

# West African Experience with the World Rice Crisis, 2007–2008

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## Abstract

Rice production in Africa has tended to be low-yielding, geographically dispersed, and uncompetitive against low-cost Asian imports, even when protected by high freight costs and substantial trade barriers. Skyrocketing prices in world markets in 2007–08 were a shock to African consumers, producers, and governments alike. When international rice prices were relatively low, rice imports did not pose economic or political problems for West African governments. Extremely expensive imports reverse that equation. This paper addresses the response to that reversal first by presenting a historical review of trends in the West African rice sector and, second, by assessing the effect of world rice prices on domestic prices, primarily at the consumer level.



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## I. Introduction

Historically, rice production in Africa has tended to be low-yielding, geographically dispersed, and uncompetitive against low-cost Asian imports, even when protected by high freight costs and substantial trade barriers. Skyrocketing prices in world markets, however, were a shock to African consumers, producers, and governments alike, and numerous initiatives have been announced to stimulate rice production on the continent.<sup>1</sup>

Although most African countries produce at least small amounts of rice, we focus here on the rice economy of West Africa and its response to the 2007/08 food crisis. The West African rice industry has deep historical roots. The West African Rice Development Authority (WARDA) was founded in 1971. The classic commodity-system analysis of the West African rice economy by Pearson, Stryker and Humphreys was published in 1981. The International Rice Research Institute (IRRI) has undertaken collaborative research on rice varieties suitable for West African conditions for decades.

Despite this long history, the West African rice economy (with the exception of Nigeria) has shown surprisingly little progress over the past half century, and has become increasingly dependent on imports to meet rapidly growing consumer demand, especially in urban areas. Although grown efficiently by small farmers, a successful rice *economy* needs sophisticated engagement from governments to develop the economies of scale and scope that permit a low-cost rice system. This engagement has largely been missing in West Africa.

Research and extension, rural infrastructure, a stable marketing environment, and a broad base of consumer demand all depend to a greater or lesser degree on effective government investments and policies. Asian governments learned long ago how to provide these essentials if they were to survive and their economies to grow. Not a single West African country has sustained such investments and policies for more than a few years at a time. This lack of investment, along with geographic, technological, and market constraints,

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<sup>1</sup> *Inter-réseaux Développement Rural*, No. 42, June-August, 2008. ([http://www.inter-reseaux.org/rubrique.php3?id\\_rubrique=8/](http://www.inter-reseaux.org/rubrique.php3?id_rubrique=8/))

has resulted in an import-dependent region, where urban demand for cheap rice has overwhelmed local production capacity. Without sustained government investment in West African's rural economy, and its rice economy in particular, rice imports have dominated consumption.

When international rice prices were relatively low, rice imports did not pose economic or political problems for West African governments. Extremely expensive imports reverse that equation. This paper addresses the response to that reversal. As already noted, farmers, consumers, investors, donors and West African governments have all taken notice of the new price environment. The first response in most countries was to lower or remove import barriers for rice to protect consumers. But this response quickly shifted as Senegal and several of its neighbors announced various strategies to spur domestic rice production in response to high international prices.<sup>2</sup> This might be risky, as the world rice market is notoriously volatile, and the price spike in 2008 has turned out to be quite short-lived. Will West Africa's new-found interest in stimulating local rice production survive a return to cheap rice in world markets?

We address that question in three stages. Section II presents a historical review of trends in the West African rice sector. Section III assesses the impact of world rice prices on domestic prices, primarily at the consumer level. This involves understanding the mechanisms of price transmission from world markets to domestic markets, and the efficiency of domestic rice marketing. Finally, in Section IV, we discuss some of the steps needed to make the West African rice economy competitive with our vision of the future world rice economy. We begin by reviewing recent rice trends in West Africa.

## **II. Recent Trends for Rice in West Africa<sup>3</sup>**

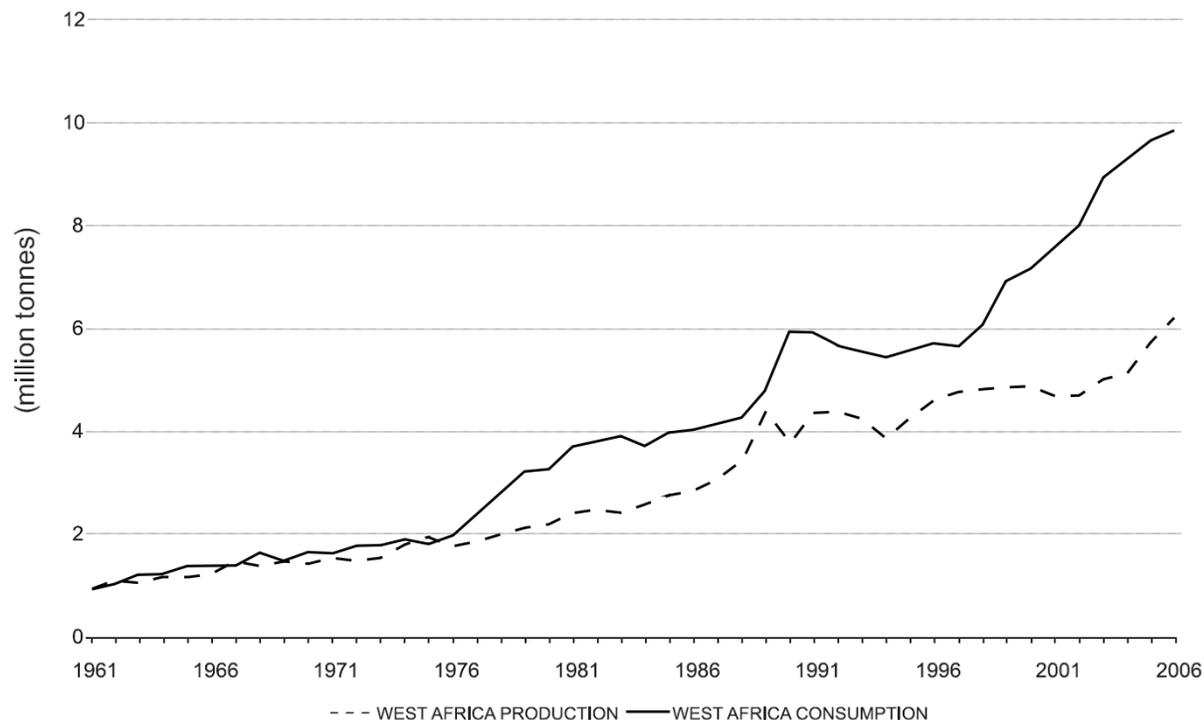
Rice production in West Africa has doubled since 1985; yet rice consumption has increased even more rapidly, resulting in a growing shortfall of local rice production. This increasing dependence on imports has left West African rice consumers – mainly those located in urban markets -- increasingly vulnerable to volatility in world rice markets. Though the extent of import dependence varies substantially across the different countries of West Africa, Figure 1 summarizes the regional trend.

