high yielding (not hybrid) varieties of paddy and wheat remained largely in the confines of the public sector.

This period witnessed various other activities including the provision of production, distribution and transport subsidy on seeds and distribution of Seed Mini-kits[136] with high yielding rice seed varieties to below poverty line cultivators.

[136] Rice seed minikit distribution program was started in 1972-73 with the objectives accelerating coverage of area under location specific high yielding varieties/hybrids, building up of stocks of improved seed at the farm level, training extension workers with the newly evolved technology and propagation and adoption of improved production technology; Source: http://www.rkmp.co.in/content/minikit-programme-for-rice-wheat-and-coarse-cereals

Based on findings of an *Irrigation* Commission of 1972 that went into the problems faced by large irrigation projects, improvement in the efficiency of irrigation investments being made was sought in light of the unsatisfactory management of irrigation, particularly the delivery and utilisation of water at the farm level. Starting in 1973, a coordinated approach to the development of irrigated agriculture was sought which was to be implemented through Command Area Development Authorities (CADA). The major objective was to upgrade the outlet command with suitable on-farm development works to lead to better distribution and utilization of water over the entire irrigation command. The Command Area Development Program (CADP) which was started in 1974-75 to achieve speedier utilisation of irrigation potential and ensure proper use of water identified farmer involvement in system management as part of the program.

Expansion of the extension network continued through various institutions and programs viz. District Rural Development Agency/Society (DRDA, 1976), Integrated Rural Development Programme (IRDP, 1978) and Lab to Land Programme sponsored by ICAR (LLP, 1979). Although, these programs were able to improve the socio-economic conditions of beneficiaries, they were isolated in a given time and implemented in a phased manner.

Midstream

The state-owned and operated network of procurement and distribution paid off when a major draught struck in 1979-80 and FCI's stockpile of 20 mn MT came to the rescue preventing imports. However, the operational complexity of the network, exposure to the motivations of its political masters and the lack of the shareholder value maximization engine that self-corrects and optimizes the efficiency of private enterprises began to tell on the mega-enterprise which was now handling a throughput of over 30 mn MT[137] of which rice was close to 50% in addition to the management of strategic reserves.

Populist political decision making ensured that the distinction between Procurement Price and Minimum Support Price disappeared with the latter becoming the norm for FCI's procurement even while it was developed for application in severe shortage situations and was pegged at a higher level than what was minimally needed to ensure that the farmer would remain motivated to produce the grain (Refer Footnote 132).

The Essential Commodities Act was amended in 1974 to ensure quicker and more elective action against the anti-social activities of profiteers, hoarders and black marketeers. The administration enforced orders relating to display of prices and stocks by dealers in essential goods and items of mass consumption. Powers of invocation were delegated to the state governments while requiring state governments to take the central government's approval before notifying any decision under it. At the same time the punitive powers of the government to take action against those attempting to profit from hoarding and blackmarketeering were increased under Prevention of Black Marketing and Maintenance of Supply of Essential Commodities Act, 1980.

[137] As of 1989

Wholesaling and milling infrastructure kept pace with rising volumes as witnessed in the expanding network of APMC markets[138] and a significant rise in the number of mills, especially modern mills despite the aforementioned controls in the sector.

Development of large scale modernized rice milling units was facilitated by the availability of large quantities of paddy of the same variety which in turn came about on account of a conscious approach of the extension setup to facilitate mono-cropping in large areas including through the distribution of the aforementioned seed mini kits.

Downstream

As surplus in rice started to rise, export was permitted for the premium "basmati" variety rice[139] while still being controlled for non-basmati rice with exclusive right of exports and imports residing with FCI which exercised these rights – in addition to the fixing of a "minimum export price" intermittently in line with its mandate to maintain buffer stocks and affordable availability of rice at all times. The Agriculture and Processed Foods Export Development Authority (APEDA), setup in 1985 played an important role in the commencement of exports.

Cross-cutting enablers

Nationalization of banks and imposition of mandates to service the rural sector in 1969 as mentioned earlier served to significantly increase the flow of credit to agriculture of which the rice sector was also a beneficiary.

The All-India Rural Credit Review Committee (AIRCRC) (1969) concluded that small farmers continued to be handicapped with cooperatives due to exclusion from membership, insistence on land security and restriction on loan size to tenants, which can aggravate the situation of inequality especially in the context of new agricultural technology. The National Commission on Agriculture (NCA) in one of its interim reports argued that formal agencies like cooperative and commercial banks lacked a clear understanding in dealing with the poor.

These studies observed that cooperatives- both in short-term and long term structure, have neither been able to reduce the dependence on informal sources nor able to adequately cover the landless and other weaker sections. Land based credit policy, focus on agriculture and production loans, control by elite and other vested interests not keen to bring in poor are identified by these authors as the reasons as to why the co-operatives have not been able to reach out to the poor.

Multiple new institutions were launched with a view to enhance and supplement the effectiveness of credit cooperatives in making credit available to the intended rural population of small and marginal farmers and agricultural labourers. To direct credit towards the most needy and excluded segment, the Small Farmers' Development Agency (SFDA) and the agency for Marginal Farmers and Agricultural labourers (MFAL), were launched in 1975 with a mandate to direct at least 20% of the total credit to small farmers. In addition Regional Rural Banks[140]

[138] The National Commission on Agriculture (1976) had recommended establishment of one market at a radius of 5 km.
[139] 67,000 tonnes of basmati rice were thus exported in 1978-79
[140] The Government of India has 50% shareholding in all RRBs. The government of the respective State where an RRB mainly operates, and its sponsor bank, hold 35% and 15%, respectively.

(RRB) were setup to cater exclusively to the credit needs of the small farmers and served to strengthen the linkages and ease the flow of credit through the tiered structure of cooperative bank from the district level to the Primary Agriculture Cooperative Societies (PACS) and act as a via media between the local cooperatives and the professionally managed commercial banks. There was large scale expansion of RRBs in the country during 1980s reaching out to many remote rural areas. Refinance to cooperatives was also made conditional upon meeting the target fixed for the small farmers.