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<sup>2</sup> Senegal's response to the crisis, dubbed the Big Agricultural Offensive for Food and Abundance (GOANA), promised to dedicate over two-thirds of the programme's \$792 million budget to subsidizing the purchase of fertilizers, seeds and pesticides. Similarly, the Malian government implemented a "Rice Initiative", which provided input subsidies for rice.

<sup>3</sup> This section draws heavily on WARDA (2008).

**Figure 1. Evolution of Rice Consumption and Production in West Africa**



Source: WARDA 2008

For the period 2001-2005, rice production in West Africa increased at an average annual rate of 5.06%, as compared with an annual growth rate of 6.55% for rice consumption. Approximately 95% of the increase in rice production resulted from expansion of the area cultivated, suggesting little growth in productivity on average for the region.

The regional trends conceal substantial difference across individual countries. In this paper, for reasons of data availability, we focus in particular on Benin, Burkina Faso, Niger, and Senegal.<sup>4</sup> Nevertheless, as poor and primarily Sahelian countries located in sub-Saharan Africa, their experiences with the increase in rice prices in 2008 can be instructive. This section therefore summarizes specific trends in rice production, consumption, and trade in our focus countries. Table 1 presents figures for area, yield, and production. Table 1 shows that the growth rates of rice area, yield, and production have been highly variable, both across countries and over time within countries. Among our focus countries, Benin and Senegal are the only two in which paddy production grew in each decade since the

<sup>4</sup> These countries, collectively, account for approximately 10% of West Africa's total rice production (excluding Nigeria) in 2001-2005. The two other countries with significant rice production and consumption are Mali and Nigeria.

1960s; yet, Senegal's average rate of productivity growth between 1961 and 2005 was substantially below that of Niger, while Niger was substantially below Benin, which had the highest average productivity growth among these countries. Benin began the period with comparatively little rice production but has rapidly increased its output to levels comparable to Niger. The level of productivity in Niger has been somewhat higher as compared to the other focus countries (though these levels converged somewhat by 2000). Rice yields in these countries, however, remain approximately one-half of the levels common in Asia, though the latter benefits from substantially greater shares of irrigated production.

Table 2 addresses trends and levels of rice imports. These data reflect substantial variations over time within countries, as well as substantial variations across our four focus countries. For example, the 1970s saw rapid growth in both the quantity and value of rice imports into Burkina Faso and Niger, followed in the 1980s by falling quantities and values of rice imports in Niger. The clearest pattern to emerge from Table 2 pertains to the value of rice imports as a share of total merchandise imports. These figures trend steadily upward in Benin, Burkina Faso, and Niger between 1961 and 2007. By 2001-2007, Benin's import share exceeded that of Senegal, which had been higher than in the other countries throughout the period, though with no trend over time.

Table 3 summarizes growth rates and levels of rice consumption within these countries, presenting as well the share of caloric intake accounted for by rice and trends in each country's rice self-sufficiency ratio. The yearly averages indicate clearly the dominant role of rice in Senegalese diets. Senegal's per capita rice consumption remains substantially greater than that of our other focus countries. Since the 1960s, per capita rice consumption has increased consistently in Burkina Faso, with particularly rapid increases in Benin, while rice has retained its secondary status among staple grains in Niger (where millet and sorghum dominate) and its primary status in Senegal.

The rice self-sufficiency ratios reported in the bottom panel of Table 3 summarize the production, consumption, and trade data presented above.<sup>5</sup> Niger has reported surpluses since 2001. Yet these surplus conditions have been the exception among our focus countries. Senegal, the largest rice consumer in this group, is highly import-dependent, with a self-sufficiency ratio declining from about 25% in the 1960s to nearly 15% by 2006. Similarly, the rapid increases in Benin's rice consumption have outpaced its production growth, resulting in the lowest self-sufficiency ratio among this group of countries. With

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<sup>5</sup> The self-sufficiency ratio is defined here as the share of locally-produced rice in total rice supply.

the exception of Senegal, rice consumption in these countries is primarily focused in the urban centers, and or in the main growing regions along the river basins.

As reflected in Figure 1, the growth rate of West Africa's rice consumption has consistently outpaced its growth in rice production. In our focus countries, nearly all increases in rice production – particularly since 1970 – have resulted from extensification rather than productivity growth. In general, these trends suggest that the rice sector of these countries faces substantial challenges in the foreseeable future. In particular, the growing dependence on imports suggests potentially severe consequences for urban consumers in an era of rapid price increases in world rice markets. Two broad concerns follow: 1) What are the potential welfare effects for consumers and producers of recent dramatic increases in food prices (especially rice)? 2) How much of the recent increase in international rice prices has been transmitted into domestic rice markets in the region?

Attempting to address the first of these questions, a team of researchers at the World Bank, led by Quentin Wodon, has produced a series of country studies on the effects of high food prices on various poverty indicators in West Africa.<sup>6</sup> These studies, which appeared in September and October 2008, share a methodological approach that extrapolates from household data to simulate the effect of price changes on poverty outcomes. Their simulation results suggest that a 50% increase in the price of rice could increase the headcount index of poverty (in the worst case) by 3.4 percentage points in Senegal, and (in the best case) by 1.2 percentage points in Burkina Faso, where rice plays the smallest role in consumption. Yet, even this small increase in Burkina Faso's headcount index of poverty implies an addition of over 122,000 to the population living in poverty. In Senegal, a 3.4 percentage point increase in the headcount index implies an absolute increase of approximately 437,000 people living in poverty. These simulations further suggest that much of the burden of increased food prices would fall on those who were poor to begin with, with the most severe effects falling on the poorest.

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<sup>6</sup> This series of studies is summarized in Wodon, et. al. (2008).

**Table 1 Area, Yield, and Production of Rice in Selected West African Countries, 1961-2006** Source: WARDA (2008)

	Annual Growth Rate					Yearly Averages						
	1961-70	1971-80	1981-90	1991-2000	2001-05	1961-2005	1961-1970	1971-1980	1981-1990	1991-2000	2001-2005	2006 est.
Harvested Rice Paddy Area (ha)												
Benin	4.51	10.6	-0.73	13.86	-0.11	6.26	2,323	7,058	7,036	12,636	26,667	26,901
Burkina Faso	-2.6	-0.84	-4.02	9.61	-1.56	0.30	41,807	38,177	24,166	37,014	51,032	106,000
Niger	7.6	3.5	0.97	-4.41	-7.64	0.85	11,359	19,380	21,853	22,307	24,272	23,000
Senegal	2.85	0.92	1.94	0.41	3.02	1.70	82,604	75,384	71,612	74,662	86,067	85,037
Rice Paddy Yield (t/ha)												
Benin	14.62	-3.56	4.39	6.01	7.24	5.57	0.68	1.54	1.19	1.71	2.39	2.64
Burkina Faso	5.21	3.74	2.96	1.57	-3.38	2.62	0.86	1.02	1.72	2.1	1.81	1.78
Niger	12.26	-5.43	6.33	2	2.94	3.70	1.83	1.62	2.6	2.93	3.07	2.85
Senegal	-0.74	1.77	2.42	0.57	4.68	1.41	1.27	1.19	1.98	2.35	2.52	2.24
Rice Paddy Production (t)												
Benin	19.79	6.67	3.64	20.71	7.13	12.08	1,686	10,822	8,317	22,953	63,655	70,972
Burkina Faso	2.48	2.87	-1.18	11.33	-4.89	2.90	34,889	38,660	40,783	77,176	92,497	189,176
Niger	20.78	-2.12	7.36	-2.49	-4.92	4.68	22,145	30,547	56,847	63,209	73,480	65,661
Senegal	2.09	2.71	4.4	0.98	7.84	3.13	106,591	92,831	141,131	174,598	218,403	190,493

Source: WARDA (2008)

**Table 2. Imports of Rice in Selected West African Countries, 1961-2006**

	Annual Growth Rate					Yearly Averages						
	1961-70	1971-80	1981-90	1991-2000	2001-07	1961-2007	1961-1970	1971-1980	1981-1990	1991-2000	2001-2007	
	Quantity of Rice Imported (t)											
Benin	4.7	3.4	12.5	-18.7	42.3	11.0	5,366	8,663	49,448	163,306	382,748	
Burkina Faso	-6.9	51.6	14.5	10.4	-21.6		2,935	11,378	65,418	137,740	164,678	
Niger	-35.5	69.6	-1.1	15.3	2.2	12.0	1,090	9,205	34,735	58,672	194,650	
Senegal	2.8	7.2	0.6	5.3	3.9	4.3	145,514	223,974	352,561	462,763	831,616	
	Value of Rice Imports ('000 USD)											
Benin	7.8	7.6	10.9	-19.2	52.1	12.2	872	2,301	14,440	49,798	111,988	
Burkina Faso	-9.0	59.5	15.1	7.4	-4.3		455	4,007	20,768	44,471	39,261	
Niger	-23.3	77.6	-5.2	12.0	9.0	13.5	146	3,838	14,300	20,382	56,488	
Senegal	5.2	15.1	-0.1	8.9	12.5	6.3	17,027	48,121	79,554	109,689	228,139	
	Value of Rice Imports as a Share of Total Merchandise Imports											
Benin							2.2%	1.1%	4.1%	8.4%	12.8%	8.1%
Burkina Faso							1.1%	2.3%	5.5%	8.2%	3.4%	5.0%
Niger							0.4%	1.8%	3.8%	5.1%	7.9%	5.1%
Senegal							9.8%	7.9%	7.6%	8.4%	8.0%	8.1%

Source: FAO (2009); IMF (2009) for data on merchandise imports

FAO (Food and Agriculture Organization). 2009. FAOStat online. Available at <http://faostat.fao.org/default.aspx>

IMF (International Monetary Fund). 2009. International Financial Statistics online. Available at <http://www.imf.org/external/data.htm>.

**Table 3. Consumption and Self-Sufficiency of Rice in Selected West African Countries, 1961-2006**

	Annual Growth Rate						Yearly Averages					
	1961-70	1971-80	1981-90	1991-2000	2001-05	1961-2005	1961-1970	1971-1980	1981-1990	1991-2000	2001-2005	2006 est.
Rice and Rice Product Total Consumption (t)												
Benin	7.39	3.41	9.09	-3.06	46.87	8.95	5,889	12,613	45,142	93,197	233,964	395,527
Burkina Faso	1.94	11.45	10.22	4.68	-5.91	5.63	23,258	33,588	95,379	158,857	174,200	155,003
Niger	16.08	9.18	4.16	-1.12	-14.24	4.71	13,604	27,082	70,008	65,526	45,962	31,136
Senegal	3.9	7.63	3.6	3.25	0.11	4.10	201,805	271,909	438,061	596,501	818,204	839,844
Rice and Rice Product Consumption Per Capita (kg/yr)												
Benin	5.31	0.9	5.27	-4.96	32.7	5.08	2.37	4.06	10.71	15.69	31.62	45.7
Burkina Faso	-0.07	8.78	7.39	1.99	-7.87	3.15	4.7	5.32	11.78	15.1	12.99	10.86
Niger	12.51	5.97	0.82	-4.6	-15.85	1.51	3.59	5.46	10.38	7.17	3.54	2.31
Senegal	1.16	4.59	0.33	-0.48	-2.28	0.99	54.59	55.01	66.73	63.73	72.54	68.81
Rice Share of Caloric Intake (%)												
Benin	4.59	0.26	2.92	2.94	27.65	5.45	1.21	2.04	5.05	5.32	11.04	17
Burkina Faso	-1.73	7.87	1.97	3.59	-34.09	-1.19	2.78	3.23	5.57	5.21	4.65	0.47
Niger	10.03	5.22	1.72	-3.69	-16.51	1.12	1.81	2.49	4.78	4.47	4.56	2.97
Senegal	-0.06	4.48	-0.33	2.53	-0.47	1.42	21.66	23.73	28.13	27.96	30.94	31.55
Self-Sufficiency Ratio (%)												
Benin	11.55	3.15	-5	24.52	-27.06	4.60	18.99	61.76	13.37	18.29	23.22	12.02
Burkina Faso	0.53	-7.7	-10.34	6.35	1.08	-2.36	102	84.19	33.15	31.85	35.73	81.77
Niger	4.05	-10.35	3.07	-1.39	10.87	0.18	105	84.86	54.56	64.5	110.44	141.29
Senegal	-1.74	-4.58	0.77	-2.2	7.72	-0.86	37	24.7	21.76	19.77	17.89	15.2

Source: WARDA (2008)

### III. Transmission of International Prices into Domestic Rice Markets

In practice, the magnitude of the impact of rapid increases in the international price of rice depends directly on the extent to which those increases are transmitted to domestic markets. The previous sections have described the dramatic price fluctuations in global rice markets since 2000, as well as recent trends in the rice sector in West Africa and the potential welfare consequences of high food prices in these countries. It is clear that high food prices have the potential to increase both poverty and perhaps malnutrition in the region. Senegal in particular may be particularly vulnerable to rapid increases in rice prices. Thus, it is critical to assess the extent to which recent fluctuations in global rice prices have been transmitted into domestic markets in West Africa.