The state governments also came with many incentive based measures to encourage cooperatives to become more inclusive in their working. Universal membership drive was launched by many state governments which provided subsidy or concession loan to enable poor to subscribe to the share capital of the cooperatives. Contributions were made to bad debt reserves to encourage cooperatives to take risk in lending proactively to the poor. Reservations were made for weaker sections to be on the governing committee of cooperatives to reduce elite control of cooperatives as well as help poor participate in the management of cooperatives. An attempt was made even to amalgamate primary credit cooperatives to make them become viable.

An “Integrated Rural Development Program” was launched in 1977 as a credit based poverty alleviation programme targeting the poor and covered nearly 54 million poor till 1999. The focus of IRDP was helping the identified poor by the state agencies to get access to easy and collateral free credit from the formal agencies at reasonable terms for variety of income generating activities.. Cooperatives were also roped in the implementation of IRDP giving them an opportunity to overcome their past failure in reaching out to the poor.

Further, National Bank for Agriculture and Rural Development (NABARD) came into existence in 1982 by transferring the agricultural credit functions of RBI and refinance functions of the then Agricultural Refinance and Development Corporation (ARDC).

Also, under a differential interest rate scheme in 1974, loans were provided at concessional interest rates on advances made by public banks to selected low income groups to engage in productive and gainful activities. The differential rate of interest was fixed uniformly at 4 per cent per annum, i.e. 2 per cent below the bank rate.

In *summary*, though this period witnessed widespread impetus being given to agriculture across the board, there was a rising realization of the less than desired impact of the same. Even with the setup of multiple institutions as described above and release of multiple schemes, governance and corruption challenges were visible raising the costs of delivery and limiting the targeting effectiveness of programs. All this contributed to the country’s march towards a balance of payments crisis that led to the cross-cutting economic reforms of 1991 (discussed in next section)

Liberalization in early 90s compelled reform, de-bottlenecking private investment

The process of liberalization which started in India in 1991 with the goal of making the economy more market-oriented and expanding the role of private and foreign investment did not include any reform package specifically directed at the agribusiness sector.

Nevertheless, reforms in key policies that impacted agriculture marketing and food processing have been introduced intermittently[141] since around the same time. The focus of agricultural policy since 1991 shifted to improving the functioning of markets, reducing excessive legislation, and liberalising agricultural trade by gradually removing various restrictions and controls on the same.

Upstream

The new seed policy of 1988 and the economy-wide reforms of 1991 attracted the multinational companies (MNCs) to India in a major way. Most of them entered through partnership with the national companies, and only a few established their independent seed business in the country.

The ICAR, as the apex agricultural R&D organisation of the country, initiated dialogues with private R&D organisations, NGOs and other stakeholders to develop partnerships. A number of policy decisions were taken through a consultative process. These decisions underscored continuity of dialogue, sharing of resources, expertise and cost and benefits of technologies in a transparent manner, capacity building, and developing a culture of mutual confidence and trust. Although these initiatives are quite comprehensive and path breaking in several ways, there are only a few examples of successful partnerships.

In the case of hybrid rice, ICAR, SAUs, IRRI and national private seed companies collaborated for development of male sterile lines, development of hybrids and refinement of seed multiplication technologies. The partnership upscaled the hybrid rice technology and intensified plant breeding and seed multiplication activities in the private sector. The technology has been commercialized and being adopted even in marginal areas of eastern India because of significant yield advantage.

The Plant Variety Protection and Farmers' Rights Act (PVPFR) in 2001, National Seeds Policy in 2002 followed by the Seeds Bill in 2004 have underpinned the opening up of the seeds sector in this period. With the PVPFR extending protection to the rights of breeders of open-pollinated varieties also, private sector activity has witnessed a rapid increase in the hitherto public sector dominated paddy seeds sector.

The Seeds Bill provided for Registration of kinds and varieties of Seeds, Regulation of Sale of Seed and Seed Certification Seed Analysis and Seed Testing Export and Import of Seeds and Planting Material.

[141] For a longer list of all key policy reforms undertaken since 1991 please refer World Bank Report, "India : Accelerating Agricultural Productivity Growth (Annexure 1)

For rice, the principal source of seeds remained the farmers themselves. Seeds saved from the preceding crop supply nearly 90% of the requirement.

In order to ensure that seeds are available to the farmers at the time of natural calamities like floods, droughts, etc., a Seed Bank Scheme was launched to maintain stocks of foundation and certified seeds of different crops/varieties which can be utilized for such contingent requirements.

Government data and surveys of seed firms show that from about 1990 to 2010 the number of new seed cultivars available to farmers in maize, wheat, and rice roughly doubled, while the number of cotton cultivars at least tripled. Private hybrids of cotton, rice, maize, pearl millet, and sorghum increased yields over public hybrids, varieties, and landraces. Small farmers in some of the poorest regions of India—the semiarid tropics of central India and the rainfed rice regions of eastern India—get higher productivity with private hybrids.

Analysis of rice yield data for 2008/09 shows that, on average, in the states that grow hybrid rice, yields of private rice hybrids are 22% higher than yields of HYVs and traditional varieties. Indian firms and subsidiaries of MNCs based in India are now becoming important innovators in other countries by exporting technology developed in India. Hybrid rice cultivars are being exported to Bangladesh and Southeast Asia. Indian small tractors are being exported to the United States, Africa, and elsewhere. Generic pesticides are exported around the world. Indian biopesticides based on neem are being exported to Europe, the United States, and Asia.

Overall, the private seed sector witnessed tremendous growth - even in self-pollinated crops like paddy, the share of public sector is nominal and the private sector supplies 60-80 per cent of commercial seed in the states of Haryana and Andhra Pradesh. Low marginal cost and risk in producing paddy seed and potential lucrative market for hybrid rice could explain greater private sector’s participation in rice seed in the favorable production environments.

In 2000, the Government of India published a comprehensive agricultural policy statement — the National Agricultural Policy (NAP) that set out clear objectives and measures for all the important sub-sectors of agriculture.

The fertilizer system was also reformed with the launch of a New Pricing Scheme (NPS) from 2003 to enable greater efficiency and targeting of subsidies.

In 2007, India announced a new Agricultural Development Plan to spend around $6.1 billion over four years, increasing spending on irrigation by 80 per cent in 2008–2009.