The extent of transmission is important for two reasons. First, it is domestic, not world, prices that affect the welfare of poor consumers and farmers. Second, the magnitude of price transmission will influence the extent to which adjustments by producers and consumers help stabilize world price movements. These adjustments (reduced consumption, increased production) will only take place if world prices are transmitted to domestic prices (Imai, Gaiha, and Thapa, 2008). Finally, domestic price changes can also have implications for the political stability of governments in West Africa. In fact, numerous demonstrations and riots took place in capital cities of West Africa in response to higher food prices, with large-scale riots taking place in Burkina Faso (February 22, 2008), Cameroon, Guinea, Ivory Coast (March 31, 2008), Senegal (March 31, 2008).

The link between rice price increases and conflict is more than a theoretical concern for West Africa. The surge in rice prices in 1979 contributed to Liberia's descent into chaos, sparking riots and a political crisis that led to the coup that brought Samuel Doe to power and the onset of a decade-long civil war in the 1990s. Liberia and Sierra Leone are both emerging from protracted civil conflicts, and price increases and riots can be risk factors for both countries.<sup>7</sup>

The extent of price transmission is a function of two key variables: 1) the exchange rate at which US dollar prices are converted to domestic currency prices; and 2) trade policies at the border, which restrict (or enhance) the flow of commodities. The time

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<sup>7</sup> <http://www.irinnews.org/Report.aspx?ReportId=77932>. <http://www.irinnews.org/Report.aspx?ReportId=76905>  
<http://www.irinnews.org/report.aspx?ReportID=77539>

horizon of adjustment is a third factor, as normal marketing lags as well as policy interventions delay the immediate transmittal of international prices into domestic economies (though the longer there is a substantial difference between the two prices, the more pressure there is for convergence).<sup>8</sup>

### Exchange Rate Effects

Even before the dramatic surge in prices in 2008, world market prices had increased substantially in real US dollar terms. Comparing the last quarter of 2007 with the last quarter of 2003, world market prices increased 56 percent for rice, 91 percent for wheat, 40 percent for maize and 107 percent for urea (a primary source of nitrogen in fertilizer). During that time, the US dollar depreciated substantially against the currencies of several large rice exporting countries, putting upward pressure on world prices quoted in dollars.<sup>9</sup>

Real exchange rate (RER) appreciation vis-à-vis the US dollar, to the extent that it occurs, will neutralize some of the impact of increased prices in US dollar terms. Thus, in assessing the extent to which increases in the international price of rice were transmitted to domestic markets in West Africa, we must first calculate the change in each country's real exchange rate, calculated as:

$$(1) \quad \% \Delta RER_i = \% \Delta e_i + \% \Delta GDPDefl^{US} - \% \Delta CPI_i$$

where  $RER_i$  is the real exchange rate for country  $i$ ,  $e_i$  is the country's nominal exchange rate,  $CPI$  is the consumer price index and the  $GDPDefl$  is the GDP of that country deflated by US prices.

Since each of the focus countries presented in this paper (Benin, Burkina Faso, Niger and Senegal) is a member of the CFA Zone -- thus sharing a common currency that is fixed relative to the Euro -- they experienced the same 14% nominal appreciation against the U.S. dollar between 2003 and 2007. Since domestic inflation in these countries was both similar across countries (owing to the regulation of monetary policy within the CFA Zone) and approximately equal to the rate of inflation in the U.S. (the change in the US GDP deflator over this period was 12.8%), the price effects essentially cancel out, leaving these countries with a real exchange rate appreciation of

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<sup>8</sup> This section draws on Dawe (2008) for its methodology.

<sup>9</sup> In fact, this depreciation is one cause of the recent high commodity prices.

approximately 14% (roughly equivalent to their nominal appreciation). Real appreciation over this period thus tended to mitigate the effects of increases in the international price of imports.

The next step in assessing the pass-through to domestic markets of a given real increase in the dollar-denominated international price of rice is to filter that increase through the change in each country's RER, resulting in the real change in the domestic currency-denominated international price of rice. This effect is presented in column 2 of Table 4. For the CFA-zone countries, the real domestic currency-denominated increase in international rice prices ranged from 41% to 45%.

**Table 4. Cumulative percentage changes in real rice prices, Q4 2003 to Q4 2007**

Country	(1) World price (US\$)	(2) World price (DC)	(3) Domestic price (DC)	(4) World Price Pass-through from exchange rate = (2)/(1)	(5) Total DC Pass through = (3)/(1)
Benin	56	41.5	6.75	74	12
Burkina Faso	56	44.5	8.6	79	15
Niger	56	42	11.0	75	19.6
Senegal	56	41.5	10.6	74	18.9

Sources: IMF, SIMA/Niger, SIM-C Burkina Faso, ONASA/Benin, and OMS-Senegal. .

Table 4 builds on the changes in the world price of rice in domestic currency terms described above (Column 2) to then address the extent to which West African governments permitted the 56% increase in the dollar-denominated international price of rice to pass through to domestic consumers. Column 3 uses domestic rice market data from the market information systems of selected countries to show the percent increase between 2003 and 2007 in the real retail price of imported rice in capital cities.<sup>10</sup> To the extent the increase in domestic prices (column 3) is less than the domestic currency-denominated world price (column 2), it reflects government intervention to stem the impact of increased international prices on domestic markets.

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<sup>10</sup> These prices are either the imported rice price (domestically) or the price of local rice in the market nearest to the urban center. They are not national averages.

Clearly, in the four countries for which we have domestic market price data, the combination of RER appreciation and government interventions provided a substantial buffer between international and domestic rice markets in the period leading up to the crisis.

Column (4) presents the proportion of the dollar price increase that remained net of the exchange rate effects, while (for selected countries) column (5) presents the proportion of the dollar price increase that remained net of both the exchange rate effects and the effects of each country's border price interventions. As is evident from the fact that the numbers in column (5) are much less than those in column (4), most of the buffering of domestic rice markets from the dramatic increase in international prices was the result of border price interventions, rather than an artifact of RER appreciation. In each case for which we have domestic price data, approximately two-thirds of the pass-through effect is the result of border price interventions (a topic to which we return below).

We gain further insights into the nature of commodity markets in our countries and the effects of the crisis by comparing several sets of prices: 1) world versus domestic prices of imported rice, 2) the price of millet versus the price of imported rice, and 3) the price of imported versus domestically-produced rice. We begin simply by summarizing the levels and changes in the prices of millet, imported rice, and domestic rice before and during the crisis. Table 5 presents the data.

**Table 5 Levels and Changes in Nominal Prices (CFA) for Millet, Domestic and Imported Rice, Q4 2003 – Q2 2008**

	Annual Growth Rate						Yearly Averages					
	1961-70	1971-80	1981-90	1991-2000	2001-05	1961-2005	1961-1970	1971-1980	1981-1990	1991-2000	2001-2005	2006 est.
Rice and Rice Product Total Consumption (t)												
Benin	7.39	3.41	9.09	-3.06	46.87	8.95	5,889	12,613	45,142	93,197	233,964	395,527
Burkina Faso	1.94	11.45	10.22	4.68	-5.91	5.63	23,258	33,588	95,379	158,857	174,200	155,003
Niger	16.08	9.18	4.16	-1.12	-14.24	4.71	13,604	27,082	70,008	65,526	45,962	31,136
Senegal	3.9	7.63	3.6	3.25	0.11	4.10	201,805	271,909	438,061	596,501	818,204	839,844
Rice and Rice Product Consumption Per Capita (kg/yr)												
Benin	5.31	0.9	5.27	-4.96	32.7	5.08	2.37	4.06	10.71	15.69	31.62	45.7
Burkina Faso	-0.07	8.78	7.39	1.99	-7.87	3.15	4.7	5.32	11.78	15.1	12.99	10.86
Niger	12.51	5.97	0.82	-4.6	-15.85	1.51	3.59	5.46	10.38	7.17	3.54	2.31
Senegal	1.16	4.59	0.33	-0.48	-2.28	0.99	54.59	55.01	66.73	63.73	72.54	68.81
Rice Share of Caloric Intake (%)												
Benin	4.59	0.26	2.92	2.94	27.65	5.45	1.21	2.04	5.05	5.32	11.04	17
Burkina Faso	-1.73	7.87	1.97	3.59	-34.09	-1.19	2.78	3.23	5.57	5.21	4.65	0.47
Niger	10.03	5.22	1.72	-3.69	-16.51	1.12	1.81	2.49	4.78	4.47	4.56	2.97
Senegal	-0.06	4.48	-0.33	2.53	-0.47	1.42	21.66	23.73	28.13	27.96	30.94	31.55
Self-Sufficiency Ratio (%)												
Benin	11.55	3.15	-5	24.52	-27.06	4.60	18.99	61.76	13.37	18.29	23.22	12.02
Burkina Faso	0.53	-7.7	-10.34	6.35	1.08	-2.36	102	84.19	33.15	31.85	35.73	81.77
Niger	4.05	-10.35	3.07	-1.39	10.87	0.18	105	84.86	54.56	64.5	110.44	141.29
Senegal	-1.74	-4.58	0.77	-2.2	7.72	-0.86	37	24.7	21.76	19.77	17.89	15.2

<sup>a</sup> Q1 2004; <sup>b</sup> Q4 2006

For most of the cases presented in Table 5, the rate of increase in nominal prices accelerated dramatically between the fourth quarter of 2007 and the second quarter of 2008 (as compared with the quarterly average growth rate for the 15 quarters from the fourth quarter of 2003 to the third quarter of 2007).

The apparently large role for border price interventions noted above is reinforced by comparing in nominal prices the time series of the international rice price with the domestic prices of imported rice, as in Figure 2.

**Figure 2. International vs Domestic Prices of Imported Rice, October 2003–June 2008, CFA/kg**

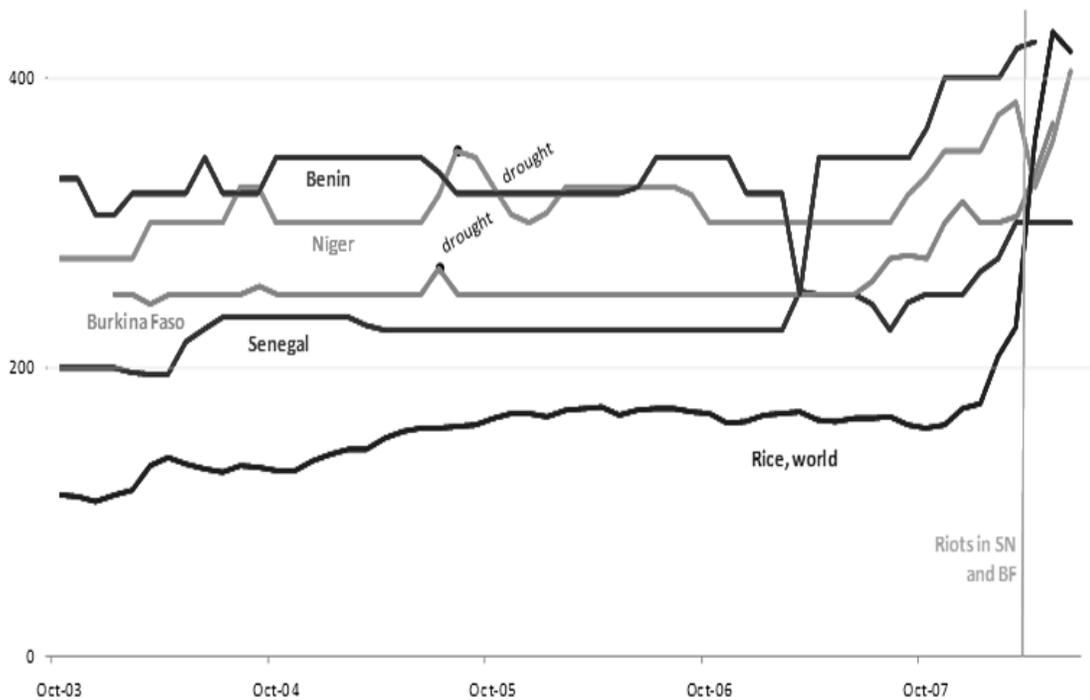


Figure 2 shows international rice prices (free on board) as compared with imported retail rice prices in the capital cities of several West African countries: Cotonou (Benin), Ouagadoudou (Burkina Faso), Niamey (Niger) and Dakar (Senegal). While imported rice prices follow international prices, the correlation is not perfect. Average correlations between international and the domestic prices of imported rice in Senegal, Burkina Faso, Niger, and Benin were 0.70, 0.67, 0.46, and 0.55, respectively, between 2003 and

2008. Imported rice prices in these countries have been strikingly stable during this period, primarily due to: 1) import tax regimes; and 2) floor/ceiling prices.<sup>11</sup> The increases in imported rice prices in 2004/2005 in Burkina Faso and Niger were primarily due to regional droughts and food crises during that year. During that time, staple food prices (millet and sorghum) were the highest on record, and in some cases consumers switched to rice – thereby increasing demand for rice and increasing prices.