Midstream

The National Commission on Farmers (NCF) was set up in 2004 which comprehensively studied the food situation covering mostly concerns regarding supplies for the public distribution system and the concerns related with production and productivity.

Agriculture Marketing regulation was reformed permitting the development of private markets, removing the restriction on the sale of agriculture produce exclusively at APMC mandis, facilitating contract farming and electronic trading amongst others.

Futures trading in rice among several other agriculture commodities was also permitted in 2003 but has been removed from the list of permitted commodities since 2007 responding to fears of price rise fuelled by speculative activity on the futures markets.

The food subsidy remained untouched and unaffected by the sweeping reforms and instead demonstrated a sharp rise in these years. While the MSP was increased successively, the CIP (retail price) remained fixed for a long period leading to a ballooning of the subsidy. Efforts to contain the operational cost have been made through the extension of programs for private partnership and investment in storage infrastructure including large scale rice and wheat silos. Procurement cost reduction was instituted through the scheme of Decentralized Procurement of foodgrains in 1997-98 which encouraged local procurement by delegating procurement functions to the state agencies thereby extending the benefits of MSP to local farmers as well as to saving on logistics costs. This also enabled procurement of foodgrains more suited to the local taste.

The Warehouse Development and Regulation Act of 2007 has also enabled rapid expansion of warehousing capacity through the provision of direct capital subsidies. Warehouse Receipt Based finance has also demonstrated rapid growth after futures trade was permitted in several agri commodities in early 2003. While futures trade in rice is not permitted, the expansion of warehousing infrastructure has had a positive spin-off on rice also with sizeable capacity of private sector warehouse operators being occupied with paddy / rice.

Technology transfer from Japan and Germany was facilitated for rice milling in this period which was supplemented by domestic equipment suppliers' efforts to indigenize equipment manufacturing. Soft loans available for millers under the renewed and widened impetus towards release of finance to the agriculture sector (discussed in the "cross-cutting enablers" section) provided a strong impetus to this sector which started witnessing the emergence of large scale modern mills.

With the opening up of wholesale trade to 100% foreign direct investment in 1997, global MNCs including Wal-Mart, Tesco, Metro among others established presence in the wholesale trade.[142]

Downstream

As part of the effort to make the public procurement and distribution network of FCI more efficient and effective, the Public Distribution System was revamped with the creation of three different categories of beneficiaries based on their income levels viz. Above Poverty Line, Below Poverty Line and the "poorest of the poor" with different prices being set for them at the Fair Price Shops. The revamp while well-intended suffered from governance failures and consequent widespread leakages[143].

[142] With prior approval of GOI; in 2006, FDI in wholesale trade was brought under the automatic route, requiring no approval from GOI
[143] http://pdscvc.nic.in/

Exports of rice were intermittently controlled either through the setting of a minimum export price or an outright ban the latter having come about during the global food price crisis of 2007-08. Imports continued to be restrained being allowed only through the State Trading Corporations.

Cross-cutting enablers

Despite improvements with respect to targeting of credit undertaken in the previous period, in the early-1990s, the policy of social and development banking was considered ineffective. The Committee on the Financial System (Narasimham Committee) argued that banks should function on a commercial basis, and profitability should be the prime concern in their activities (RBI, 1991). Thus, banks were permitted to close rural branches and Priority sector norms were increasingly diluted.

Even so, the government made a pronouncement in 2004 to double agriculture credit within three years. In recognition of the fact the development of agriculture required the rapid development of off-farm agricultural activities (trade, processing etc) also, the definition of "priority sector" that was used to measure banks' contribution to the sector was widened.

At this time private Microfinance institutions also proliferated and with their flexible and direct approach were able to grow rapidly.

The result was an exponential increase in agriculture credit of both long and short tenor though the latter expanded relatively more a key reason for the same being that NABARD refinancing of cooperative banks ceased to be limited to only long term finance.

One of the reasons for an increased flow of credit to farmers was the issuance "Kisan Credit Cards". These were individually provided to farmers to enable timely credit for their agricultural operations.

In *summary*, this period witnessed the "cutting back" of public spend in a "course correction" of sorts after the heavy public spending witnessed in the previous period. While the previous period had started seeing removal of constraints towards greater participation of private enterprise, this period entailed an active policy for encouragement of private investment and deliberate actions towards prudence in public expenditure.

This was also the period when India started taking an active role in promoting regional economic co-operation and trade in South Asia through the South Asian Association for Regional Cooperation (SAARC). In April 1993, a regional trading block was formed with the signing of the SAARC Preferential Trading Agreement, which was improvised in 2004 in the form of an Agreement on South Asian Free Trade Area (SAFTA) that supersedes the Agreement on SAARC Preferential Trading Arrangement.

With improved competitiveness, public focus is on further pushing inclusiveness

The last time active control of free trade in rice was witnessed in India was close to a decade ago when the food price crisis struck. Export of non-basmati rice was banned all the way up to 2011 long after the food crisis was over.

Focus has continued to be on making government spend more targeted and efficient while ensuring that the gains generated from the same in addition to those from permitting greater private enterprise can be more effectively ploughed back to the impoverished.

Some examples of such focus seen across the value chain include

- the mechanism for fertilizer subsidy has been revamped to make it more targeted under the Nutrient Based Subsidy policy effective from 2010
- trials have been carried out for direct transfer of subsidies to farmers to make up for the shortfall in market price vis-à-vis the MSP.
- All controls on rice milling were removed when the system of levy rice was abolished in 2015

A program was “Bringing the Green Revolution to Eastern India” was launched in 2010 to sustain the momentum in rice production. Among other notable characteristics of this program hybrid rice, now covering about 5% of the rice area across India, is spreading to less favorable rice environments, also not well served by the Green Revolution varieties. It is replacing older improved varieties and landraces. Green Revolution varieties were generally not cultivated in eastern India because they were considered unsuited to these regions. More than 80% of rice hybrids in India are cultivated in eastern Uttar Pradesh, Bihar, Jharkhand, and Chhattisgarh, and 15% in the northwestern and western parts of India.

Annexure 1B: Accounting for West Africa's unique challenges in adapting lessons from India

Before assessing the local context in West Africa to derive takeaways from Asia's experience, it is important to also recognize the various factors that make the context in the latter unique from the former.

A beginning towards customizing learnings to derive specific actions can be made by recognizing how the current situation in West Africa is different from that of India when it achieved its transformation. Supplementing this understanding with the pitfalls in the strategy and implementation of India's transformation can provide for a nuanced set of guiding principles for West Africa.

The level and extent of aid dependency in India was never allowed to reach the level it is already at in most West African nations. This makes the task of taking the wide and sweeping actions that the Indian government took towards controlling almost the entire chain and, most importantly, placing restrictions on imports, extremely challenging. Also, the capacity of the Indian economy to absorb the heavy capital investment and subsidy bills of controlling the end to end chain was greater, not to mention that the sheer costs[144] of exercising such control were lesser than they are now.

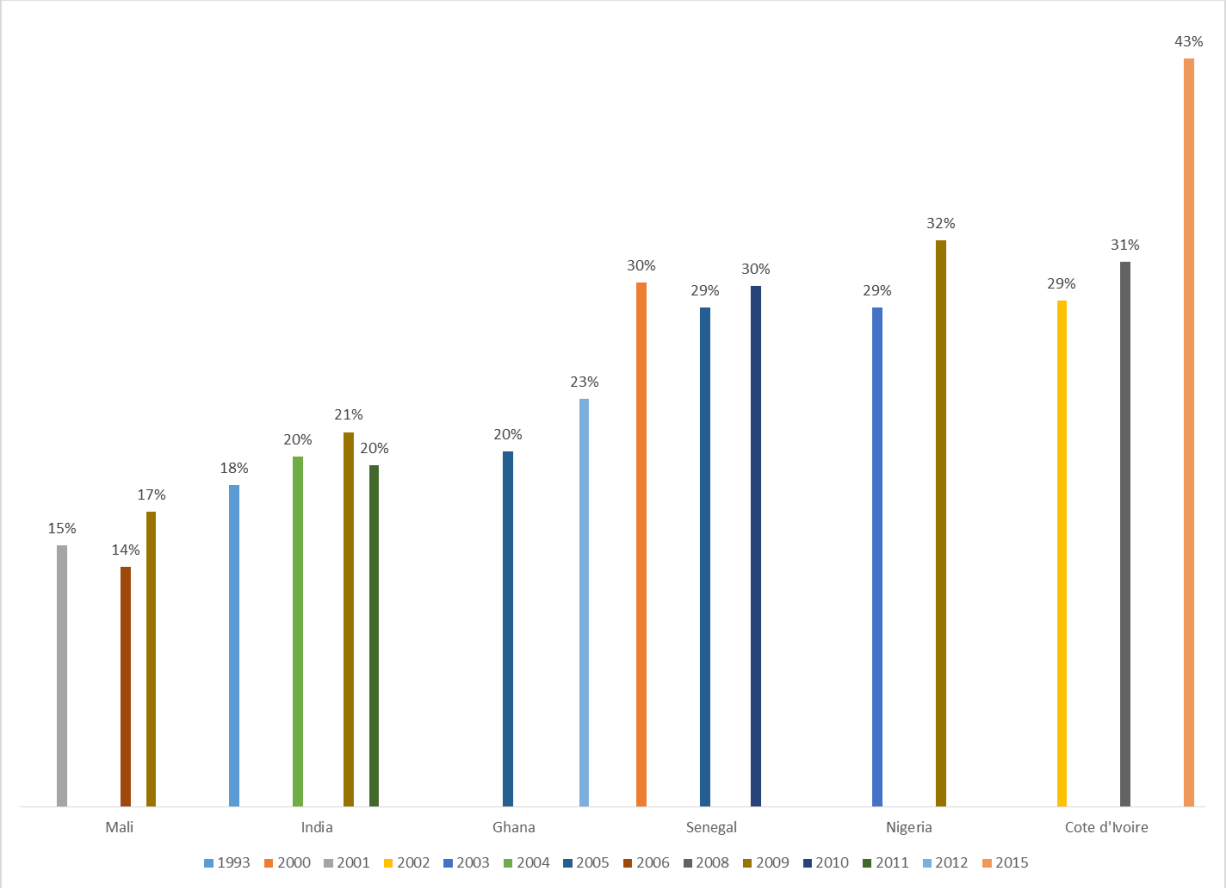
Importantly, the density and spread of population, especially that of the poor population between rural and urban centres in India was less stark than it is in West Africa now. The relatively greater share of urban population in the total population in the West Africa arguably raises the costs of logistics and distribution of domestic rice in West Africa compared to India[145]. A higher share of urban poor in the total poor population in most West African nations (Figure 43) makes the task of subsidized provision of rice to the urban poor[146] taking an approach similar to India's impractical and cost prohibitive. This also implies that the demands on the level of quality of rice in urban centres in West Africa are sharper and more acute now than these were in India at the time of its transformation. A focus on quality and not just the quantity of rice produced and distributed is therefore more relevant in West Africa than it was in India.

Figure 43: Percentage of population below the poverty line living in urban areas

[144] Cost of funding the gap between procurement price and sale price in addition to the investments in storage capacity and expenditure of inventory carrying, transportation and handling. Though demonstrating that all these costs in West Africa's context now will be much greater than the costs India incurred on the same at the time of its transformation is beyond the scope of this paper, a look at the higher cost of credit (as a representation of inventory carrying costs), higher cost of transport over a less developed road network in West Africa and the higher cost of inputs, particularly fertilizers, bought in smaller quantities by individual West African nations makes the relevance of this assertion evident.