On average, imported rice prices in West Africa followed the surge in international rice price increases in late 2007 and early 2008. In many cases, this increase actually *preceded* the international rice price increase, starting in August/September 2007 in most West African countries, whereas the international rice price increase did not seem to begin until late 2007 or early 2008. One potential reason for this increase in West Africa is the increases in shipping costs. Virtually all of the rice imported into West Africa originates in Asia. During the months from February 2007 to November 2007 (e.g., the period when we observe increasing domestic prices in advance of the increased international price), the Baltic Dry Goods Index more than doubled.<sup>12</sup> This increase could have reduced the demand for imports, thus contributing to increased domestic prices by reducing available supplies. In any case, it is clear that in the face of the dramatic surge in the international price beginning in late 2007, these countries were unable to afford sufficient import subsidies to protect domestic rice consumers from world markets.

However, these average correlations conceal an interesting break point at the beginning of the rapid increase in world prices. Table 6 demonstrates that the West African governments had little trouble stabilizing domestic rice prices during the long period of stable or declining international prices (prior to the last quarter of 2007); yet, the pattern of price correlations changes sharply when international prices surged in late 2007.

The dramatic increases in the correlations between the international rice prices domestic prices for imported rice reinforces the conclusion that most governments in West Africa were either unprepared for, or incapable of containing, the dramatic surge in international rice prices.<sup>13</sup> The only exception was Niger, whereby the correlation actually decreased as compared with the previous period. As Niger as a rice price

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<sup>11</sup> As members of UEMOA, these countries share a common external tariff, although in practice the tariff for rice varies across countries.

<sup>12</sup> The Baltic Dry Goods Index is a global index of freight costs.

<sup>13</sup> This is consistent with the conclusion reached by *Inter-réseaux Développement Rural*, No. 42, June-August, 2008.

stabilization scheme, this suggests that the government did not change its price ceiling when international rice prices changed, thereby lowering the correlation between the two.

**Table 6. Correlation of International and Domestic Rice Prices Before and During Crisis**

	Q4 2003 – Q3 2007	Q4 2007 – Q2 2008
Senegal	0.32	0.83
Burkina Faso	0.12	0.77
Niger	0.46	-0.07
Benin	-0.01	0.65

### **Price Transmission Across Commodities Within Countries**

In addition to price transmission between international and domestic imported rice prices, there are two additional questions that are important for assessing the impact of international rice price increases in West Africa: 1) Do fluctuations in domestic prices of imported rice spill over into market prices for staple food crops (such as millet)?, and 2) Do fluctuations in domestic prices of imported rice spill over into market prices for domestically-produced rice?

Transmission of price shocks across commodities could result from substitution in both production and consumption. One might posit, for example, that following an increase in the price of rice, consumers would substitute away from rice towards millet. Similarly, producers might substitute away from producing millet towards rice (although in practice, such substitution in production is highly unlikely, as the production systems for both are quite distinct). Millet is a rainfed crop that requires limited amounts of rainfall, whereas rice is either produced in upland or lowland (swamps) areas, requiring substantial amounts of water. Either substitution (consumption being more likely) would tend to transmit the increased rice price into increased millet prices. Figure 3 compares millet and imported rice prices for Senegal, Benin, Burkina Faso, and Niger.

**Figure 3. Millet vs Imported Rice Prices in Selected Countries, October 2003 – June 2008, CFA/kg**

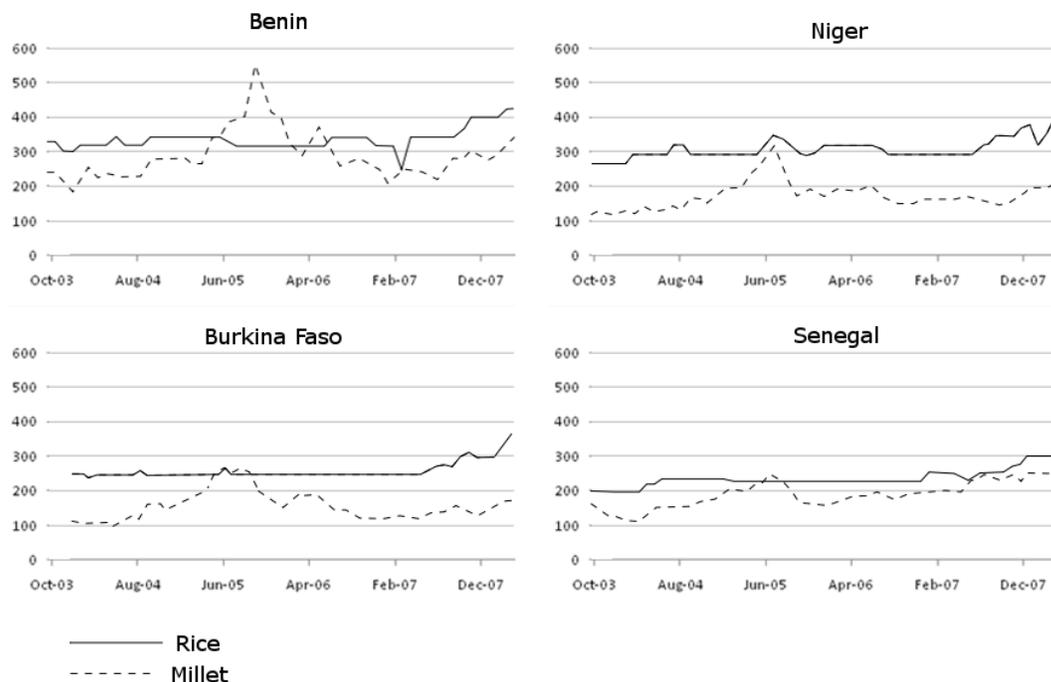


Figure 3 shows that, in general, there is not a strong correlation between imported rice and millet prices in these countries. Millet prices fluctuate highly on an inter- and intra-annual basis (coinciding with the harvest), and appear to be highly correlated across the Sahelian countries (Burkina Faso, Niger and Senegal). While each of these countries experienced drought and a millet production shock in 2004/2005, this only appears to have affected rice prices in Burkina Faso and Niger, where millet is relatively more important for producer and consumer welfare. It is notable, however, that rice prices have been consistently above millet prices in all four countries, with the exception of 2004/2005 in Benin.

Similar to our previous analyses, we also find a structural break in the pattern of correlations between rice and millet prices in these markets before and during the rice price crisis. Table 7 illustrates the substantial increases in the correlations of millet and rice prices in domestic markets – again with the exception of Niger – before and during the crisis. These data are retail rice and millet prices in the capital cities, where consumers may have greater opportunities to substitute across commodities. Thus, the increased correlations during the crisis suggest that urban consumers may have substituted towards millet when rice prices surged, thus driving up millet prices, as well.