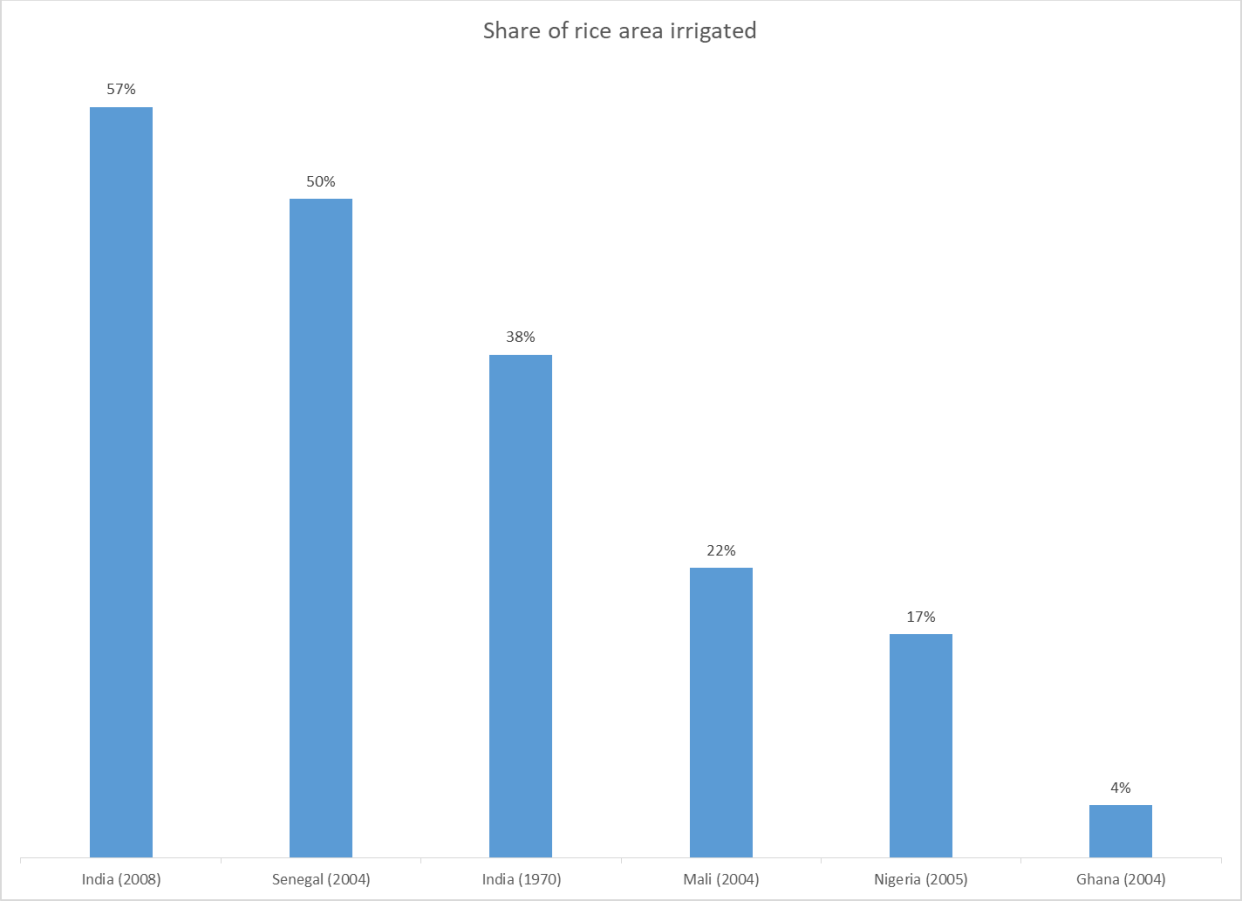
[145] http://www.documentation.ird.fr/hor/fdi:34086; Neoliberal policy, rural livelihoods, and urban food security in West Africa: A comparative study of The Gambia, Côte d'Ivoire, and Mali, Moseley, Carney, Becker, 2010

[146] According to the measure of Multidimensional Poverty Index (MPI) developed by the Oxford Poverty & Human Development Initiative (www.ophi.org.uk) the share of poor in urban areas in South Asia as of 2010 is 13.7% compared to 14.2% for Sub-Saharan Africa. Given that rural-urban migration has been consistently growing since the 1960s in South Asia, the share of urban poor in that period in South Asia is likely to have been much lower



Further, the diversity of production ecosystems in West Africa and the limited availability of the irrigated ecosystem also makes the context different and worthy of a more nuanced analyses for replicability of learnings from India. (Figure 44)

Figure 44: Share of rice area irrigated



At one level, the relatively lower share of the irrigated ecosystem in West Africa can be seen as a disadvantage, but at another level the availability of wider irrigable area and the potential to enhance yields with lower investment (compared to irrigation) in the vast unexplored rainfed lowlands and uplands of West Africa can be an advantage (See Box titled "Comparing rice production ecosystems")[147].

Comparing rice production ecosystems

Though production and productivity of rice in India has predictably been led by the irrigated ecosystem, vast areas of lowland, upland and even flood prone cultivation remain and contribute significantly to overall production.

The northern states of Punjab, Haryana and some parts of Western Uttar Pradesh comprise the main irrigated areas even while irrigated area is expanding in the South and East. Upland cultivation is undertaken primarily in the relatively more remote Eastern and Northeastern parts of the country while lowland cultivation dominates the Eastern and Southern region.

Table 13: Rice Ecosystems in India and West Africa

[147] According to calculations done by CARD a yield level of 3.3t/ha is required across Africa to reach self-sufficiency by 2030. This could guide the extent of investment required for irrigation and water management.

	Rice Ecosystem	Area (%)	Production (%)	Areas / states	Yield (MT/ha)
India	**Irrigated**	50-60	70-80	Punjab, Haryana, Western Uttar Pradesh, Jammu & Kashmir, Andhra Pradesh, Tamil Nadu, Sikkim, Karnataka, Himachal Pradesh and Gujarat	Around 5
	Rainfed	40-50	20-30		
	Upland	10-15	<5	Assam, Bihar, Eastern Madhya Pradesh, Odisha, Eastern Uttar Pradesh, West Bengal and North-Eastern Hill region	< 1
	Lowland	30-35	15-25	Western Madhya Pradesh, Maharashtra, Odisha, Chhattisgarh, parts of West Bengal, Bihar	1-3
	Flood-prone	10-12	NA		~1.5
West Africa	**Irrigated lowland**	10-15	20-25	Mali followed by Senegal, Nigeria, Ivory Coast	3-5
	Upland	35-40	20-25	Ivory Coast followed by Nigeria, Mali	~1
	Rainfed lowland	35-40	40-45	Nigeria followed by Ghana, Senegal	~2
	Other	10-15	5-10		