**Table 7. Correlation of Domestic Millet and Rice Prices Before and During Crisis**

	Q4 2003 – Q3 2007	Q4 2007 – Q2 2008
Senegal	0.54	0.71
Burkina Faso	0.13	0.72
Niger	0.66	0.52
Benin	-0.04	0.72

Figure 4 addresses the question of whether fluctuations in domestic prices of imported rice spill over into market prices for domestically-produced rice (comparing within the same local markets in Senegal and Benin).

**Figure 4. Local vs Imported Rice Prices in Selected Countries, CFA/kg**

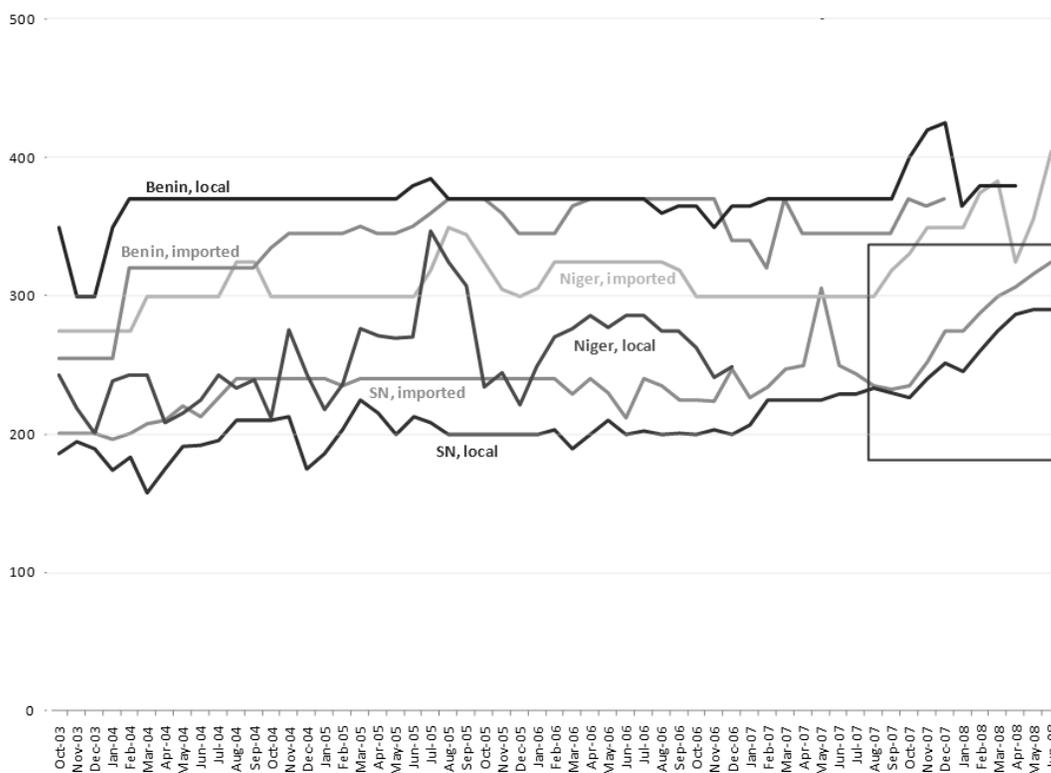


Figure 4 suggest a greater degree of correlation in general between local and imported rice prices *within* countries as compared with correlations between millet and imported rice. This seems plausible, as local and imported rice are much closer substitutes in consumption than imported rice and millet. Yet, here, too, we find a

substantial difference in these correlations before and during the crisis, as illustrated in Table 8.

**Table 8. Correlation of Domestic and Imported Rice Prices Before and During Crisis**

	Q4 2003 – Q3 2007	Q4 2007 – Q2 2008
Senegal	0.62	0.98
Benin	0.66	0.86

Comparing levels, rather than correlations, imported rice acts as a price ceiling on local rice for Niger and Senegal, but not Benin. This suggests that border price interventions on rice may be a powerful tool in shaping incentives facing domestic rice producers in these countries, but may not be sufficient to increase rice yields and production.

### Historical Trade Policy Responses to Rice Price Fluctuations

In examining the policy implications of the recent surge in world rice prices, it is useful to review countries' border price policy reactions to past fluctuations in world prices. A new dataset, recently released by the World Bank's Distortions to Agricultural Incentives Project, includes nominal rates of assistance (NRAs) for rice for a broad cross-section of countries since the early 1960s.<sup>14</sup> Among our focus countries, this dataset includes only Senegal. The NRA is the percentage difference between the domestic price and the border price of a commodity. Positive NRAs indicate that governments are intervening to protect domestic producers of the import-competing commodity by taxing imports; negative NRAs indicate import subsidies to protect consumers by lower domestic prices below border prices.

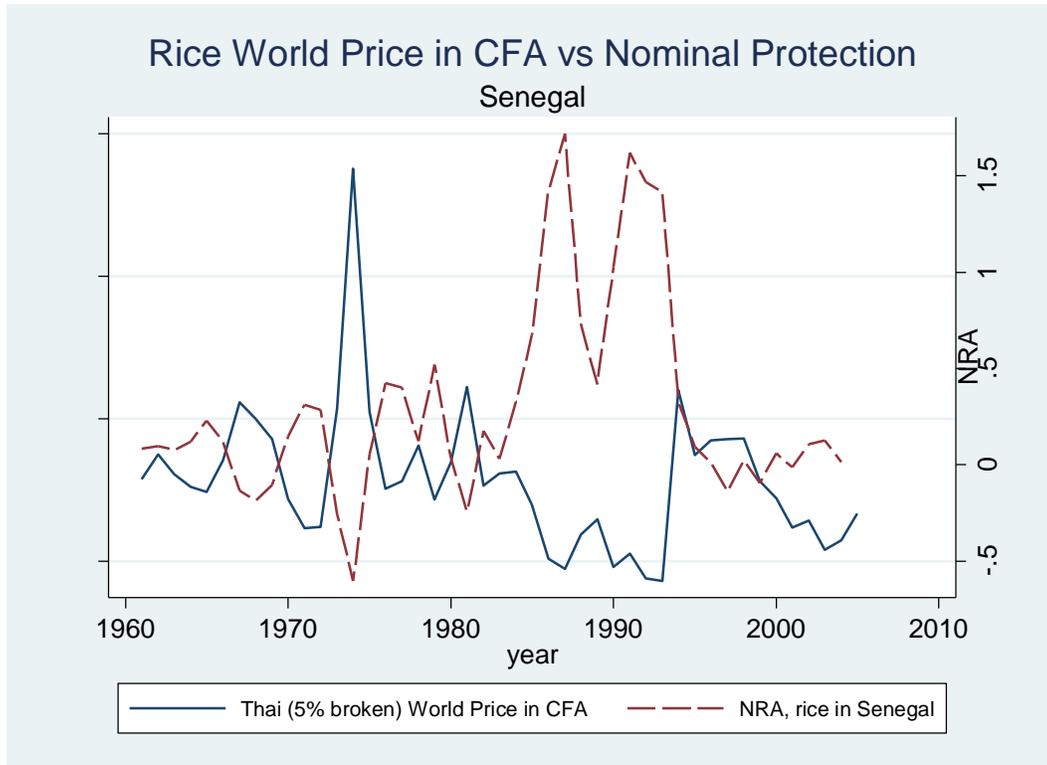
Figure 5 illustrates the trade policy responses of governments in Senegal to historical fluctuations in the price of rice on world markets. The left-hand axis scales constant world rice prices (the export price for 5% broken Thai) in CFA francs, and the right-hand axis scales the NRA for rice. It is clear that Senegalese governments have generally used trade policy to counteract fluctuations in world rice prices, thus tending to stabilize domestic prices. The most striking example of this tendency occurred in response to the global food crisis of 1973, during which time world rice prices tripled. In response,