Sources: Indian Council of Agricultural Research (http://www.rkmp.co.in/), GoI (www.farmer.gov.in), CCER on Integrated Genetic and Natural Resources Management, 2006, WARDA; Africa Rice
Note 1: For eg. In Côte d'Ivoire, upland, rainfed lowland, and irrigated lowland rice cultivation area occupies 74%, 19%, and 7%; Source: Ecological Diversity and Rice Varietal Improvement in West Africa, Dalton, T.J., Guei, R.G., 2001
Note 2: AreaPercentages do not add upto 100% because floodprone area could overlap with rainfed areas
Note 3: Total area under cultivation in India: 43mn ha (Source: FAOSTAT) and in West Africa: 4.7mn ha
Note 4: Overall yield in India: 3.4 MT/ha (Source: FAOSTAT) and in West Africa: 1.6 MT/ha
Note 5: Data from India is from 2010 and from West Africa is from 2003; lack of availability of updated regional data limits comparability

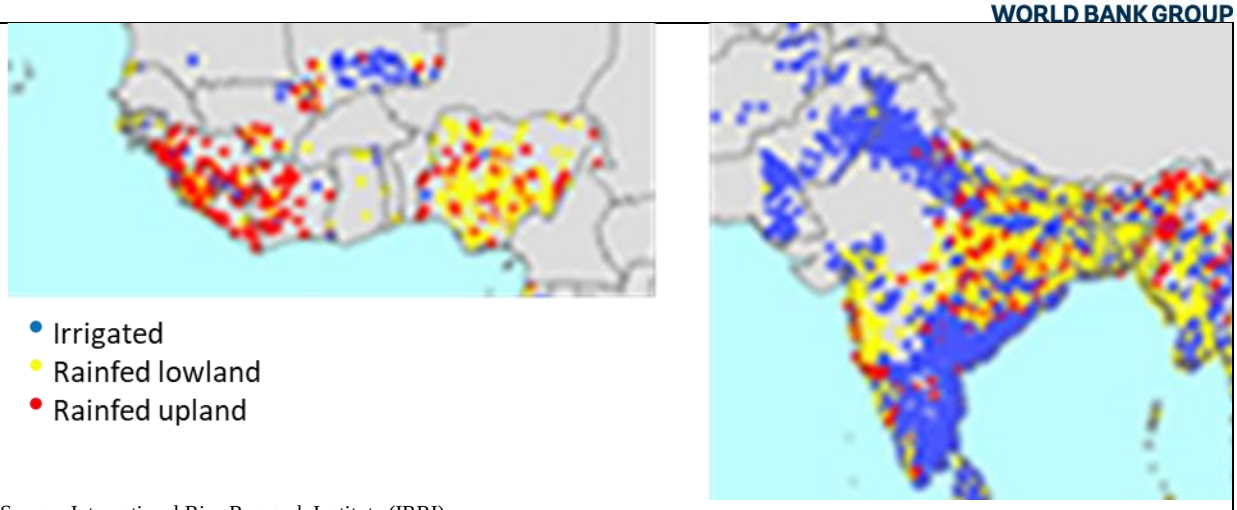
Expectedly, yields in the irrigated ecosystem are high and these areas have benefitted through a conscious policy driven agenda traditionally from sustained research and investment in the development of high yielding varieties (HYV) that respond very well not only to the availability of irrigation but also to the use of chemical fertilizers.

Since the Green Revolution (GR) – a reference to the period between late 1960s and 1970s when an exponential increase in production was witnessed primarily on the back of the use of HYVs in irrigated areas of the north supported by subsidized provision of practically all the factors of production across seeds, fertilizers, equipment, credit - productivity has witnessed sustained increases across ecologies.

As can be seen from Table 13, yields in West Africa lag those in India across ecosystems. Though irrigated area in West Africa is significantly lower than that in India, the share of upland area is significantly higher and the share of rainfed lowland area is also greater, indicating that the later periods of India's transformation that had a greater share of growth in non-irrigated areas are perhaps more relevant to draw learnings from. Even though the irrigated ecosystem deserves top most priority given the much superior yield potential, transformational impact from these areas would be dependent upon heavy investments.

Also, even while being the largest exporter of rice, overall average rice yield in India (3.4 MT/ha) lags behind its peers and the global average, with China being at 6.8 MT/ha, Vietnam at 5.8 MT/ha and the World average at 4.9 MT/ha indicating that aspiring to reach India's level of productivity is perhaps not ambitious enough and, as a corollary, something that can be aimed for as the base case at least.

Figure 45: Primary rice production ecosystems in India and West Africa

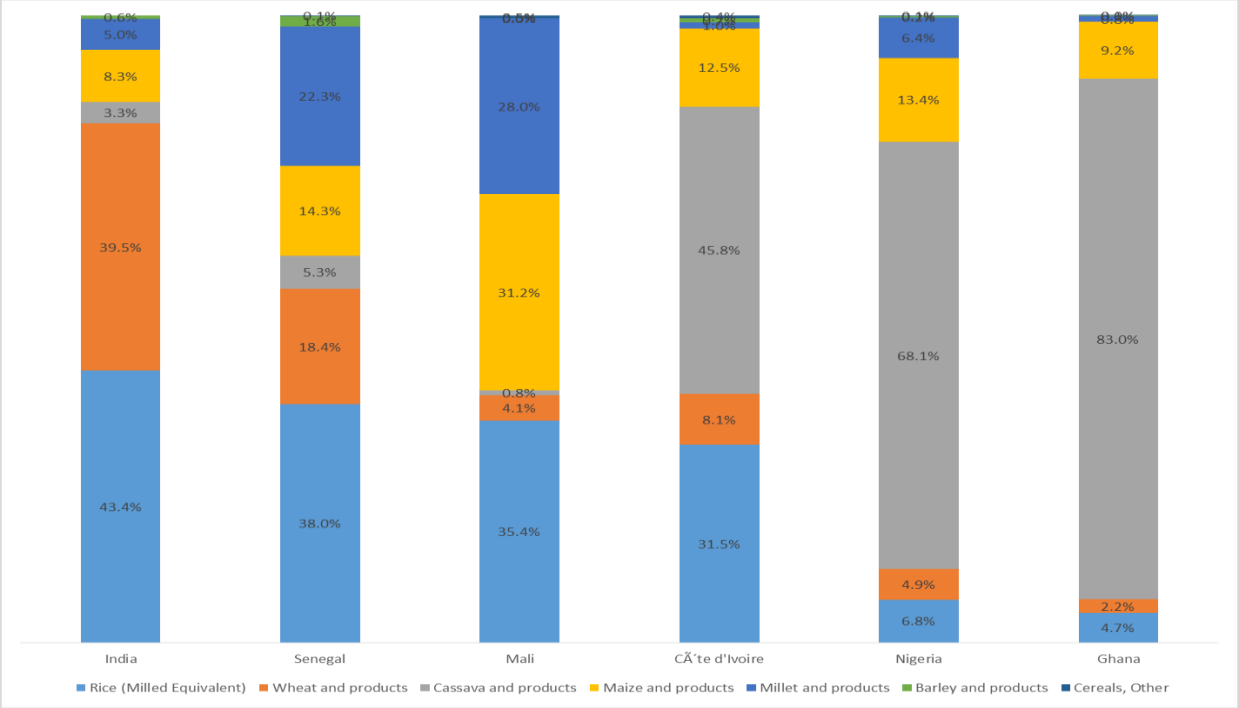


Source: International Rice Research Institute (IRRI)
Note: Each dot represents 10,000ha

Another important difference in the contexts of the two regions is that there is greater diversity in the consumption basket of West African nations as compared to India. While this diversity has suffered on account of the easy availability of imported rice over the last several decades, it is seen to be somewhat preserved in at least some nations of West Africa ((Compare Figure 46: Consumption shares of key foodgrains (2013) with Figure 47: Consumption shares of key foodgrains (1961)).

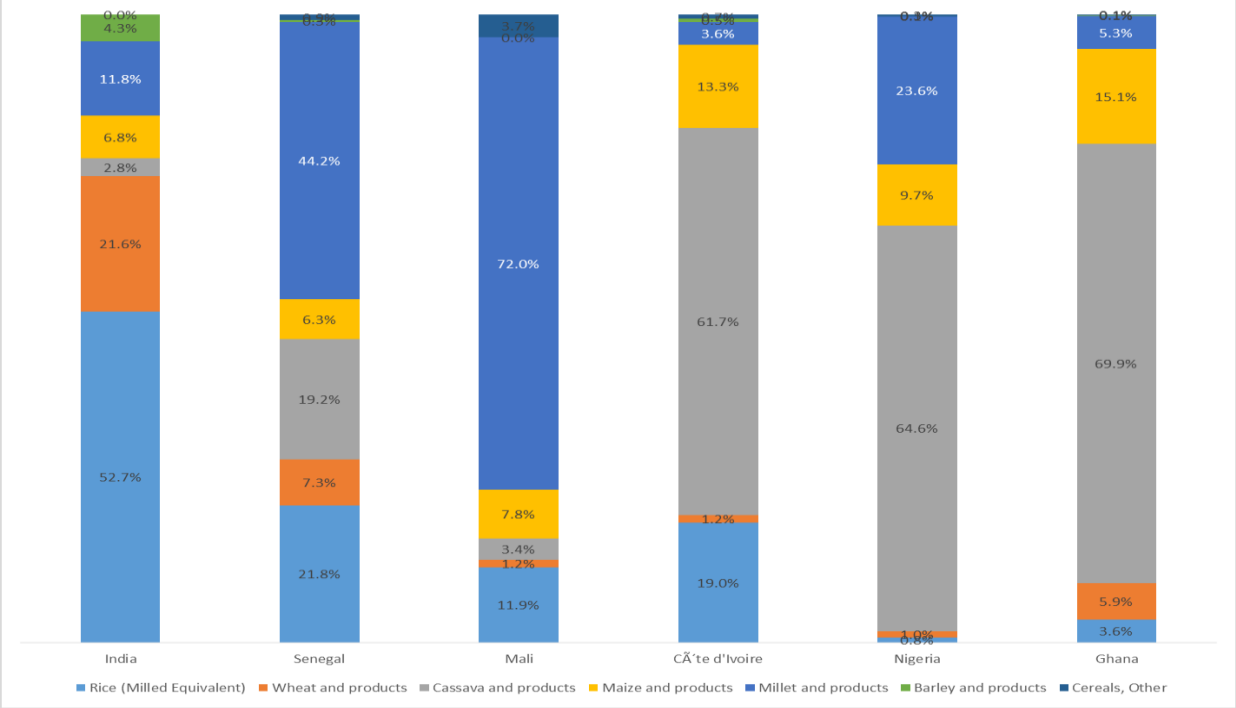
The wider spread of cereals in the consumption basket of West African countries, especially Ghana and Nigeria (Figure 46: Consumption shares of key foodgrains), can provide for an opportunity to explore options that are not single-mindedly devoted to the achievement of self-sufficiency in rice but are instead complemented with preventing concentration of the consumption basket towards rice.

Figure 46: Consumption shares of key foodgrains (2013)



Source: FAO

Figure 47: Consumption shares of key foodgrains (1961)