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<sup>14</sup> This dataset, along with relevant background and working papers, is available at: [www.worldbank.org/agdistortions](http://www.worldbank.org/agdistortions).

Senegal dramatically altered its rice trade policy. In 1972, Senegal was taxing rice imports at the rate of nearly 29%. In response to the 1973 price spike, Senegal subsidized rice imports, reducing them to 60% below world prices, clearly using trade policy as a tool to help stabilize domestic markets for its staple grain.

**Figure 5. Rice Trade Policy and World Prices in Senegal**



The sudden increase in the CFA-denominated world price of rice in 1994 reflects primarily the 100 percent devaluation of the CFA franc that year. The devaluation acted as a substitute for import tariffs, which fell simultaneously. Subsequent to 1995, the fluctuations in Senegal’s rice tariffs were substantially reduced relative to the previous period. This may relate to economic reforms in Senegal. Until 1995, the state’s price stabilization fund maintained a monopoly on rice imports. Subsequent to 1995, rice imports in Senegal were privatized.

Despite these historical precedents for using border price interventions to counteract international price fluctuations, it appears that the recent upsurge in international rice prices was simply too great for the governments of West Africa’s rice importing countries to contain. This failure reflects the new dependence of West Africa in particular and Sub-Saharan Africa more broadly on rice imports to meet rapidly rising

demand. With imports now a significant share of total consumption, as Denning and Gajigo (2009) document, it is no longer logistically or financially possible for most African countries to isolate themselves from the world market. Although this dependence grows out of the cheaper rice available in the world market compared with domestic production, and is thus good for consumers, it does come with the added cost of exposure to price fluctuations in the world market. Most of these fluctuations must now be passed on to domestic consumers and, with considerable lags and variation, to domestic rice producers.

### **Policy Responses to Recent Rice Price Increases**

West African governments reacted to the rapid increase in international rice prices in a variety of ways, none of which appears to have been greatly effective in mitigating the impact of international price increases on their domestic markets.<sup>15</sup> The most common response was to eliminate pre-existing tariffs and value-added taxes on imported rice. Senegal initiated rice import subsidies beginning in 2008, adding to the fiscal strain caused by eliminating a significant source of government revenue. As public anger mounted in the face of continued increases in rice prices (along with the prices of other commodities), governments in Guinea, Mali, Burkina Faso, and Senegal reacted by attempting to fix consumer rice prices, and by prohibiting exports (though, in practice, their ability to implement this policy was limited).

In addition to trade policies, governments across the region (Burkina Faso, Mali, Niger and Senegal) attempted to use the rice price crisis of 2008 as an opportunity to reinvigorate domestic rice production, as higher international prices appeared to increase the competitiveness of their domestic producers. In Senegal, for example, the government initiated the Big Agricultural Offensive for Food and Abundance (GOANA), promising to dedicate over two-thirds of the program's \$792 million budget to subsidizing the purchase of fertilizers, seeds and pesticides. GOANA's target was to produce in the next season 500,000 tons of rice—2.5 times more than the current production. Similarly, the Malian government implemented a "Rice Initiative", which provided input subsidies for rice. Finally, the Emergency Rice Initiative for Africa was launched in late 2008, providing assistance to rice-growing countries in Africa in four major areas: seed; fertilizer; best-bet technologies; and post-harvest and marketing.

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<sup>15</sup> This discussion is based on reporting by analysts from Oxfam and Fewsnet, presented in *Inter-réseaux Développement Rural*, No. 42, June-August, 2008.

This initiative was launched jointly by the Africa Rice Center (WARDA), Food and Agriculture Organization of the United Nations (FAO), IFDC, Catholic Relief Services (CRS) and International Fund for Agricultural Development (IFAD).<sup>16</sup> Nevertheless, these initiatives focus primarily on increased production, rather than processing and marketing, which are important determinants of domestic rice prices. In addition, the rapid decline in international rice prices during late 2008 calls into question the sustainability of these initiatives.

#### **IV. Summary and Conclusions**

Rice consumption in West Africa has increased rapidly over the past decade, substantially outpacing the growth rate of local production. The importance of rice in local consumption and production varies widely across countries in the region. Coastal countries in particular, have been largely dependent on low cost Asian exports to meet the growing gaps between production and consumption. For those countries in which per capita rice consumption is substantial (Senegal in particular, but also Mali and Benin), the rice crisis of 2007-2008 was a severe shock, with potential consequences for both under-nutrition and poverty.

In recent decades, governments in the region tended to intervene in trade with the goal of buffering consumers from international market price fluctuations. This objective presented little challenge during the long period of stable or declining international rice prices. Between 2003 and 2007, rice consumers in Senegal, Benin, Burkina Faso, and Niger saw only a small share of the gradual increases in international prices. However, the dramatic surge in international rice prices during 2007-2008 undermined these efforts, as governments in the region had neither the financial nor the physical capacity to provide sufficient quantities of rice to consumers at pre-crisis prices.

Governments across West Africa responded to the crisis, first by reducing or eliminating rice import tariffs. Several countries also responded by prohibiting cereals exports. Though costly to the governments, these efforts were insufficient to buffer domestic consumers from the increase in international prices. Senegal went further, subsidizing rice consumption in 2008. In addition, Senegal and other countries announced plans to reinvigorate domestic rice production in the face of high prices. While these initiatives have taken different forms in different countries, the steep

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<sup>16</sup> <http://allafrica.com/stories/200806180893.html>

decline in international rice prices in late 2008 calls into question the sustainability of these efforts, however well-intentioned by the governments.

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