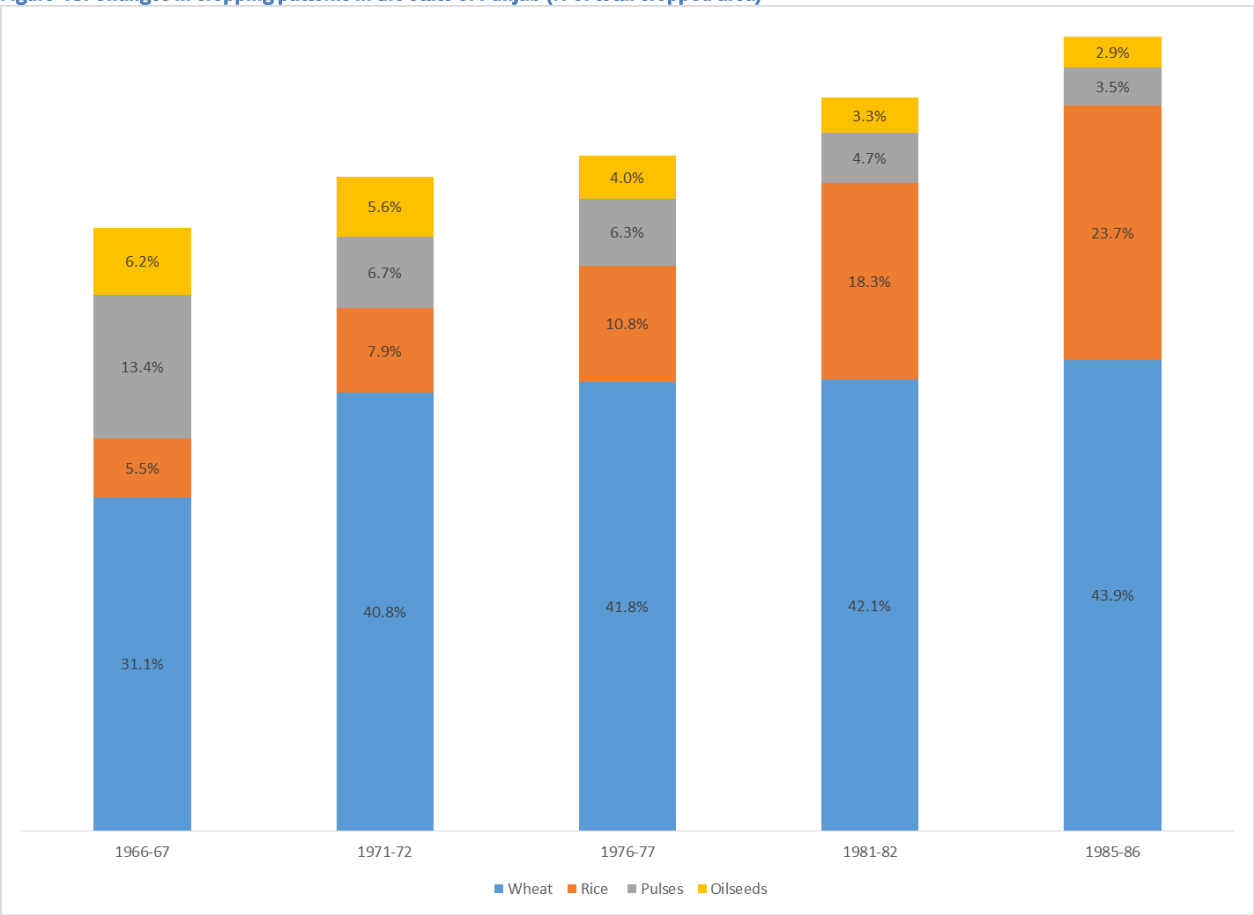


Source: FAO
Note: Official figures; Unofficial exports into Nigeria through Benin and into Ghana through Ivory Coast are believed to be significant

This is a very important consideration and is also borne out by the Indian example - an excessive focus on some staples (rice and wheat) at the cost of others (millets and more importantly, pulses) has led to a situation where the latter has declined in consumption even while possessing

important nutrition benefits that rice and wheat do not provide and has created a rising burden of imports, having a less elastic demand[148] (Figure 48).

Figure 48: Changes in cropping patterns in the state of Punjab (% of total cropped area)



Source: FAO
Note: Official figures; Unofficial exports into Nigeria through Benin and into Ghana through Ivory Coast are believed to be significant

[148] With the world's largest vegetarian population, the key source of protein for a large number of Indians is pulses and hence the demand for pulses is less elastic.

Annexure 2: List of people met

	Mission for rice self-sufficiency study (Ghana)
1	Ezra Anyango, Senior programme (blended finance) and Forster Boateng, Alliance for Green Revolution in Africa (AGRA)
2	RMG Ghana
3	Shashidhar Kolavalli, CGIAR
4	Afcott (Input supplier)
5	JICA
6	Hardwick Tchale, World Bank
7	Local market visits - Okaishie and Nima
8	Field visit and Weta Rice Farmers Association
9	Field visit and Brazil Agro Group
10	Field visit and Farmerlane (Small Rice Mill and contract farming) and Vice-President of Ghana Rice Interprofessional Body
11	Director Crop Services, Govt. of Ghana
12	Amoro Imoro (Local Rice Distributor and President of Ghana Rice Interprofessional Body)
13	Olam Ghana leadership
14	GIZ representative
15	Sales Head, Avnash Ghana
16	Field visit and Osudoku Rice Cooperative
17	Field visit and Fysso Ghana (paddy trader)
18	AFD Representative
19	Dr. Ofori
20	CIC Ghana representative (Rice importer)
21	NASTAG (Seed association) Head
22	Head of Agriculture at Agriculture Development Bank
23	IFC
24	Operations head of National Buffer Stock
25	Chief of Party, Chemonics, USAID Contractor for APSP
26	AfDB representative
27	Maria (Oiko Finance Regional Dy. Head)

	Mission for rice self-sufficiency study (Cote d"Ivoire)
28	CIPRISSA Focal person for Senegal
29	Overseas Private Investment Corporation
30	UNACOOPEC
31	Hassan, CIPRISSA Focal Person Ghana
32	Socgen Bank
33	DG, AfricaRice
34	Visit to Sicogi market
35	Christian Kouame, ONDR
36	Michael Laroche, Kanu Eqpmt
37	Nyaagadou, Importer
38	Two producers (Cooperative leaders)
39	Two seed producer/s
40	Paddy trader
41	Barry, IFAD
42	IFC
43	Atlantique Finance
44	Big and small mill, paddy traders, women growers/parboiler group, rice distributor
45	SRI, Seed multiplication, Seed lab, JICA, ISBD Project, AfDB Project, 2pai belier project
46	Louis Dreyfus
47	Oiko Credit
48	Debrief of meetings in Cote d'Ivoire
49	Agriculture Bank
50	Suraj, ETG Group
51	Visit to producer location near Grand Bassam
52	Mr KOUASSI, DG de ALM Agrochimie
53	Rice Distributor

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